ADOPTED REGULATION OF THE

COMMISSION ON MINERAL RESOURCES

LCB File No. R011-14

Effective October 24, 2014

EXPLANATION – Matter in ***italics*** is new; matter in brackets **[**~~omitted material~~**]** is material to be omitted.

AUTHORITY: §§1-19 and 22, NRS 522.040 and 522.119; §20, NRS 522.040 and 522.150; §21, NRS 534A.090.

A REGULATION relating to natural resources; providing for the regulation of hydraulic fracturing in this State; revising provisions governing the operation of wells for the extraction of oil, gas and geothermal resources; and providing other matters properly relating thereto.

Legislative Counsel's Digest:

Existing law authorizes the Division of Minerals of the Commission on Mineral Resources to regulate wells drilled for the production of oil, gas and geothermal resources. (Chapters 522 and 534A of NRS) In 2013, Senate Bill No. 390 required the Division of Minerals and the Division of Environmental Protection of the State Department of Conservation and Natural Resources, jointly, to develop a hydraulic fracturing program for the State of Nevada. This regulation adopted by the Commission on Mineral Resources generally establishes that program.

Sections 9-13 of this regulation provide for the regulation of a well for which an operator intends to engage in hydraulic fracturing. **Section 9** provides for the sampling, testing and continued monitoring of certain water sources located within a specified sampling area. **Section 10** requires an operator to include with his or her application to drill certain information. **Section 11** establishes certain additional requirements for the installation and cementing of certain casing strings in a well used for hydraulic fracturing. **Section 12** establishes certain notice, reporting, monitoring and certification requirements for the operator of a hydraulic fracturing operation and additionally establishes certain requirements for the use of chemicals during the hydraulic fracturing process and the containment and disposal of liquids that are returned to the surface and discharged from the wellbore during hydraulic fracturing. **Section 13** authorizes an operator of certain existing oil or gas wells to request and the Division of Minerals to approve a hydraulic fracturing operation at the oil or gas well.

Sections 14-20 of this regulation revise provisions of general applicability to all oil and gas wells. **Section 14:** (1) requires an operator to maintain a copy of the drilling permit at the site of the well during the operation of the well; (2) prescribes certain notice requirements relating to spudding a well and installing or cementing casing or equipment for the prevention of a blowout;

(3) requires an operator to ensure compliance with certain industry standards relating to casing; and (4) provides for the management, containment and disposal of spills or releases and liquids that are returned to the surface and discharged from the wellbore during the drilling operation. **Section 15** prescribes certain safety measures for the safe operation of the well. **Section 18** revises provisions governing certain applications submitted to and permits issued by the Division. **Section 19** revises provisions relating to the installation and cementing of the surface casing string, an intermediate casing string or liner and a production casing string or liner in an oil or gas well. **Section 19** additionally requires an operator to report certain information to the Division of Minerals to ensure the safe operation of the well. **Section 20** increases the amount of the administrative fee that a producer or purchaser of oil or natural gas must pay to offset the expenses of the Division.

Section 21 of this regulation revises provisions prescribing certain safety measures for the safe operation of geothermal wells.

Section 22 of this regulation repeals certain regulations relating to wells drilled with cable tools and administrative fees for the new production of oil or natural gas.

Section 1. Chapter 522 of NAC is hereby amended by adding thereto the provisions set forth as sections 2 to 15, inclusive, of this regulation.

Sec. 2. ***"Area of review" means:***

1. The area of land located within a radius of 1 mile of a proposed oil or gas well and any surface projection of any lateral component of the wellbore that is proposed for hydraulic fracturing; and

2. Any additional area of land prescribed by the Division or specified by an operator pursuant to subsection 3 of section 10 of this regulation.

Sec. 3. ***"Available water source" means a water source for which the person who owns, holds or has the right of use to the water source has consented to the sampling and testing of the water source and to making the results of the sampling and testing available to the public.***

Sec. 4. ***"Division of Environmental Protection" means the Division of Environmental Protection of the State Department of Conservation and Natural Resources.***

Sec. 5. *"Hydraulic fracturing" has the meaning ascribed to it in paragraph (b) of subsection 3 of NRS 522.119.*

Sec. 6. *"Sampling area" means the area of land located within a radius of 1 mile of a proposed oil or gas well and any surface projection of any lateral component of the wellbore that is proposed for hydraulic fracturing.*

Sec. 7. *"Water source" means a water well or spring that is regulated by the Division of Water Resources of the State Department of Conservation and Natural Resources.*

Sec. 8. *Except as otherwise provided in section 13 of this regulation, the provisions of sections 2 to 13, inclusive, of this regulation, apply for each oil or gas well for which the operator intends to engage in hydraulic fracturing.*

Sec. 9. *1. Except as otherwise provided in subsections 2 and 4, an operator shall collect an initial baseline sample and subsequent monitoring samples from each available water source, not to exceed four available water sources, located within the sampling area. If more than four available water sources are located within the sampling area, the operator shall select the four available water sources for sampling based on:*

(a) The proximity of the available water sources to the proposed oil or gas well. Available water sources closest to the proposed oil or gas well are preferred.

(b) The orientation of the sampling locations relative to the available water sources. To the extent that the direction of the flow of groundwater is known or can reasonably be inferred, sample locations from both down-gradient and up-gradient locations are preferred over cross-gradient locations.

(c) The depth of the available water sources. The sampling of the deepest of the available water sources is preferred.

(d) The condition of the available water sources. An operator is not required to sample an available water source if the Administrator determines that the available water source is improperly maintained or nonoperational, or has physical characteristics which would prevent the safe collection of a representative sample or which would require nonstandard sampling equipment.

(e) The construction and use of the water source. If an operator constructs a temporary well within the sampling area to use as a water source for the purpose of supporting the drilling or operation of an oil or gas well, the operator must include the water source as an available water source for the purpose of sampling and monitoring pursuant to this section.

2. An operator may, before a well is spudded or drilled for oil or gas, request an exception from the requirements of this section by filing a sundry notice (Form 4) with the Administrator. The Administrator may grant the request for an exception if the Administrator finds that:

(a) No available water sources are located within the sampling area;

(b) The only available water sources are unsuitable pursuant to paragraph (d) of subsection 1; or

(c) Each owner of a water source that is suitable for testing and located within the sampling area has refused to grant the operator access to the water source for sampling and additionally finds that the operator has made a reasonable and good faith effort to obtain the consent of the owner to conduct the sampling.

