

BEFORE THE OIL & GAS COMMISSION

AMERICAN WATER MANAGEMENT SERVICES, LLC,	:	Commission Appeal Nos. 889 & 890
	:	Court of Common Pleas No. 15 CV 7857
	:	Court of Appeals No. 16AP-4
Appellant,	:	
	:	
-vs-	:	Review of Chief's Orders 2014-372 &
	:	2014-374 (AWMS #2 Well)
DIVISION OF OIL & GAS RESOURCES MANAGEMENT,	:	
	:	
	:	<u>ORDER AFTER REMAND</u>
Appellee.	:	

These matters initially came before the Oil & Gas Commission upon appeal by American Water Management Services ["AWMS"] from Chief's Orders 2014-372 and 2014-374. AWMS's initial appeals to the Oil & Gas Commission were filed on October 2, 2014 by counsel acting on behalf of AWMS (Attorneys John K. Keller, Michael J. Settineri and Scott M. Guttman of Vorys, Sater, Seymour & Pease LLP).

O.A.C. §1509-1-04(B) allows appearances before the Oil & Gas Commission to be either in person or through counsel:

(B) Appearances before the commission shall be in person or by an attorney admitted to practice before the supreme court of Ohio.

Where an appellant is represented by counsel, said counsel is substituted for the individual appellant for administrative and notice purposes. Consistent with O.A.C. §1509-1-04(B), counsel receives the notices and orders issued by the Commission.

As AWMS's *Notice of Appeal* was filed by counsel representing AWMS, the Commission issued notices and orders to said counsel. This is the Commission's typical practice and is consistent with O.A.C. §1509-1-04(B).

On March 11, 2015, these matters came on for hearing before the Oil & Gas Commission. Throughout these proceedings, AWMS was represented by counsel from the Vorys Law Firm.

O.R.C. §1509.36 addresses decisions rendered by the Oil & Gas Commission, and provides *inter alia*:

If upon completion of the hearing the commission finds that the order appealed from was lawful and reasonable, it shall make a written order affirming the order appealed from; if the commission finds that the order was unreasonable or unlawful, it shall make a written order vacating the order appealed from and making the order that it finds the chief should have made.

Notice of the making of the order shall be given forthwith to each party to the appeal by mailing a certified copy thereof to each such party by certified mail.

On August 12, 2015, the Commission rendered its decision in the matters of American Water Management Services vs. Division, #889 & #890. In accordance with O.R.C. §1509.36 and O.A.C. §1509-1-04(B), and consistent with the Commission's past practices, the Commission sent certified copies of its decision to counsel of Record for each party. Counsel for AWMS received the Commission's decision on August 13, 2015.

After August 13, 2015, AWMS obtained new counsel, Mr. Thomas J. Wilson of Comstock, Springer & Wilson Co., LPA. Mr. Wilson did not enter an appearance before the Commission.

In accordance with O.R.C. §1509.37, any party adversely affected by a decision of the Oil & Gas Commission may appeal to the Franklin County Court of Common Pleas. O.R.C. §1509.37 provides in pertinent part:

Any party desiring to so appeal shall file with the commission a notice of appeal designating the order appealed from and stating whether the appeal is taken on questions of law or questions of law and fact. A copy of the notice also shall be filed by appellant with the court and shall be mailed or otherwise delivered to appellee. Such notices shall be filed and mailed or otherwise delivered within thirty days after the date upon which appellant received notice from the commission by certified mail of the making of the order appealed from.

AWMS elected to appeal the Commission's August 12, 2015 decision to the Court of Common Pleas for Franklin County, Ohio. On September 8, 2015, AMWS's new counsel, Mr. Wilson, filed a *Notice of Appeal* from the Commission's August 12, 2015 decision with the Franklin County Court of Common Pleas and served a copy of this *Notice of Appeal* upon opposing counsel representing the Appellee Division.

AWMS did not file a *Notice of Appeal* with the Commission on September 8, 2015. In fact, AWMS did not file a *Notice of Appeal* with the Commission until October 20, 2015. Thus, the Commission was first notified of AWMS's appeal of the Commission's August 12, 2015 decision on October 20, 2015.

The Commission received AWMS's *Notice of Appeal* to the Common Pleas Court more than 30 days after AWMS's counsel received the certified copy of the Commission's August 12, 2015 decision.

On December 18, 2015, the Common Pleas Court **dismissed** AWMS's appeal from the Commission's August 12, 2015 decision. The Common Pleas Court held that AWMS's appeal to the court (case no. 15 CV 7857) was untimely and was not filed in compliance with O.R.C. §1509.37.

AWMS appealed the Common Pleas Court's December 18, 2015 decision to the Tenth District Court of Appeals (case no. 16AP-4). On May 5, 2016, the Tenth District Court of Appeals **reversed and remanded** the Common Pleas Court's decision, instructing the Common Pleas Court to dismiss this matter for further action by the Commission.

On May 11, 2016, the Common Pleas Court **remanded** this matter to the Commission for further action.

On May 5, 2016, the Court of Appeals held that the Commission had not properly complied with the notice requirements of O.R.C. §1509.36, in that the Commission issued its August 12, 2015 decision via certified mail sent to counsel of Record, rather than sending the certified copies to the actual parties to this action. Because the Commission's decision was sent to counsel, rather than to the actual parties, the Court held that the Commission's August 12, 2015 decision had never been properly issued. Consequently, the Court found that the 30-day period for appealing the Commission's August 12, 2015 decision to the Common Pleas Court has never begun to run.

In accordance with the directive of the Court of Appeals, the Commission must now **RE-ISSUE** its August 12, 2015 decision, this time serving certified copies of the decision directly upon the parties, rather than upon counsel of Record.

To fulfill the mandate of the Tenth District Court, the Commission hereby **RE-ISSUES** its August 12, 2015 decision, which is attached hereto and incorporated herein, via Certified Mail directed to the parties at the following addresses:

American Water Management Services, LLC
One American Way
Warren, Ohio 44484.

Richard Simmers
Chief, Division of Oil & Gas Resources Management
2045 Morse Road, Building F-3
Columbus, Ohio 43229.

June 21, 2016
DATE


ROBERT C. SMITH
Chairman, Oil & Gas Commission

INSTRUCTIONS FOR APPEAL

This decision may be appealed to the Court of Common Pleas for Franklin County, within thirty days of your receipt of this decision, in accordance with Ohio Revised Code §1509.37.