➥ *An operator seeking an exception on the grounds set forth in paragraph (b) shall provide to the Administrator documentation of the conditions of each available water source which is deemed unsuitable. An operator seeking an exception on the grounds set forth in paragraph*

(c) shall provide to the Administrator documentation of the efforts of the operator to obtain the consent of each owner of a water source.

3. Except as otherwise provided in subsections 2 and 4, an operator shall collect from each available water source for which the operator is required to collect samples pursuant to this section:

(a) An initial sample during the 12-month period immediately preceding the commencement of hydraulic fracturing at an oil or gas well.

(b) A first subsequent sample, collected not earlier than 6 months but not later than 12 months after the commencement of hydraulic fracturing. If a well that has been drilled produces hydrocarbons for a period of less than 6 months after the commencement of hydraulic fracturing and the well is subsequently plugged and abandoned, or if the well is plugged and abandoned without having produced hydrocarbons after the commencement of hydraulic fracturing, the operator shall collect each first subsequent sample at the time the well is plugged.

(c) A second subsequent sample, collected not earlier than 60 months but not later than 72 months after the commencement of hydraulic fracturing. If a well that has been drilled produces hydrocarbons for a period of less than 60 months and the well is subsequently plugged and abandoned, the operator shall collect each second subsequent sample at the time the well is plugged. An operator is not required to collect second subsequent samples if a well that is drilled is plugged and abandoned without having produced hydrocarbons.

4. For the purposes of satisfying the requirements for sampling available water sources pursuant to paragraphs (a) and (b) of subsection 3, an operator may rely on the test results of a previous sample from an available water source if:

(a) The previous sample was collected and tested during the respective period prescribed for sampling pursuant to paragraph (a) or (b) of subsection 3.

(b) The procedure for collecting and testing the sample, and the constituents for which the sample was tested, are substantially similar to those required by this section.

(c) The Administrator receives the test results not less than 14 days before the commencement of hydraulic fracturing.

5. The Administrator may require an operator to collect and test samples of an available water source in addition to the collection and testing protocol prescribed by this section if the Administrator finds that additional testing is warranted.

6. The testing of a water sample pursuant to this section must be conducted by a laboratory certified pursuant to NAC 445A.0552 to 445A.067, inclusive. Upon request, an operator shall provide his or her protocol for collection and testing to the Administrator.

7. The test results of initial and subsequent samples collected pursuant to this section must include, without limitation:

(a) The level of each analyzed constituent identified in the routine domestic water analysis of the Nevada State Public Health Laboratory of the University of Nevada School of Medicine.

(b) The levels of benzene, toluene, ethylbenzene and xylene.

(c) The levels of dissolved methane, ethane, propane and hydrogen sulfide gases within the sample.

8. If a dissolved methane concentration greater than 10 milligrams per liter (mg/l) is detected in a sample of water collected pursuant to this section, an analysis of the gas composition, including, without limitation, an analysis of the stable isotope ratios of carbon (13C vs. 12C) and hydrogen (2H vs. 1H) and an analysis of the origin (biogenic vs.

thermogenic), must be performed on the sample using gas chromatography and mass spectrometry, as necessary.

9. An operator shall immediately notify the Administrator and the owner of an available water source if the test results of a sample collected pursuant to this section indicate:

(a) The presence of benzene, toluene, ethylbenzene, xylene or hydrogen sulfide in a concentration greater than the specified maximum contaminant level set forth in the primary and secondary standards for drinking water pursuant to NAC 445A.453 and 445A.455.

(b) If the sample is a subsequent sample, any change in water chemistry indicative of a degradation in water quality.

10. An operator shall provide copies of the test results of each sample collected pursuant to this section to the Administrator and to the respective owner of the available water source not later than 30 days after the operator receives the test results from a laboratory. The Division will, upon request, make the test results available to a member of the public for inspection at the office of the Division located in Carson City.

11. An operator shall include with the copy of the test results of a sample provided pursuant to subsection 10 a description of the location of the available water source and any field observations recorded by the operator during the collection of the sample. The operator shall describe the location of the available water source by public land survey and the county assessor's parcel number and shall include the global positioning system coordinates of the available water source in the manner prescribed by subparagraph (2) of paragraph (b) of subsection 2 of NAC 534.340.

12. An operator shall not commence hydraulic fracturing at a well until the operator has complied with subsections 1, 2 and 4 to 11, inclusive, and paragraph (a) of subsection 3.

13. As used in this section, "public land survey" has the meaning ascribed to it in NAC 534.185.

Sec. 10. *1. An operator must include with his or her application to drill an oil or gas well:*

(a) The water appropriation permit number and the name of the owner of each water source within the area of review that is on file with the Division of Water Resources of the State Department of Conservation and Natural Resources.

(b) The well log number, well depth and the diameter of the water well casing.

(c) The static water level below the surface of the ground or the rate of flow of the water, if any.

(d) A description of the location of each water source located within the area of review in the manner prescribed by subsection 11 of section 9 of this regulation.

(e) Publically available maps and cross-sections of the area of review which describe the surface and subsurface geology of the area of review, including, without limitation, the location of known or suspected faults.

(f) A map showing the location of each water source or perennial stream located within the area of review, the overall project area or lease holdings, the boundaries of the area of review, all known well locations, land ownership and applicable assessor parcel numbers.

(g) The source and estimated volume of water required for hydraulic fracturing in each well.

(h) A plan for the management and disposal of all fluids to be used in the proposed hydraulic fracturing operation.

2. If an operator discovers inconsistencies with respect to publically available and proprietary hydrologic or geologic information within an area of review that the operator reasonably believes to be relevant with respect to potential contamination from hydraulic fracturing, the operator shall disclose the inconsistencies to the Division.

3. The Division may prescribe or an operator may specify an area of review that includes an area of land in addition to that area of land located within a radius of 1 mile of a proposed oil or gas well and any surface projection of any lateral component of the wellbore that is proposed for hydraulic fracturing for the purposes of compliance with this section or the collection of additional data based on population density, residential locations, water source locations or for other good cause as the Division or an operator may deem reasonable.

Sec. 11. *In addition to the requirements prescribed by NAC 522.265, the operator of an oil or gas well shall:*

1. Ensure that:

(a) The surface location of the well is at a lateral distance of not less than 300 feet from any known perennial water source, existing water well or existing permitted structure.