DISTRIBUTION:

American Water Management Services, LLC, Via Certified Mail #: 91 7199 9991 7030 3099 0692

Richard Simmers, Chief Division of Oil & Gas Resources Management, Via Certified Mail #: 91 7199 9991 7030 3099 0708

John K. Keller, Michael J. Settineri, Scott M. Guttman, Timothy J. Cole, Via E-Mail [jkkeller@vorys.com; mjsettineri@vorys.com; smguttman@vorys.com; tjcole@vorys.com] & Regular Mail

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BEFORE THE OIL & GAS COMMISSION

AMERICAN WATER MANAGEMENT
SERVICES, LLC,

Appellant,

-vs-

DIVISION OF OIL & GAS RESOURCES
MANAGEMENT,

Appellee.

Appeal Nos. 889 & 890

Review of Chief's Orders 2014-372 &
2014-374 (AWMS #2 Well)

FINDINGS, CONCLUSIONS AND ORDER OF THE COMMISSION

Appearances: John K. Keller, Michael J. Settineri, Scott M. Guttman, Timothy J. Cole, Counsel for Appellant American Water Management Services, LLC; Brett Kravitz, Brian Becker, Assistant Attorneys General, Counsel for Appellee Division of Oil & Gas Resources Management.

Date Issued:

August 13, 2015

BACKGROUND

These matters come before the Oil & Gas Commission upon appeal by American Water Management Services ["AWMS"] from Chief's Orders 2014-372 and 2014-374. Both orders required the suspension of injection operations at a well, known as the AWMS #2 Well. Order 2014-374 revised certain language in Order 2014-372.

Suspension was ordered as a result of seismic events, attributed to injection operations at the AWMS #2 Well. The orders under appeal will be collectively referred to as the "Suspension Order." The Suspension Order not only suspended injection operations at the AWMS #2 Injection Well, but also required AWMS to submit information to the Division of Oil & Gas Resources Management [the "Division"] for evaluative purposes.

On October 2, 2014, AWMS appealed Orders 2014-372 and 2014-374 to the Oil & Gas Commission. On November 19, 2014, AWMS filed a *Motion to Stay* the execution of the Suspension Order. Rather than rule upon the *Motion to Stay*, the Commission hereby proceeds to a ruling upon the merits of this matter.

On March 11, 2015, these **consolidated** causes came on for hearing before the Oil & Gas Commission. At hearing, the parties presented evidence and examined witnesses appearing for and against them.

ISSUE

The primary issue in this appeal is: **Whether the Division Chief acted lawfully and reasonably in suspending operations at the AWMS #2 Well, based upon the determination that seismic events, reasonably attributed to injection operations at the AWMS #2 Well, had occurred.**

In order to decide this primary issue, the Commission must consider: (1) **whether the Division Chief has authority to suspend injection operations under the facts presented, and (2) whether the mandates of Chief's Orders 2014-372 and 374 are reasonable and lawful under the facts of this matter and the laws of Ohio.**

FINDINGS OF FACT

1. American Water Management Services ["AWMS"] is a corporation, based in Warren, Ohio. AWMS is a wholly-owned subsidiary of Avalon Holdings Corporation. AWMS engages in waste management and disposal, handling waste from various industries, including the oil & gas industry.

2. On December 23, 2011, AWMS filed with the Division of Oil & Gas Resources Management [the "Division"] applications for permits to drill two injection wells. The wells were proposed to be located in Trumbull County, Ohio, near the community of Weathersfield Township. The two proposed wells would be the first injection wells constructed and operated by AWMS. These wells were designated as the AWMS #1 Well and the AWMS #2 Well. The AWMS #2 Well is the subject of the immediate matter.

3. Weathersfield Township, Ohio is an urban community located in Trumbull County, near the city of Niles. Schools, residences, businesses, a fire department, and associated infrastructure, are located within this community and in close proximity to the AWMS #2 Well.

4. Wells may be constructed for the specific purpose of providing underground disposal of fluid wastes. These disposal wells are known as "injection wells." Fluids are pumped into the well bore, generally under pressure, and are released into porous rock formations far below the Earth's surface and below all known ground water resources. In constructing an injection well, an operator identifies "target zones," containing lithologic units with the proper porosity and permeability to accept injected fluids. Most of the injection well's bore (including all "shallow" portions of the bore) is encased in multiple layers of protective steel and cement, ensuring the containment of fluids being transported for disposal. Certain deep portions of the well's bore are "open" (i.e., uncased) or perforated. The open or perforated sections of the well bore "line up" with porous geologic zones targeted to receive the injected fluids. Once introduced into the targeted zones, the injectate disperses, moving under pressure away from the well bore through pore spaces and into the permeable rock "reservoir."

5. In late December 2011, shortly after AWMS filed its application to drill the AWMS #2 Well, two seismic events were detected in the vicinity of Youngstown, Ohio. These two events, and several smaller events, were clustered within one mile of an injection well, known as the Northstar #1 Well. These seismic events were ultimately attributed to injection operations at the Northstar #1 Well. The Northstar #1 Well was owned and operated by D&L Energy Company. The Northstar #1 Well was drilled to a depth of 9,184 feet. The bottom 200 feet of the well was drilled into the basement rock formation known as the Precambrian layer.¹

¹ The Precambrian Basement is a part of the Earth's crust formed of hard igneous or metamorphic rock, which lies beneath the cover of softer sedimentary rock, sediment and soil. Basement rock is older and harder than other rock sequences. Situated deep within the Earth (and thus under great pressure), the Precambrian Basement has a high level of "potential energy." Consequently, the Precambrian Basement may be more likely to produce seismic events. (See Division's Ex. D.)

6. On December 24, 2011, a 2.7-magnitude [M_L 2.7] seismic event was recorded within one mile of the Northstar #1 Well. On December 30, 2011, the Division ordered the Northstar #1 Well to be "shut in" (*i.e.*, taken out of operation). Even though injection operations had ceased on December 30, 2011, one day later - on December 31, 2011 - a M_L 4.0 seismic event was recorded within one mile of the Northstar #1 Well. At this point, the State of Ohio placed a moratorium on injection operations in the Youngstown area.² Injection activities have not resumed at the Northstar #1 Well. The Northstar #1 Well is located approximately seven miles from the AWMS #2 Well.

7. Induced seismicity refers to ground movement (*i.e.*, seismic events, earthquakes or tremors) caused by human activity. Such human activity alters stresses below the Earth's surface. An induced seismic event generally occurs when "energy" is transferred to an existing fault or fracture system that was already in a near-failure state of stress and ready to be released. In the injection well context, fluids and/or pressure may transfer enough energy into underground rock formations to induce movements that may, or may not, have eventually occurred naturally. Many human activities induce seismicity, including mining, quarrying, lake filling, geothermal energy-related injections, oil & gas production and the disposal of fluid wastes through injection.