(b) The edge of the drilling pad is at a lateral distance of not less than 100 feet from any known perennial water source, existing water well or existing permitted structure.

➥ An owner or an operator may request and the Division may approve an exception to the requirements prescribed by this subsection.

2. For the intermediate casing string installed in the well directly below the surface casing, install the intermediate casing string through the surface casing from the installed depth of the intermediate casing string to the surface of the ground.

3. For a production casing string, conduct a pressure test of the casing string in which the casing is pressurized to 3,000 pounds or more per square inch gauge (psig), not to exceed 80 percent of the burst-pressure rating of the casing, for a period of not less than 30 minutes. A pressure test must be conducted and the results of the test must be reported in the manner prescribed by subsection 7 of NAC 522.265.

Sec. 12. *1. An operator of an oil or gas well shall:*

(a) Not less than 14 days before the commencement of hydraulic fracturing:

(1) Provide written notice to each owner of real property and any operator of an oil, gas or geothermal well located within the area of review of the hydraulic fracturing operation.

(2) Provide written notice to the board of county commissioners in the county in which the oil or gas well is located.

(3) Submit to the Division an affidavit (Form 15) certifying that each strata is sealed and isolated with casing and cement in accordance with NAC 522.260. The affidavit must be signed by the operator or a competent person designated by the operator and must incorporate and include a copy of each relevant cement evaluation log as evidence of compliance with NAC 522.260.

(4) Submit for approval by the Division a sundry notice (Form 4) and a report describing all specific aspects of the proposed hydraulic fracturing operation. The report must identify each stage of the hydraulic fracturing operation, the measured depth and true vertical depth below the surface of the ground for each stage, the duration of each stage, all intervals to be perforated in measured depth and true vertical depth below the surface of the ground, the number and diameter of perforations per foot and the estimated hydraulic pressures to be utilized.

(b) Maintain a record as to the manner in which each owner, operator and board of county commissioners was notified pursuant to subparagraphs (1) and (2) of paragraph (a), including, without limitation, the method of notification.

(c) Before the commencement of hydraulic fracturing:

(1) Ensure that each chemical used in the hydraulic fracturing process is identified on the Internet website maintained by the Division as a chemical which is approved by the Division for hydraulic fracturing. An operator may request and the Division may approve the use of a chemical that is not identified as an approved chemical if the operator submits the request to the Division on a sundry notice (Form 4) not less than 30 days before the commencement of hydraulic fracturing.

(2) Disclose to the Division each additive that the operator intends to use in the hydraulic fracturing fluid, including, without limitation, any additive that may be protected as a trade secret. The operator shall include with the identity of each additive the trade name and vendor of the additive and a brief description of the intended use or function of the additive.

2. The operator shall monitor and record all well head pressures, including each annular space pressure, during the hydraulic fracturing operation. The maximum hydraulic pressure to which a segment of casing is exposed must not exceed the burst-pressure rating of the casing, but the Division may require a lower maximum hydraulic pressure as the Division determines is necessary. The operator shall immediately stop the hydraulic fracturing process and notify the Division if any change in annular space pressure is observed which suggests communication with the hydraulic fracturing fluids. The operator shall provide the Division with a report documenting all recorded hydraulic fracturing pressures for each stage of the hydraulic fracturing operation not later than 15 days after the completion of each stage.

3. The operator shall contain all liquids that are returned to the surface and discharged from the wellbore at the conclusion of each stage of the hydraulic fracturing operation. The operator shall contain the liquids in enclosed tanks or in the manner prescribed by the Division of Environmental Protection pursuant to chapters 445A of NRS and 445A of NAC.

4. Except as otherwise provided in subsection 5 and not later than 60 days after the completion of a hydraulic fracturing operation, the operator shall report, at a minimum, to the Internet website www.fracfocus.org for inclusion in FracFocus, or its successor registry:

(a) The name of the operator, the well name and well number and the American Petroleum Institute well number.

(b) The date of the hydraulic fracturing treatment, the county in which the well is located, any public land surveys relevant to the location of the well and the global positioning system coordinates of the well.

(c) The true vertical depth of the well and the total volume of water used in the hydraulic fracturing treatment of the well or if the operator utilizes a base fluid other than water, the type and total volume of the base fluid used in the hydraulic fracturing treatment.

(d) The identity of each additive used in the hydraulic fracturing fluid, including, without limitation, the trade name and vendor of the additive and a brief description of the intended use or function of the additive.

(e) The identity of each chemical intentionally added to the base fluid.

(f) The maximum concentration, measured in percent by mass, of each chemical intentionally added to the base fluid.

(g) The Chemical Abstracts Service Registry Number for each chemical intentionally added to the base fluid, if applicable.

5. Proprietary information with respect to a trade secret does not constitute public information and is confidential. An operator may submit a request to the Division to protect from disclosure any information which, under generally accepted business practices, would be considered a trade secret or other confidential proprietary information of the business. The Administrator shall, after consulting with the operator, determine whether to protect the information from disclosure. If the Administrator determines to protect the information from disclosure, the protected information:

(a) Is confidential proprietary information of the operator.

(b) Is not a public record.

(c) Must be redacted by the Administrator from any report that is disclosed to the public.

(d) May only be disclosed or transmitted by the Division:

(1) To any officer, employee or authorized representative of this State or the United States:

(I) For the purposes of carrying out any duties pursuant to the provisions of this chapter or chapter 522 of NRS; or

(II) If the information is relevant in any judicial proceeding or adversary administrative proceeding under this chapter or chapter 522 of NRS or under the provisions of any federal law relating to oil or gas wells or hydraulic fracturing, and the information is admissible under the rules of evidence; or

(2) Upon receiving the consent of the operator.

➥ The disclosure of any proprietary information pursuant to this subsection must be made in a manner which preserves the status of the information as a trade secret.

6. The Division shall make available to the public for inspection any information, other than a trade secret or other proprietary information that is maintained confidentially pursuant to subsection 5, that is submitted by an operator pursuant to this section.

7. As used in this section, "trade secret" has the meaning ascribed to it in NRS 600A.030.

Sec. 13. *1. Notwithstanding any provision of sections 2 to 12, inclusive, of this regulation to the contrary, an operator of an oil or gas well that was drilled and spudded before October 24, 2014, may request approval from the Division to conduct a hydraulic fracturing operation at the oil or gas well by submitting a sundry notice (Form 4) to the Division. The sundry notice must include, without limitation:*

(a) A cement evaluation log of the production casing string that has been conducted not less than 5 years before the submission of the sundry notice.