8. As a result of the seismic events associated with the Northstar #1 Well, the process of obtaining approval of the drilling permit for the AWMS #2 Injection Well was delayed. However, on July 18, 2013, the Division issued to AWMS a permit to drill the AWMS #2 Well. In September 2013, site construction began. And, in October 2013, drilling commenced. Drilling was completed in March 2014.

² On December 31, 2011 (based upon the seismic events recorded at the Northstar #1 Well), Ohio Governor Kasich imposed a moratorium on injection activities in the area located within a seven-mile radius of the Northstar #1 Well. On October 1, 2012, additional requirements were promulgated into Ohio law to address well injection pressures and the monitoring of injection activities. Currently, the moratorium has been lifted. However, permitting in the "moratorium area" is subject to enhanced regulatory scrutiny.

9. Although the AWMS #2 Well was initially proposed to extend into the Precambrian Basement, in accordance with a condition placed upon the drilling permit by the Division, the well was drilled to a shallower depth, leaving a buffer between the targeted injection zones and the Precambrian Basement.³ The well was drilled to a total depth of 8,502 feet below ground surface ["bgs"], and was completed at the top of the Mt. Simon Sandstone Formation. The open-hole portion of the well ranged from 7,201 feet (just above the Knox Dolomite) to 8,502 feet (into the top of the Mt. Simon Sandstone), and targeted several injection intervals including the Rose Run Sandstone, the B Zone Sandstone within the Trempealeau Dolomite and the Conasauga Group.

10. At the request of the Division, AWMS installed a monitoring system, consisting of four micro-seismic monitoring stations linked to the Ohio Seismic Network. This system allowed injections at the AWMS #2 Well to be continuously monitored.

11. On March 24, 2014, the Division issued an operating permit to AWMS for the #2 well, allowing AWMS to commence injections into the well. The permit set forth a maximum allowable surface injection pressure of 1,680 pounds per square inch ["psi"]. The permit also required the installation of an automatic shut-off device, intended to terminate pumping if the maximum allowable pressure were exceeded.

12. Commercial operations at the AWMS facility began on April 1, 2014. Initially, injection volumes at the facility were relatively low. However, the amount of fluids received for disposal increased from an average of about 80 barrels per day ["bpd"] in April to about 1,494 bpd in August. In July 2014, AWMS injected the largest volumes of fluid, at an average of about 2,182 bpd. The largest single daily injection at the facility occurred on July 2, 2014, when 5,558 barrels of fluid were injected.⁴

³ Testimony differed as to the amount of buffer left between the bottom of the AWMS #2 Well and the Precambrian Basement. Chief Simmers testified that the bottom of the well was approximately 90 feet above the Precambrian Basement (Simmers, TR. P. 273), while Mr. Kilper of AWMS estimated the bottom of the well to be about 175 feet above the Precambrian Basement (Kilper, TR, p. 60).

⁴ These daily averages refer to fluids injected at the AWMS facility, where fluids could have been injected into either the #1 or the #2 well. Mr. Kilper testified that, when both wells were operating, approximately 95% of the fluids accepted for disposal at the facility were injected into the deeper AWMS #2 Well.

13. Between April and August 2014, Mr. Stephen Kilper of AWMS testified that AWMS never exceeded the maximum allowable pressure set forth in its operating permit. In fact, Mr. Kilper testified that injections at the #2 well generally occurred at pressures below the maximum allowable limit.

14. On July 28, 2014 (about three to four months after injections at the AWMS facility commenced), a seismic event measuring M_L 1.7 occurred in the vicinity of the wells. Injection volumes were reduced after the July 28, 2014 event, resulting in an attendant reduction in injection pressure. Despite this reduction, 34 days later - on August 31, 2014 - a second seismic event occurred in the same area. The second event measured M_L 2.1. Both events were recorded at similar depths and distances from the AWMS site. Prior to September 2014, at least 20 smaller seismic events were also recorded in the vicinity of the AWMS wells.

15. The July and August 2014 seismic events were recorded by AWMS's seismic monitors. The July and August events were not detectable on the surface, and no property damage was reported.

16. On September 3, 2014, the Division issued Chief's Order 2014-372. This Order noted that: (1) on July 28, 2014, a M_L 1.7 event occurred that **may have been** related to operations at the AWMS # 2 Well, and (2) on August 31, 2014, a M_L 2.1 event occurred that was related to operations at the #2 well. On September 5, 2014, a second Chief's order, Order 2014-374, was issued. This second order revised the language of the first order as regards the August 31, 2014 seismic event. The second order stated that the August 31, 2014 event **may have been** related to operations at the AWMS #2 Well.

17. Chief's Order 2014-372 and Chief's Order 2014-374 are collectively referred to in this decision as the Suspension Order. The Suspension Order required AWMS to suspend injection operations at the AWMS #2 Well and to submit a written plan to the Division for evaluation of seismic concerns associated with the operation of the AWMS #2 Well.

18. On September 4, 2014, AWMS shut in the AWMS #2 Well.⁵ Injection operations at the AWMS #2 Well have not resumed.

19. The Suspension Order called for the submission of a "plan for evaluating the seismic concerns associated with the operation of the AWMS #2 saltwater injection well." This plan was not explicitly identified as a plan to re-initiate injection operations at the well. However, it is clear that AWMS interpreted the plan to be for that purpose, and some actions by Division personnel support AWMS's interpretation of this purpose for the plan.⁶

20. On September 19, 2014, AWMS submitted a written plan to the Division, proposing the establishment of certain operation and management controls on injections at the AWMS #2 Well. The proposed plan also provided for real-time monitoring of seismic events in the area of the well. The Division rejected AWMS's plan, finding it generic and inadequate. Specifically, the Division found that the plan lacked scientific and quantitative support to show how the plan would minimize risks.

21. On March 4, 2015, in response to a list of "Seismic Evaluation Criteria" provided to AWMS by the Division, AWMS supplemented its original plan.

22. AWMS's submitted plan basically calls for injections to resume at the AWMS #2 Well at lower volumes, which injections would be monitored for seismicity. AWMS proposes to gradually increase injection volumes over time, based upon data obtained through monitoring.

⁵ A separate order was issued suspending operations at the AWMS #1 Well, and the #1 well was also shut in on September 4, 2014. The shallower AWMS #1 Well injected into different underground formations than the #2 well. Review of data indicated that there was no "communication," or geologic connection, between the formations targeted by the #1 well and the formations targeted by the #2 well. Thus, the Division determined that injections into the AWMS #1 Well were not likely adding to seismicity in the area. On September 18, 2014, the suspension of injections at the AWMS #1 Well was lifted, and the AWMS #1 Well remains in operation.