(b) A pressure test of the production casing string conducted in the manner prescribed by subsection 7 of NAC 522.265.

(c) Any other information required by the Division.

2. The Division will, upon receipt of a request pursuant to subsection 1, evaluate each well design which is the subject of the request and approve or disapprove the request.

Sec. 14. *An operator of an oil or gas well shall:*

1. Maintain a copy of the approved drilling permit at the site of the well during the operation of the well, including, without limitation, during the stages of drilling, hydraulic fracturing, reconditioning and completion.

2. Not less than 24 hours before a well is spudded for oil or gas, notify the Division by telephone or electronic mail.

3. Not less than 24 hours before installing or cementing casing, installing any equipment for the prevention of a blowout or conducting a formation integrity test, notify the Division by telephone or electronic mail.

4. Ensure that the casing installed in the well meets the minimum specifications for casing prescribed by the American Petroleum Institute in Specification 5CT, "Specification for Casing and Tubing, Ninth Edition," or by its successor organization, or as may be otherwise prescribed by the Administrator.

5. Notify the Division if any casing or casing material has been previously used in a hydraulic fracturing operation or in any other oil or gas well.

6. Ensure that the cementing of each casing string meets the minimum specifications prescribed by the American Petroleum Institute in Specification 10A, "Specification for Cements and Materials for Well Cementing, Twenty-Fourth Edition," or by its successor organization, or as may be otherwise prescribed by the Administrator.

7. Store and contain all materials at the site of the well in a safe and orderly manner.

8. Manage spills or releases in the manner prescribed by the Division of Environmental Protection pursuant to chapters 445A of NRS and 445A of NAC.

9. Except as otherwise provided in subsection 3 of section 12 of this regulation, contain all liquids that are returned to the surface and discharged from the wellbore in the manner prescribed by the Division of Environmental Protection pursuant to chapters 445A of NRS and 445A of NAC. A reserve pit for drilling liquids must not subsequently be used for the discharge of wellbore liquids during the testing of the well without the prior approval of the Administrator.

10. If an unintentional mechanical failure of the well or an uncontrolled flow or spill from the well site occurs, immediately notify:

(a) The Division at the telephone number of the Division.

(b) The Division of Environmental Protection at the spill reporting hotline maintained on its Internet website.

➥ *An operator may obtain information on the types of spills which must be reported pursuant to this subsection at the Internet website http://ndep.nv.gov/BCA/spil_rpt.htm.*

Sec. 15. *1. An operator shall take all precautions which are necessary to keep wells under control and operating safely at all times. Well control and wellhead assemblies used in an oil or gas well must meet the minimum specifications for assemblies prescribed by the American Petroleum Institute in Standard 53, "Blowout Prevention Equipment Systems for Drilling Wells, Fourth Edition," or by its successor organization, or as may be otherwise prescribed by the Administrator.*

2. Equipment for the prevention of a blowout which is capable of shutting in the well during operation must be installed on the surface casing and maintained in good operating condition at all times. The equipment must have a rating for pressure greater than the maximum anticipated pressure at the wellhead. The equipment must include casing outlet valves with adequate provisions for mud kill and bleed-off lines of appropriate size and working pressure.

3. An operator shall test the equipment for the prevention of a blowout under pressure immediately after installing the casing and the equipment at the wellhead. A representative of the Division must observe the test in person or otherwise approve the results of the test before

the operator drills the shoe out of the casing. An operator shall notify the Division not less than 24 hours before conducting a test pursuant to this subsection.

4. The operator shall submit to the Division the pressure data and supporting information for the equipment for the prevention of a blowout as soon as practicable after the conclusion of the test. The operator shall record the results of each test in the daily drilling log of the operator.

Sec. 16. NAC 522.100 is hereby amended to read as follows:

522.100 "Gas well" means a well which produces primarily natural gas or any well classified as a gas well by the Division. ***The term includes an exploratory well or a well that is otherwise drilled for exploratory purposes.***

Sec. 17. NAC 522.115 is hereby amended to read as follows:

522.115 "Oil well" means any well which is not a gas well and which is capable of producing oil or condensate. ***The term includes an exploratory well or a well that is otherwise drilled for exploratory purposes.***

Sec. 18. NAC 522.210 is hereby amended to read as follows:

522.210 1. Before any well is spudded in or drilled for oil or gas, application must be made to and a permit obtained from the Division.

2. The application must be made on Form 2, properly completed and accompanied by Form 1, the required fee and a location plat prepared by a land surveyor licensed in Nevada. Evidence of a federal bond for drilling on a federal lease must be included in the space provided on Form 2. ***The source and estimated volume of water required for drilling each well must be included with the application.***

3. If the well is to be drilled on state or private land, Form 3 or 3a, properly completed, must accompany the application.

4. The Division will, upon the approval of an application for a permit to drill or a sundry notice (Form 4) for a permit to conduct a hydraulic fracturing operation, make a copy of the permit available on the Internet website maintained by the Division.

Sec. 19. NAC 522.265 is hereby amended to read as follows:

522.265 Unless a special provision requires otherwise, the following applies to all ***oil and gas*** wells ~~[drilled with rotary tools:~~

~~1. Suitable and safe surface casing must be used in all wells for proper anchorage. In all wells being drilled, surface and other protection casing must be run to sufficient depth to afford safe control of any pressures which might be encountered and must be sufficiently tested therefor. Surface casing must be set into an impervious formation and be cemented with sufficient cement to circulate to the top of the hole. If cement does not circulate, the annulus outside the casing must be cemented before drilling plug or initiating tests.~~

~~2. On all strings of casing below surface pipe, sufficient cement must be used to fill the annular volume behind the casing for a minimum distance of 500 feet above the bottom of the casing. A cement plug or shoe must not be drilled until a minimum compressive strength of 300 pounds per square inch at bottom hole conditions has been attained according to the manufacturer's tables of cement strength for the particular cement mix being used.~~

~~3. After cementing the surface casing, each well being drilled must be equipped with adequate blowout preventers. The use of blowout equipment must be in accordance with good established oil field practice. The control equipment must include casing outlet valves with~~

~~adequate provisions for mudkill and bleed-off lines of proper size and working pressure. All equipment must be in good operating condition at all times.]~~ ***:***

1. An operator shall install conductor casing and cement the annular space surrounding the conductor casing from the shoe to the surface with cement, cement grout or concrete grout.