⁶ Mr. Stephen Kilper, of AWMS, testified that he met with Division personnel on September 8, 2014 to discuss the Division's expectations for the plan required under the Suspension Order. Mr. Kilper testified that he was told that the plan should be developed as a proposal for re-starting injection operations at the AWMS #2 Well.

23. In September 2013, Division Chief Simmers became involved with the National Induced Seismicity Working Group. This workgroup is tasked with evaluating emerging induced seismicity issues. The workgroup's goal is to produce a guidance document that will aid state regulatory authorities in developing state-specific programs to address injection-induced seismicity. Chief Simmers co-chairs this national workgroup. Chief Simmers predicts that the national workgroup could release its final guidance document as early as September 2015. This guidance document will provide a model for state programs.

24. It is uncertain when the national workgroup will actually complete its recommendations. It is also uncertain when a state program, based upon the recommendations of the guidance document, would be implemented in Ohio. Chief Simmers does not intend to allow the resumption of injection operations at the AWMS #2 Well until a state policy on injection-induced seismicity is in place.

25. On October 2, 2014, AWMS appealed the Suspension Order to the Oil & Gas Commission, seeking to have the Suspension Order vacated, and advocating for the phased-in resumption of injection operations at the AWMS #2 Well. On November 19, 2014, AWMS filed a *Motion to Stay* the execution of the Suspension Order.

26. Evidence adduced at hearing did not establish that AWMS ever operated the AWMS #2 Well in violation of the terms and conditions of its injection permit.

27. Evidence adduced at hearing did not establish that AWMS was ever in "material and substantial violation," as that term is defined at O.R.C. §1509.01(EE).

28. At hearing, AWMS presented the testimonies of two experts, Mr. J. Daniel Arthur and Mr. Michael Hasting. Both experts testified that the seismic events reported in July and August 2014 were likely associated with injection operations at the AWMS #2 Well. Division Chief Richard Simmers also testified to his determination that the seismic events were connected to injections at the AWMS #2 Well.

29. Professional Engineer J. Daniel Arthur testified at hearing on behalf of AWMS as a qualified expert in petroleum engineering, injection well operations and induced seismicity. Mr. Arthur supported AWMS's proposal to resume operations at the AWMS #2 Well under a program where injection volumes would be initially reduced, well-monitored, and then increased based upon data gained through monitoring. Mr. Arthur had familiarity with seismic events that occurred between 2010 and 2012 in Washington County, Ohio, near the city of Marietta. These events may have been associated with injections into the Long Run Well, and operational adjustments were thus made at the Long Run Well.⁷ Based upon his experience with the Long Run Well, Mr. Arthur opined that operations at the AWMS #2 Well could be safely re-initiated at reduced volumes, subject to monitoring and with the potential to increase volumes over time.

30. Michael Hasting testified at hearing on behalf of AWMS as a qualified expert in geophysics, induced seismicity and seismology. Mr. Hasting testified regarding the magnitudes of various seismic events, stating that people generally cannot feel a seismic event until it reaches a level of M_L 2.5 to M_L 2.7, and that property damage does not typically occur until an event reaches a level of M_L 3.5 to M_L 3.8.⁸ Mr. Hasting supported the application of a "traffic light system" for the evaluation of induced seismicity.⁹ Under a "traffic light system" magnitudes of seismic events are classified as occurring within either green, yellow or red zones (based upon the amount of energy released, and the potential for human detection and/or property damage). Under this system, operators and regulators would use the traffic light model as an aid in informing them of when injection activities might require adjustments in order to keep seismic events at undetectable and safe levels. Mr. Hasting opined that injections at the AWMS #2 Well could safely resume, with monitoring and the application of the "traffic light system."

⁷ The Commission received evidence at hearing that distinguished conditions at the Long Run Well from conditions at the AWMS #2 Well.

⁸ Seismicity is a unitless, logarithmic scale; meaning, for example, that a M_L 4.0 event does not produce two times the amount of energy produced by a M_L 2.0 event. Mr. Hasting explained that in order to go from a M_L 0.0 event to a M_L 1.0 event, 33 times the amount of energy would need to be released. Notably, the seismic events at the Nothstar #1 Well moved from M_L 2.7 to M_L 4.0 in approximately a one-week period (even in light of the fact that injections had ceased prior to the second event), indicating that the second event released more than 33 times the amount of energy than the event that occurred one week earlier.

⁹ Mr. Arthur also supported the use of the "traffic light system." The "traffic light system" has been a concept discussed between Division personnel and oil & gas injection well operators. However, this system has not been "adopted" by the Division as a regulatory standard or regulatory tool.

31. When asked at hearing, neither Mr. Arthur nor Mr. Hasting could state that the Chief's issuance of the Suspension Order was unreasonable given the specific facts of this matter.

32. At hearing, Division Chief Richard Simmers testified on behalf of the Division as an expert qualified in the field of geology. Mr. Simmers testified that, based upon his geologic knowledge and regulatory experience, and in recognition of his responsibility under the law to protect public health and safety, he believes that injections at the AWMS #2 Well should be temporarily ceased until further investigation and evaluation is completed and until the State of Ohio has put in place a regulatory program addressing injection-induced seismicity.

DISCUSSION

In Ohio, oil & gas operations are conducted under the authority of Chapter 1509 of the Ohio Revised Code. The Division of Oil & Gas Resources Management possesses permitting, regulatory and enforcement authority over all aspects of oil & gas operations.

The oil & gas industry has had a presence in the State of Ohio dating back to 1860. Since that time, more than 250,000 oil & gas production wells have been drilled in Ohio. Recent development of the Marcellus and Utica Shale Plays in the Appalachian Basin, has increased oil & gas exploration and production in Ohio.

Industry produces waste; and the oil & gas industry is no exception. The drilling of oil & gas wells, and their operation, both require and produce certain fluids. In some circumstances, fluids generated by oil & gas production can be recycled and reused in other oil & gas operations. However, if not recycled, these fluids must be properly disposed of. One method of disposing of oilfield-related fluids is by injecting these fluids into porous rock, located far below the Earth's surface.

The use of injection wells as a method of disposal is not a new concept. There are different classes of injection wells, each subject to distinct regulatory requirements. Class II disposal wells handle oilfield wastes, and are regulated by the Division Chief under Ohio Revised Code Chapter 1509. The recent expansion of oil & gas activities within the State of Ohio has increased the need for oilfield waste disposal options. Currently, in Ohio, about 200 injection wells accept fluids associated with oil & gas exploration and production.