2. An operator shall install surface casing to a depth of not less than 500 feet below the surface of the ground. The annular space surrounding the surface casing string must be cemented with sufficient cement to circulate to the top of the hole. If the cement does not circulate to the top of the hole, the operator shall:

(a) Measure the distance from the surface of the ground to the top of the cement and report the measurement to the Division.

(b) Take any remedial action that may be required by the Administrator to ensure compliance with NAC 522.260 before the operator resumes drilling or conducts any testing pursuant to this section.

3. Except as otherwise provided in section 11 of this regulation, each successive intermediate casing string or liner or production casing string or liner installed in a well below an existing casing string must overlap with the shoe of the existing casing string or liner, as applicable, by not less than 100 feet.

4. For each intermediate casing string or production casing string installed in a well, the operator shall cement the annular space surrounding the casing string to a depth of not less than 500 feet above the shoe of the casing string or, if the casing string enters a known hydrocarbon-producing zone of interest, to a depth of not less than 500 feet above the zone of interest.

5. As soon as practicable after an operator has completed the cementing of the surface casing string, an intermediate casing string or a production casing string, the operator shall submit to the Division a cementing evaluation report to ensure that the operator has complied with the cementing requirements prescribed by this section. The report must include, without limitation, the weight and volume of cementing materials used to cement the respective casing string and the pumping rates and pressures which are related to the cementing of the respective casing string.

6. If the Administrator determines that an operator must take remedial action to ensure compliance with NAC 522.260, the operator shall complete such remedial action before the operator resumes drilling or conducts any testing pursuant to this section.

7. Except as otherwise provided by section 11 of this regulation, before drilling the cement out of the bottom joints of the surface casing string, an intermediate casing string or a production casing string, an operator shall conduct a pressure test of the respective casing string in which the casing is pressurized to 0.22 pounds per square inch gauge (psig) per foot of casing string length or 1,500 pounds per square inch gauge (psig), whichever is greater, not to exceed the maximum anticipated bottom-hole pressure or 80 percent of the burst-pressure rating of the casing. The casing string must be pressurized for a period of not less than 30 minutes. The operator shall submit to the Division the pressure test results for the respective casing string as soon as practicable after the conclusion of the test. If the results of the test indicate a drop in pressure of 10 percent or more, the operator shall notify the Division of a failed pressure test and shall immediately cease operations at the well. In the event of a failed pressure test, an operator shall not resume operations at the well until the Administrator approves a remediation plan, the operator successfully implements the plan and the operator

conducts a successful pressure test for the respective casing string. A subsequent pressure test resulting in a drop in pressure of less than 10 percent after 30 minutes or more shall be deemed to be proof satisfactory that the condition has been corrected.

8. The Administrator may require the operator to submit a cement evaluation log evaluating the bonding integrity of the cement from the shoe of the surface casing string to the surface. The Administrator may require the submission of an initial cement evaluation log pursuant to this subsection if:

(a) The Administrator determines that a significant amount of cement was lost during the cementing of the surface casing string; or

(b) The surface casing string fails a formation integrity test conducted pursuant to subsection 10.

➥ If the initial cement evaluation log does not indicate sufficient bonding integrity of the cement occupying the annular space, the Administrator may require the operator to submit a subsequent cement evaluation log evaluating the bonding integrity of the cement occupying the annular space. An operator shall provide to the Division a copy of each cement evaluation log required pursuant to this subsection as soon as practicable after a copy of the cement bond log becomes available to the operator.

9. An operator shall, upon completion of cementing operations with respect to an intermediate casing string or production casing string, submit to the Division a cement evaluation log evaluating the bonding integrity of the cement at the level of the respective casing string from the shoe of the casing string to the surface of the cement filling the annular space surrounding the casing string. If the initial cement evaluation log does not indicate sufficient bonding integrity of the cement occupying the annular space, the Administrator may

require the operator to submit a subsequent cement evaluation log evaluating the bonding integrity of the cement occupying the annular space. An operator shall provide to the Division a copy of each cement evaluation log required pursuant to this subsection as soon as practicable after a copy of the cement bond log becomes available to the operator.

10. An operator shall, to verify that the cement and the formation below the casing shoe can withstand the wellbore pressure which is required to safely drill to the next depth at which casing will be installed, conduct a formation integrity or leakoff test at the time the operator drills the cement out of the bottom joints of the surface casing string, an intermediate casing string or a production casing string. The operator shall submit to the Division the results of a formation integrity or leakoff test conducted pursuant to this subsection as soon as practicable after the conclusion of the test. If the results of the formation integrity or leakoff test indicate a poor cement bond at the casing shoe, an operator shall not resume operations at the well until the Administrator approves a remediation plan, the operator successfully implements the plan and the operator conducts a successful pressure test for the respective casing string to ensure compliance with NAC 522.260.

Sec. 20. NAC 522.342 is hereby amended to read as follows:

522.342 *1.* The amount of the administrative fee that a producer or purchaser of oil or natural gas must pay pursuant to subsection 2 of NRS 522.150 is ~~[10]~~ *15* cents per barrel of oil or per 50,000 cubic feet of natural gas, as appropriate.

2. The administrative fee must be paid on or before the last day of each month and must be prorated to reflect the amount of oil or natural gas produced during the preceding month.

Sec. 21. NAC 534A.270 is hereby amended to read as follows:

534A.270 1. ~~[All necessary]~~ ***An operator shall take all*** precautions ~~[must be taken]~~ ***which are necessary*** to keep wells under control and operating safely at all times. ***Well control and wellhead assemblies used in any geothermal well must meet the minimum specifications for assemblies prescribed by the American Petroleum Institute in Standard 53, "Blowout Prevention Equipment Systems for Drilling Wells, Fourth Edition," or by its successor organization, or as may be otherwise prescribed by the Administrator.***

2. Equipment for the prevention of a blowout, capable of shutting in the well during any operation, must be installed on the surface casing and maintained ~~[ready for use]~~ ***in good operating condition*** at all times. This equipment must ~~[be made of steel and]~~ have a rating for pressure ~~[equal to]~~ ***greater than*** the maximum anticipated pressure at the wellhead. Equipment for the prevention of a blowout is required on any well where temperatures may exceed 250°F.

3. ~~[Immediately after installation, the casing and]~~ ***An operator shall test the*** equipment for the prevention of a blowout ~~[must be tested]~~ under pressure. ~~[These tests must be witnessed by]~~ ***A representative of*** the Division ***must observe the test in person or otherwise approve the results of the test*** before the ~~[guide]~~ ***operator drills the casing*** shoe ~~[is drilled]~~ out of the casing. ~~[The Division must be given reasonable notice of any such test. If necessary, conductor pipe must be equipped with annular blowout equipment which is hydraulically activated from a remote control station.]~~ ***An operator shall notify the Division not less than 24 hours before conducting a test pursuant to this subsection.***

4. The ~~[use of any equipment for the prevention of a blowout must be in accordance with established good practices of the oil field.]~~ ***operator shall submit to the Division the pressure data and supporting information for the equipment for the prevention of a blowout as soon as***

practicable after the conclusion of the test conducted pursuant to subsection 3. The operator shall record the results of each test in the daily drilling log of the operator.

Sec. 22. NAC 522.270 and 522.343 are hereby repealed.

TEXT OF REPEALED SECTIONS

522.270 Wells drilled with cable tools. The following applies to all wells drilled with cable tools:

1. Before drilling begins, adequate slush pits must be constructed.

2. Surface casing must be set in the same manner as described in NAC 522.265. Surface casing must be tested by bailing or pressure test to ensure a shutoff before drilling proceeds below the casing point.

3. The use of blowout equipment must be in accordance with good established oil field practice. After cementing the surface casing, a well being drilled must be equipped with adequate blowout preventers. All equipment must be in good operating condition at all times.

522.343 Reduced administrative fee for new production. (NRS 522.040, 522.150)

1. Notwithstanding the provisions of NAC 522.342, the amount of the administrative fee that a producer or purchaser of oil or natural gas must pay pursuant to subsection 2 of NRS 522.150 for new production is one-half cent per barrel of oil or per 50,000 cubic feet of natural gas, as appropriate, and in accordance with the provisions of this section.

2. Upon the filing of Form 5, the well completion report, pursuant to NAC 522.510, the Division shall determine whether the production from the well that is the subject of the report qualifies as new production. If the Division determines that the production from the well qualifies as new production, the producer or purchaser is entitled to pay the administrative fee required by subsection 2 of NRS 522.150 for that new production at the reduced rate prescribed in subsection 1 for 12 consecutive calendar months, beginning on the put-on-production date reported in Form 5 for that well. At the end of the 12-month period, the producer or purchaser must pay the administrative fee required by NRS 522.150 for further production from the well in the amount prescribed in NAC 522.342.

3. A producer or purchaser may, pursuant to NRS 522.110, challenge a determination made by the Division pursuant to subsection 2.

4. As used in this section, “new production” means production from a new or existing well that is completed in a new interval, as determined by the Division.

THE NEVADA DIVISION OF MINERALS
OF THE COMMISSION ON MINERAL RESOURCES

INFORMATIONAL STATEMENT SUBMITTED IN COMPLIANCE WITH NRS 233B.066 UPON ADOPTION OF A REGULATION FOR HYDRAULIC FRACTURING, AND REVISING PROVISIONS GOVERNING THE OPERATION OF WELLS FOR THE EXTRACTION OF OIL, GAS AND GEOTHERMAL RESOURCES IN CHAPTERS 522 AND 534A OF THE NEVADA ADMINISTRATIVE CODE

LCB File No. R011-14

September 12, 2014

The need for the adopted regulation is to satisfy the Legislative mandate given to the agency by the approval of SB 390 in 2013 and incorporated in NRS § 522.119, and is to clarify existing language and present new language since the rule was last adopted in 2000. The proposed changes will provide for additional specificity for all oil and gas well construction, well bore integrity and will provide requirements for baseline groundwater monitoring where unconventional oil and gas development involving hydraulic fracturing is contemplated in Nevada.

Initial public and affected industry comment was solicited on November 21, 2013 during a meeting with Nevada Division of Minerals (NDOM) and Nevada Division of Environmental Protection (NDEP) senior staff and all stakeholders that had presented testimony before the legislature on Senate Bill 390. NDOM prepared an initial draft regulation and presented it to the Commission on Mineral Resources (CMR) and to the public at their January 16, 2014 meeting. Public comment on the proposed regulation was considered at the meeting and the CMR voted to submit the draft regulation to the Legislative Counsel for review as provided in NRS 233B. The revised text of the regulation was received from the Legislative Counsel on February 25, 2014.

Formal public and affected industry comment on the above-referenced regulation was solicited beginning on February 27, 2014, by Notice of Workshops and Hearings set for March 17, 2014 in Carson City, March 19, 2014 in Elko and March 21, 2014 in Las Vegas. The notice was mailed to over 100 individuals and companies on the NDOM-maintained mailing list and was also posted in public buildings throughout the state.

At each of the workshops, a significant number of individuals from the regulated industry and the general public provided both oral and written comments on the proposed regulation. The audio recording of these sessions and the written comments are available for review in the NDOM Carson City Office during regular business hours. The sign-in sheets for the attendees of the workshops are attached to this informational statement, together with the names of the persons submitting written comment.

The majority of the public and affected industry comment received concerned the baseline water quality sampling requirements and the protection of groundwater from contamination and the workability of some of the new procedures.

A document entitled *Response to Summary of Comments on the proposed regulation of the Nevada Division of Minerals of the Commission on Mineral Resources,* dated September 12, 2014 and consisting of 26 pages, was prepared by the agency and it is attached to this Informational Statement in compliance with NRS § 233B.066(1)(b),(e).

The period for submitting written comment on the first revised draft was extended at the workshops to March 28, 2014. NDOM and NDEP senior staff considered all of the public and affected industry comment over nine (9) working sessions and the regulation was amended to incorporate much of the comment received within the time frame allowed and again submitted it to the Legislative Counsel for review. The proposed regulation was approved by the Legislative Counsel and, after one additional review, the approved text of the third revised regulation was returned to the agency on July 24, 2014. As provided in NRS § 233B.061 (3), the public hearing was conducted by the CMR on August 28, 2014 in Elko. After considering fully all written and oral submissions respecting the proposed regulation, the CMR adopted the revised text of the regulation dated July, 24, 2014, with three minor changes made at the hearing, and that is the final adopted regulation that is filed this date with the Legislative Counsel.