In 2011, AWMS entered into the oilfield waste disposal business by applying to install two injection wells. Commercial injections at the wells commenced in April 2014. Seismic events, reasonably attributed to the AWMS #2 Well, occurred in July and August 2014. By early September 2014, injection operations at the AWMS #2 Well had been suspended by order of the Division Chief.

Individual disposal wells differ. For example, some injection wells are particularly "thirsty," and will readily accept injected fluids, while others will not. The effectiveness of a particular injection well is influenced by items such as: well construction, geology, and the characteristics of the injected fluids.

Notably, injection wells in Ohio are now being drilled to greater depths than seemed possible even a few years ago. Wells which target very deep injection zones are identified as "deep injection wells."¹⁰ The AWMS #2 Well was drilled more than 1.5 miles into the Earth's surface. This well qualifies as a "deep injection well." Advances in well construction have also allowed for larger-diameter well bores. These larger and deeper injection wells provide more oilfield waste disposal opportunities, but may also present new issues. For example, a deeper well, with a larger circumference bore hole, creates greater "column pressure" during the injection process than would be created by a smaller, shallower well. Increased column pressure may require adjustments in how fluids are injected. Logically, the development of these deeper, larger wells may also require some adjustments in how such wells are controlled and regulated by the State.

¹⁰ The drilling of "deep" injection wells is a relatively new trend in Ohio. The Division estimates that only about 15% of permitted injection wells in Ohio reach into the Mt. Simon Sandstone, the lowest sedimentary formation in Ohio, situated directly above the Precambrian Basement. "Deep" injection wells have only been studied by the state's geosurvey division since 1999.

Where technologies and industries quickly advance, it is not unusual for regulation to lag behind. Currently, Ohio meets or exceeds all U.S. EPA standards and regulations for Class II injection wells.¹¹ However, there is no denying that, regarding certain aspects of oil & gas injection, the industry has out-paced its regulatory authority. For example, the Division has the unqualified authority to regulate injection operations under O.R.C. §1509.22, yet regulatory provisions addressing injection-induced seismicity are currently lacking. This has created a situation, in which there is great enthusiasm for the development of a natural resource, and the enjoyment of the attendant economic benefits, yet regulations for certain aspects of this industry have not kept pace.

The development of regulations and enforcement criterion is a complicated process that does not happen overnight. Thus, the Division – despite its best efforts – is left with few tools to regulate certain aspects of an ever-expanding industry. However, the Division is committed to reforming its Class II injection well program. Indeed, since 2012, the Division has taken steps to enhance monitoring programs associated with injection operations. Through his efforts with the National Induced Seismicity Working Group, Chief Simmers hopes to develop technical review and risk criterion relative to injection-induced seismicity, allowing Ohio to create a meaningful regulatory toolbox for responding to seismic issues at injection sites. Moreover, the Division intends to propose changes to Ohio Revised Code Chapter 1509, and its amplifying regulations, in order to ensure protection of the health and safety of the citizens of Ohio.

Although the Division is aggressively seeking improvements in its regulatory program, specific regulations addressing seismic impacts from injection do not yet exist. Add to this scenario the fact that this industry operates underground, and outside of our direct observation. While science may aid us in understanding the geophysics and lithostratigraphies associated with injection operations, to a certain extent both the industry and the Division are "working with their eyes closed."

¹¹ The U.S. EPA UIC ["Underground Injection Control"] Program has as its focus the protection of underground sources of drinking water. States may apply to the U.S. EPA to obtain primary enforcement responsibility, or "primacy," over the permitting and regulation of injection wells operating within their borders. In order for a state to receive primacy, the state must demonstrate that its program meets or exceeds the minimum federal requirements developed under the Safe Drinking Water Act. The Division sought, and obtained, primacy in 1983, and is, thereby, responsible for the regulation of Class II injection wells in Ohio.

We cannot directly visualize the "terrain" that exists thousands of feet below the Earth's surface. And, it is possible that geologic connections exist at these great depths that we cannot readily anticipate. There simply are many unknowns regarding the complexities of deep geology in eastern Ohio.¹²

The AWMS #2 Well is located seven miles northwest of the Northstar #1 Well. Seismic events of magnitudes M_L 2.7 and M_L 4.0 were attributed to injections at the Northstar #1 Well, suggesting the existence of an "energized" fault in the area. While seven miles distance may not seem "close" to us on the surface, in geological terms that distance is not so great. Testimony at hearing revealed that it is entirely possible that the AWMS #2 Well has "tapped into" the same geologic fault system that plagued the Northstar #1 Well. Again, we are dealing in many unknowns. Yet, the fact that data is lacking or uncertain, does not relieve the Division Chief of his responsibility to protect public health and safety.

The Division's knowledge and experience in the area of injection-induced seismicity is evolving. Investigations at the Northstar #1 Well, as well as investigations into other recent events of suspected induced seismicity, have enhanced the Division's understanding of the potential seismic impacts of injection.

The drilling permit for the AWMS #2 Well was issued before the Division had completed its investigation of the Northstar #1 events. Notably, Chief Simmers testified at hearing:

So, at a minimum, if we would have issued the permit knowing then what we know now, it's very likely we would have applied additional conditions to the permit, or it's conceivable that we may have denied the permit.

(Simmers, TR, pp. 253-254.)

¹² For example, while most geologic units are "named," "deep" injection wells drilled in Ohio have encountered unnamed formations, drilling into geologic formations that have not been previously studied or "mapped." (*See Division Ex. D.*)

Whether the Division Chief has authority to suspend injection well permits.

O.R.C. §1509.06 specifically authorizes the Division Chief to grant drilling permits relating to oil & gas activities. O.R.C. §1509.06(E) requires that wells be operated in accordance with approved plans. O.R.C. §1509.06(F) authorizes the Chief to deny a requested drilling permit where the Chief finds a substantial risk that the operation will result in violations of the law or will present an imminent danger to public health, safety or damage to the environment. O.R.C. §1509.04(C), authorizes the Chief to suspend permits under certain circumstances, and subsection (C)(2) of this statute specifically addresses conditions or activities that the "chief determines presents an imminent danger to the health or safety of the public or that result[] in or [are] likely to result in immediate substantial damage to the natural resources of this state."

O.R.C. §1509.22(A)(2) forbids any person from placing, or causing to be placed, any oilfield wastes in surface or ground water, or in or upon the land in a manner that could cause damage to public health or safety or damage to the environment. Other sections of O.R.C. §1509.22, and the rules amplifying O.R.C. §1509.22 (O.A.C. §1501:9-03-1 through §1501:9-3-13), provide additional requirements regarding the appropriate handling of oilfield waste.

While these laws confirm the exclusive regulatory authority of the Division Chief, and reinforce his important duty to protect public health and safety, none of these sections of law specifically address the emerging issue of injection-induced seismicity.