The immediate and long term adverse economic effects on the regulated industry involve an increase in cost of materials used in oil and gas well construction, and the new costs associated with groundwater sampling prior to and after hydraulic fracturing of oil or gas wells. The immediate and long term economic beneficial effects to the industry involve establishing specific standards to allow for unconventional oil and gas development in Nevada.

The immediate and long term economic benefit to the public involves an improvement in the integrity of oil and gas well construction and operation. These proposed changes will offer greater protection of groundwater statewide. The potential adverse economic effect to the public, both short and long term, is expected to be minimal.

The estimated cost to the agency for enforcement of this regulation is expected to be substantially higher than the cost for enforcement of the existing regulation.

The proposed regulation does not duplicate or overlap other state regulations. Federal law does not require the proposed regulation changes. The proposed regulation may be more stringent than federal law for wells drilled on public lands administered by the United States Department of the Interior, Bureau of Land Management. The more stringent provisions involve the baseline water quality sampling that is necessary as a result of the mandate in SB 390.

The fee increase contemplated in the adopted regulation may, based upon the 2013 production of 330,000 barrels of oil, result in a total annual agency increase in revenue of $16,500 and the additional money will be used to administer the oil and gas program.

Respectfully submitted,

/s/

Richard Perry, P.G.
Administrator
September 12, 2014

Response to Summary of Comments on the proposed regulation of the Nevada Division of Minerals of the Commission on Mineral Resources

Table of Contents

Introduction and Overview

Existing law authorizes the Division of Minerals of the Commission on Mineral Resources to regulate wells drilled for the production of oil, gas and geothermal resources. (Chapters 522 and 534A of NRS) In 2013, Senate Bill No. 390 required the Division of Minerals and the Division of Environmental Protection of the State Department of Conservation and Natural Resources, jointly, to develop a hydraulic fracturing program for the State of Nevada. This regulation generally establishes that program.

The Commission on Mineral Resources (CMR) first generally considered the mandate set forth in SB 390 at their August 15, 2013 quarterly meeting, and then directed the Division of Minerals (NDOM) to move forward with drafting a regulation and developing the program to address hydraulic fracturing at their October 10, 2013 meeting.

NDOM and Division of Environmental Protection (NDEP) staff met informally with stakeholders prior to developing the draft regulation on November 21, 2013. Stakeholders included individuals that had provided direct comment regarding SB 390 during the legislative session.

NDOM developed the initial draft regulation and presented it to the public and the CMR at the Commission meeting on January 16, 2014. The CMR considered public comment on the proposed regulation that was submitted at the meeting and voted to file the draft regulation with the Legislative Counsel for their administrative review process as set forth in NRS 233B. NDOM then delivered the proposed regulation to the Legislative Counsel on that date.

As provided in NRS 233B and for all agency proposed regulations, the Legislative Counsel completed their review and approved the revised text of the proposed regulation and returned it to NDOM on February 25, 2014.

On February 27, 2014, and as provided in NRS § 233B.0603, NDOM issued the Notice of Intent to Act Upon a Regulation and Notice of Workshops to receive public comment. The Notice was sent to all interested persons on the agency established mailing list and was posted on the NDOM internet web page. The Notice was also sent to all oil, gas, and geothermal producers in Nevada, each county library, the State Library and Archives, the Legislative Building, and each facility where the workshops would take place. The time and place for each workshop was set forth in the Notice for March 17, 2014 in Carson, March 19, 2014 in Elko and March 21, 2014 in Las Vegas. At each of the workshops, full opportunity was provided all wishing to comment or submit written comments on the proposed rule. The date for submitting written comments was extended to March 28, 2014. The following sections include the agency response to a summary of the comments.

The proposed regulation was then amended as a result of NDOM and NDEP review of the comments and the second revised text was received from the Legislative Counsel on June 25, 2014. After some additional revisions, the Third Revised Proposed Regulation dated July 24, 2014 was received from the Legislative Counsel and was made available to the public on the

internet web page maintained by NDOM, and written comment was solicited on this revised regulation until August 15, 2014. Additional comment was received at the public hearing on August 28, 2014 Agency response to the summary of comment received on the third revised draft and at the hearing is set forth in the last section of this document.

Response to Comments on Monitoring Requirements

Comment: Regular monitoring of air and water should be included in the permit. The proposed regulation calls for no development of groundwater monitoring other than "available water sources". Therefore the baseline and future monitoring is entirely dependent upon existing wells. There needs to be an analysis of the hydrology for all levels of strata to be encountered by HF. The proposed project needs to submit a detailed plan which includes the HF scheme so that groundwater monitoring wells are judiciously located. Several commenters expressed concern that, if there are no water sources within the area of review that the operator be required to install a dedicated monitoring well. We ask that the regulation call for a nearby narrow-bore well to be drilled in conjunction with every fracking well in order to monitor water quality. Commenters also expressed concern that groundwater flow direction must be determined by the operator.

Response: Existing regulations governing air quality and water quality will continue to be administered by NDEP for all oil and gas operations. NDOM technical specifications for construction, pressure testing and operation of oil or gas wells are designed to ensure the effects of HF are confined to the wellbore and to prevent the migration of injected or liberated fluids from the HF stimulation to reach underground sources of drinking water. As provided in the original (1953) statute defining the duties of the Division (NRS § 522.040), this is the regulatory approach designed to control the source of any potential contaminants to the well and to prevent the migration of fluids above or beneath the surface.

NDOM believes that, in addition to monitoring the annular and well head pressures during the HF process to confirm the wellbore mechanical integrity both inside and outside the casing, that the requirement to sample existing water sources will additionally confirm that there was no migration of fluids.

The proponent of an HF operation must submit geologic and hydrologic information with the permit application that describes basin-specific and location-specific data (Section 10). The known location and depths of all water sources within the area of the proposed HF stimulation must be included together with the source of water to be used in the operation. In many remote areas, the operator may drill a temporary water source well near the location to support the drilling and completion operations for the oil or gas well and hence this water source would then be included for monitoring. This information will, at a minimum, help to develop a conceptual site model.