AWMS argues that nowhere in these statutory or regulatory provisions, does the legislature clearly state that the Division Chief may suspend operations at a well, where activities associated with the well do not constitute a "material or substantial violation." This is true.

It is also true that AWMS has operated its #2 well in compliance with its injection permit.

However, the fact that AWMS has properly followed the terms and conditions of its injection permit, does not alter the reality that seismic events, of concern to the Division and to the citizens of Ohio, have occurred in response to injections at the AWMS #2 Well. Nor does it alter the fact that the AWMS #2 Well's injection permit, as currently issued, lacks conditions specific to induced seismicity.

Given the Division's well-established statutory responsibility to protect health, safety and the environment, there must be a means of reconciling this important responsibility with the Division's obligation to permit, monitor and fairly regulate the oil & gas injection industry.

The ability to engage in oil & gas production and disposal operations is a privilege, granted only when an operator obtains the appropriate permits to engage in such activities. In obtaining a permit to engage in oil & gas disposal activities, an operator submits to the regulatory authority of the Division and its Chief.

The Chief's authority to grant or deny permits infers the ability to also suspend or revoke permits that are found to be improvidently issued, or where continued operation under an issued permit could cause adverse impacts to health, safety or the environment.

Pursuant to O.R.C. §1509.04(C), the authority of the Chief to suspend a permit would appear to be limited to circumstances where a "material and substantial violation" is found. "Material and substantial violation" is very narrowly defined at O.R.C. §1509.01(EE), and the actions of AWMS do not fit under this statutory definition. Yet, the Chief's exclusive jurisdiction over injection operations, suggests that that the Chief also possesses regulatory oversight relative to on-going operations. Moreover, the repeated acknowledgement in the statutes and rules that the Chief is tasked with protecting public health and safety, again suggests that the Chief possesses regulatory authorities that can be exercised after the initial issuance of a permit in circumstances where the Chief believes public health or safety may be in jeopardy.

The Commission addressed "inferred" authorities of the Chief in the matter of D&L Energy, Inc. vs. Division, case #847 (June 21, 2013). In that case, the Commission affirmed a Chief's Order that: (1) revoked six injection permits, (2) denied three applications for new injection permits, (3) ceased temporary storage operations at a disposal facility, and (4) ordered that stored wastes be disposed of within a specified period. Basically, the operator in the D&L Energy case was permanently removed from the oilfield waste disposal business.

In the D&L Energy case, the Commission found that - based upon the facts presented - the Division Chief possessed inferred and inherent regulatory powers to take the extreme action of permanently removing this operator from the oilfield disposal business. This was found even though that operator was not shown to be in "material and substantial violation" under O.R.C. §1509.01(EE).

The Court of Common Pleas for Franklin County affirmed the Commission's decision. See D&L Energy, Inc. v. Division, case # CVF07-7831 (November 20, 2014). In affirming the Commission, the Court held:

The Court is equally mindful that "if a statute provides the authority for an administrative agency to perform a specified act, but does not provide the details by which the action should be performed, the agency is to perform the act in a reasonable manner based upon a reasonable construction of the statutory scheme." [Citations omitted.] Clearly, in order to effectuate and enforce the numerous compliance provisions included in Chapter 1509, the statutory scheme bestows a number of inherent powers that extend to the Chief. Moreover, it is incongruent with the entire legislative purpose and language contained in R.C. Chapter 1509 to suggest that the Chief is unable to revoke a permit once it has been duly issued, or that enforcement is strictly limited to mere compliance notices. [D&L Energy's] interpretation leads to an absurd result whereby the Chief is impotent to effectuate ongoing enforcement of a permit's well-delineated terms and conditions. This is contrary to the express sections identified above, wherein exclusive regulatory authority is instilled with the Division and the Chief. * * * [I]t is inconceivable that the Chief is left devoid of power to revoke permits when sufficient cause is demonstrated. This interpretation thwarts the explicit right of the Chief to maintain oversight after a permit is issued by providing reasonable enforcement mechanisms.

(Common Pleas Court Decision, pp 12 – 13.)

The *D&L Energy* case involved the revocation of several permits, based upon an operator's willful and egregious acts. The facts in the *D&L Energy* case revealed that this operator had, on several occasions, discharged oilfield waste directly into a storm sewer that ultimately transported this waste to the Mahoning River.

It is notable that, even though the acts of D&L Energy were both willful and egregious, those acts still did not fit under the narrow definition of "material and substantial violation" found at O.R.C. §1509.01(EE).

The actions of AWMS with regards to the AWMS #2 Well also do not qualify as "material and substantial violations." Moreover, AWMS has not engaged in any egregious acts, nor has AWMS violated the terms and conditions of its permit.

However, in the immediate matter, the Division Chief is not revoking the AWMS #2 Well permit. Rather, the Chief is imposing a temporary suspension of injection operations – a pause in operations. The Chief believes that this pause in operations is necessary in order for him to more fully evaluate the facts and in anticipation of the Division's implementation of a comprehensive regulatory scheme that will specifically address injection-induced seismicity. The Commission finds that the Chief's decision to temporarily suspend injection operations at the AWMS #2 Well is a reasonable enforcement action under the facts.

So, while the immediate matter is distinguishable from the *D&L Energy* case, the principles to be applied are the same. The law must be viewed as providing the Chief with some inherent regulatory authorities to support his statutorily-imposed responsibilities to provide reasonable regulatory oversight of operating wells and to protect public health, safety and the environment.

Whether the mandates of the Suspension Order are appropriate under the facts of this case.

As Commission member Dr. Jeffrey Daniels, a geophysicist, noted at hearing "the subsurface is a noisy place," meaning that movement within the Earth's surface is constantly occurring. Most of that movement occurs naturally. But, some movement is "induced" by the activities of humans.

Most underground movements are not felt on the surface. Mr. Hasting testified that there are seismic events of M_L 2.0 occurring every day in Ohio that go undetected. Yet, more than 200 felt earthquakes have been noted in Ohio since 1776, most of which occurred naturally.

To be felt on the surface, a seismic event typically must register at least at a level of M_L 2.5. People are good "seismometers." The M_L 4.0 seismic event at the Northstar #1 Well on December 31, 2011 resulted in 4,000 "felt reports."¹³

The seismic events reported in July and August 2014, and attributed to the AWMS #2 Well, only registered at levels of M_L 1.7 and M_L 2.1. The evidence at hearing did not reveal any citizen complaints or property damage associated with these events. Nonetheless, the Division was concerned with the escalating trend relative to these events, and believed that continued injections into the AWMS #2 Well could result in additional, and more intense, seismic events. For this reason, the Division reasonably called for a temporary pause in injection operations at the AWMS #2 Well, until these events could be studied and evaluated.

The July and August 2014 seismic events were connected, both temporally and spatially, with injections at the AWMS #2 Well. Moreover, these seismic events occurred in an area that had not previously experienced notable seismicity. The parties appear to agree that the July and August 2014 events were reasonably attributable to injection operations at the AWMS #2 Well. So, the "connection" between the seismic events and the AWMS #2 Well is not in dispute.

¹³ People who feel an earthquake may submit a "felt report" to the USGS on the "Did You Feel It" website.

AWMS has made a substantial monetary investment in the #2 well, and AWMS is anxious to resume its injection operations. The Division, as the regulatory authority, is reluctant to allow the resumption of operations without additional evaluation, and without the implementation of a comprehensive plan to ensure meaningful and effective regulation of injection-induced seismicity.

The Division of Oil & Gas Resources Management is the state regulatory authority for injection wells. As such, the Division employees are the "experts" in how such operations should be controlled and regulated. The Division has candidly admitted that it requires additional time and information in order to develop an effective program of regulations, not only for the AWMS #2 Well, but for all injection wells operating in Ohio. This may be "bad news" for AWMS, which has invested in the #2 well and has attempted to operate in full compliance with the conditions of its injection permit. However, it is "good news" for the citizens of Ohio, who rely upon the Division to act as the informed and effective regulator of this industry.

It is important to note that not all injection wells produce seismic events. Approximately 200 injection wells operate in Ohio, and most of these wells do not report seismic issues. Nationally, about 144,000 injection wells are in operation, and only a small percentage of these wells are associated with seismic events.

It is clear that the Division has regulatory authority over injection operations. It is also clear that the Division is taking a proactive approach to developing a meaningful regulatory program relative to injection-induced seismicity. The Commission believes that the Division Chief possesses the authority to suspend operations, which the Division reasonably believes may result in adverse impacts to the health and safety of citizens, or may endanger air, water or environmental resources. The Commission must defer to the expertise of the Division. If the Division has identified a problem, or a lack of adequate information to evaluate seismic concerns associated with the AWMS #2 Well, the Commission must respect that agency's position. The Commission finds that the suspension of injection operations at the AWMS #2 Well is appropriate under the facts of this specific case.

CONCLUSIONS OF LAW

1. O.R.C. §1509.36 provides that any person adversely affected by a Chief's order may appeal to the Oil & Gas Commission. O.R.C. §1509.36 addresses the standard of review applied in Commission appeals, and provides *inter alia*:

If upon completion of the hearing the commission finds that the order appealed from was lawful and reasonable, it shall make a written order affirming the order appealed from; if the commission finds that the order was unreasonable or unlawful, it shall make a written order vacating the order appealed from and making the order that it finds the chief should have made.

Hearings before the Commission are *de novo* in nature; meaning that the Commission takes a "fresh look" at the evidence presented at hearing. The Commission is not restricted to a record developed before the Division Chief. Rather, the Commission may consider any evidence that either supports or refutes the Chief's decision under appeal.¹⁴ In this appeal, Appellant AWMS shoulders the burden of proving, by a preponderance of the evidence, that the Suspension Order was unlawful or unreasonable.

2. O.R.C. §1509.03(A) provides that no person shall act in violation of rules adopted by the Division Chief. O.R.C. §1509.04(A) allows the Chief to enforce the provisions of the law, and the terms and conditions of permits, through the issuance of orders.

¹⁴ The Commission is an administrative review board, and operates on the agency level. The Commission's review is not restricted to a record developed before the Chief, and the Commission may freely evaluate factual issues. In fact, O.R.C. §1509.36 allows the Commission to substitute its judgment for that of the Chief (*i.e.* to modify a Chief's order under review) where appropriate. Thus, the scope of the Commission's review is not limited in same manner as an appellate court's would be. Decisions of the Oil & Gas Commission are directly appealable into the Ohio courts (*see* O.R.C. §1509.37). Judicial review of a Commission decision is limited to the record developed before the Commission.

3. O.R.C. §1509.06(F) allows the Division Chief to deny a drilling permit if the Chief finds that there is a substantial risk that the operation will present an imminent danger to public health or safety or damage to the environment.

4. O.R.C. §1509.22 requires injection operations associated with the disposal of oilfield waste to obtain a permit for an injection well.

5. Unless specifically exempted by O.R.C. §1509.226; O.R.C. §1509.22(A)(2) forbids any person from placing, or causing to be placed, any brine, crude oil, natural gas, or other fluids associated with oil & gas activities in surface or ground water or upon land surfaces in quantities, or by such manner, that causes, or could reasonably be anticipated to cause, injury to public health or safety or damage to the environment.

6. O.R.C. §1509.04(C)(2) provides:

(C) The chief, by order, immediately may suspend drilling, operating, or plugging activities that are related to a material and substantial violation and suspend and revoke an unused permit after finding either of the following:

(1) An owner has failed to comply with an order issued under division (B)(2)(c) of this section that is final and nonappealable.

(2) An owner is causing, engaging in, or maintaining a condition or activity that the chief determines presents an imminent danger to the health or safety or the public or that results in or is likely to result in immediate substantial damage to the natural resources of this state.

7. "Material and substantial violation" is narrowly defined under O.R.C. §1509.01(EE) to include:

(1) Failure to obtain a permit to drill, reopen, convert, plugback, or plug a well under this chapter;

- (2) Failure to obtain, maintain, update, or submit proof of insurance coverage that is required under this chapter;
- (3) Failure to obtain, maintain, update, or submit proof of a surety bond that is required under this chapter;
- (4) Failure to plug an abandoned well or idle and orphaned well unless the well has been granted temporary inactive status under section 1509.062 of the Revised Code or the chief of the division of oil and gas resources management has approved another option concerning the abandoned well or idle and orphaned well;
- (5) Failure to restore a disturbed land surface as required by section 1509.072 of the Revised Code;
- (6) Failure to reimburse the oil and gas well fund pursuant to a final order issued under section 1509.071 of the Revised Code;
- (7) Failure to comply with a final nonappealable order of the chief issued under section 1509.04 of the Revised Code;
- (8) Failure to submit a report, test result, fee, or document that is required in this chapter or rules adopted under it.

8. The Division Chief does not act in an unlawful or unreasonable manner in suspending the injection operations of an operator not in "material and substantial violation" where the Chief determines that continued injection operations could result in imminent danger to public health or safety or damage to the environment.

9. The Chief's issuance of the Suspension Order (Orders 2014-372 and 2014-374) was not unlawful and/or unreasonable.

ORDER

Based upon the foregoing Findings of Fact and Conclusions of Law, the Commission hereby **AFFIRMS** the Division's issuance of Chief's Order 2014-372 and Chief's Order 2014-374, consistent with the Findings and Conclusions set forth in the immediate Order.

Date Issued: 8/12/2015


J. BRANDON DAVIS, *Chair* *WJ*


ROBERT S. FROST, *Vice Chair*


DR. JEFFREY J. DANIELS, *Secretary* *WJ*


ROBERT C. SMITH

INSTRUCTIONS FOR APPEAL

This decision may be appealed to the Court of Common Pleas for Franklin County, within thirty days of your receipt of this decision, in accordance with Ohio Revised Code §1509.37.

DISTRIBUTION:

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BEFORE THE OIL & GAS COMMISSION

AMERICAN WATER MANAGEMENT
SERVICES, LLC,

Appellant,

-vs-

DIVISION OF OIL & GAS RESOURCES
MANAGEMENT,

Appellee.

Appeal Nos. 889 & 890

Review of Chief's Orders 2014-372 &
2014-374 (AWMS #2 Well)

INDEX OF EVIDENCE PRESENTED AT HEARING

Before: J. Brandon Davis

In Attendance: Jeffrey J. Daniels, Robert S. Frost

Appearances: John K. Keller, Michael J. Settineri, Scott M. Guttman, Timothy J. Cole,
Counsel for Appellant American Water Management Services, LLC;
Brett Kravitz, Brian Becker, Assistant Attorneys General, Counsel for
Appellee Division of Oil & Gas Resources Management.

WITNESS INDEX

Appellant's Witnesses:

Stephen Kilper
James Daniel Arthur
Michael Andrew Hasting

Direct Examination; Cross Examination
Direct Examination; Cross Examination
Direct Examination; Cross Examination

Appellee's Witnesses:

Richard J. Simmers

Direct Examination; Cross Examination

EXHIBIT INDEX

Appellant's Exhibits:

Appellant's Exhibit 1	Drilling Permit for API Well #34-155-2-4075-00-00 (AWMS Well #2), with supporting documents; issued July 18, 2013 (67 pages)
Appellant's Exhibit 2	Chief's Order 2014-69, Permit to Inject Brine or Other Waste Substances Pursuant to Ohio Revised Code 1509.22(D); issued March 24, 2014 (3 pages)
Appellant's Exhibit 3	Cost of American Water Management Services, LLC; Weathersfield Township Facility; undated (1 page)
Appellant's Exhibit 4	WITHDRAWN
Appellant's Exhibit 5	WITHDRAWN
Appellant's Exhibit 6	Chief's Order 2014-372, issued September 3, 2014 and Chief's Order 2014-374, issued September 5, 2014 (total 5 pages)
Appellant's Exhibit 7	Plan in Response to September 3, 2014 Chief's Orders No. 2014-372, Salt Water Injection Well AWMS #2, API No. 3415524075; signed by Stephen G. Kilper; dated September 17, 2014 (9 pages)
Appellant's Exhibit 8	Seismic Evaluation Criteria – from ODNR 2/24/15 (1 page)
Appellant's Exhibit 9	Supplemental Information – Salt Water Injection Well AWMS #2, from Stephen G. Kilper to Mr. Robert Worstall, Deputy Chief; dated March 4, 2015 (5 pages)
Appellant's Exhibit 10	Expert Evaluation of the American Water Management Services, LLC, AWMS #2 Saltwater Disposal Well, API No. 34155240750000, Weatherford Township, Trumbull County, Ohio; prepared by ALL Consulting, LLC; signed by James Daniel Arthur, Registered Professional Engineer; dated March 2015 (24 pages).

- Appellant's Exhibit 11 Induced Seismicity Report; prepared by Michael Andrew Hasting, HMSCInc; dated March 3, 2015 (32 pages)
- Appellant's Exhibit 12 Three E-Mail Communications, one between McCorkle (ODNR) and Runyan (Youngstown Vindicator); and two between Friberg (Instrumental Software Technologies, Inc., consultant to the Division) and Adgate (Division) (3 pages)
- Appellant's Exhibit 13 Drawing by Arthur; Long Run Well, frequency/magnitude of events (1 flip chart page)
- Appellant's Exhibit 14 Drawing by Arthur; pressure differences and declines (1 flip chart page)
- Appellant's Exhibit 15 Drawing by Arthur; accuracy of scatter points (1 flip chart page)
- Appellant's Exhibit 16 Draft Letter from Simmers to AWMS; dated January 29, 2015; unsigned (3 pages)

Appellee Division's Exhibits:

- Appellee's Exhibit A Power Point; A Proactive Approach to Induced Seismicity: Can the Oil and Gas Industry Manage Induced Seismicity and Work in Cooperation with the Regulatory Agencies; authored by Tomastik and Arthur; presented at GWPC 2015 UIC Conference, February 9-11, 2015 (42 pages)
- Appellee's Exhibit B Aerial Photograph; Washington County, Newport Township; with Long Run Injection Well distances, and seismic event dates (1 oversized sheet)
- Appellee's Exhibit C Aerial Photograph; Washington County, Newport Township; with Long Run Injection Well distances, and seismic events; plotting additional events (1 oversized sheet)
- Appellee's Exhibit D Preliminary Report on the Northstar 1 Class II Injection Well and the Seismic Events in the Youngstown, Ohio; Area, Ohio Department of Natural Resources; March 2012 (25 pages)

- Appellee's Exhibit E Aerial Photograph; Washington County, Newport Township; showing location of Long Run Injection Well (1 oversized sheet)
- Appellee's Exhibit F Summary of Data from the Long Run Injection Well, with annual total injection volumes from 2011 to 2014 and graph showing monthly data from 2009 - 2014 (1 page)
- Appellee's Exhibit G Ohio Net Report for seismic activity in vicinity of AWMS Wells; July 29, 2014 seismic event (12 pages)
- Appellee's Exhibit H Ohio Net Report for seismic activity in vicinity of AWMS Wells; August 31, 2014 seismic event (19 pages)
- Appellee's Exhibit I Aerial Photograph, vicinity of AWMS Well #1 and AWMS Well #2, showing locations of seismic events (1 oversized sheet)
- Appellee's Exhibit J Report on Induced Seismicity and the American Water Management Services, LLC Injection Site in Weathersfield Township, Trumbull County, Ohio; prepared by Richard J. Simmers; March 2015 (12 pages)
- Appellee's Exhibit K Graphic Representation of Cross Section, showing casing and relative depths of AWMS Wells #1 and #2, and showing geologic units (1 page)