NDOM recognizes the substantial cost associated with requiring the operator to install a monitoring well, and knows of no other state that does. NDOM also recognizes the potential confusion with designing a well to monitor all underground sources of drinking water and the potential for creating another pathway for the migration of fluids in the monitor well itself.

However, as a result of the mandate in SB 390 and as provided in NRS § 522.119(1)(a), NDOM and NDEP may exercise their authorized discretion and require such additional information as is needed on a case-by case basis to assess the effects of HF on the waters of the state.

Comment: The baseline and subsequent sampling requirements will have a significant financial impact to my small business as it will have to be conducted by a third party to ensure authenticity of the samples.

Response: Water quality monitoring is recommended by a number of organizations as industry best practices to establish baseline groundwater quality[1]. In addition, the general concept of establishing baselines for environmental indicators, such as groundwater quality, is a show of good faith and will ultimately reduce liability[2]. In the initial review of the permit application, and throughout the operation and plugging of the well, NDOM staff will continue to be guided by their statutory mandate and the intent of the regulation to protect the waters of the state from contamination.

Comment: We believe it must be clear that the sampling and subsequent testing apply only to existing water wells or springs and that the Division may require further monitoring where a statistically significant increase in a parameter and the concentration is in excess of the water quality standard for that constituent.

Response: The Division generally agrees with the commenter and the revised regulation provides agency discretion in Section 9(5) where the additional testing will only be required if the Administrator finds it is warranted.

Comment: Wyoming regulations allow an operator to submit a master groundwater monitoring plan over a larger geographic area to provide for efficiency in the regulatory permitting process and will Nevada consider this in the proposed rule.

Response: The proposed regulation was amended to provide flexibility for both NDOM and the operator to expand the area of review as suggested. The proponent of the first approved HF permits in Nevada has in fact engaged in a hydrogeological study of the area under consideration for development with the Desert Research Institute (DRI) of Nevada and this study is ongoing at present.

Comment: Add language confirming that an exception request to sample a water source will be granted by the Administrator if he does not take action to grant or deny the request within an established time period.

---

[1] Appalachian Shale Recommended Practices Group, *Recommended Standards and Practices,* **http://asrpg.org/pdf/ASRPG_standards_and_practices-April2012.pdf** , (April 2012)

[2] International Energy Agency, *Golden Rules for a Golden Age of Gas, World Energy Outlook Special Report on Unconventional Gas,* **http://www.worldenergyoutlook.org/goldenrules/** , (May 29, 2012)

Response: The Division disagrees and believes the proposed regulation must provide the flexibility and discretion to act on each sundry notice requesting a change on a case-by-case and not be tied down to a specific number of days to approve or deny the request.

Comment: We recommend new language addressing liability associated with water sampling as is found in several other states to help ensure third party contractors will agree to conduct the sampling on behalf of operators and to encourage well owners to give their consent.

Response: The commenter raises a good point regarding liability in water sampling but NDOM believes any liability question will be a civil matter between the parties and does not find the need to have specific guidance spelled out in the regulation.

Comment: Water samples should be analyzed for a long list of constituents and analytes, and several commenters noted that the laboratory be certified and wanted to ensure appropriate chain of custody protocol was followed.

Response: The proposed regulation was developed closely with NDEP senior staff to ensure the most relevant water quality data are reported (a long list set forth in Section 9 paragraph 7 of the proposed regulation) and the regulation defers to the lab certification under existing NDEP regulations (Section 9(6)). Much of the language regarding the sampling requirements was adapted from the Colorado rule, which had been recently amended in that state.

Comment: Ongoing air monitoring at lower and upper levels is needed to assure that heavier as well as lighter fugitive air emissions are detected and nearby populations are alerted of any actions needed for protection of public health.

Response: Existing regulations governing air quality will continue to be administered by NDEP for all oil and gas operations.

Comment: Every wellhead of newly fracked gas wells should contain equipment to monitor methane leakage at the wellhead.

Comment: Methane is prominently used during HF and is a bad greenhouse gas and if wells are not properly capped it may be vented causing environmental hazards.

Response: Existing regulations governing air quality will continue to be administered by NDEP for all oil and gas operations. In addition, the existing NDOM regulation provides that no gas may be permitted to escape into the air without division approval with exceptions for safety and testing and the disposition of gas produced must be reported.

Comment: The agencies should visually observe sampling before and after HF and must be adequately staffed and random inspections are recommended. Nevada must fund our agencies in this endeavor as our existence depends on it.

Response: NDOM agrees and believes that the proposed rules that set forth the sampling protocol and the use of certified labs do provide the confidence necessary to follow the legislative mandate. Existing regulations also provide for inspections throughout the process.

Comment: The threshold of 1.0 mg/l of dissolved methane is too low and needs to be higher and water sampling is different from gas sampling. If the purpose is to determine if hydrocarbons are present then so state. As soil-gas studies in Railroad Valley have shown, soil gas concentrations of methane greater than 1 mg/l are not uncommon.

Response: NDOM agrees generally with the commenters and the revised rule uses the 10mg/l and other changes to clarify the intent of the sampling requirements.

Response to Comments on Public Notice Requirements and Chemical Disclosure

Comment: The public needs to be fully alerted with sufficient time to review and comment on any HF operations. There should be a 60-day review period where the applicant supplies the plan of operations. Several commenters generally agreed that the notice requirement in the proposed regulation is inadequate.

Comment: The public should be given a sufficient and set amount of time to participate in the environmental review process and we recommend a time of 60-days.

Response: The development of the HF program requires that the agencies provide for notice to members of the general public concerning activities relating to HF in this state, and to require chemical disclosure. Section 12 of the proposed regulation requires the operator to provide written notice to owners in the area of review and the respective board of county commissioners at least 14 days before the proposed HF operation. The operator shall simultaneously submit documentation that each stratum is sealed and isolated with casing and cement and further must submit the detailed HF plan for NDOM approval by sundry notice.

Chemicals to be used in the HF process will already have been identified on an approved list on the NDOM website. NDOM will make a copy of each approved application for permit to drill or approved sundry notice on the internet website maintained by the division. In addition, information submitted pursuant to Section 12 is available to the public for inspection. Following the HF operations, the operator shall submit a detailed report of the operations to the national internet registry FracFocus.

In addition, the United States Bureau of Land Management provides a public notice process (NEPA) before permitting oil or gas development on federal lands. The Nevada Division of Water Resources has noticing requirements regarding applications for water use related to oil or gas development and is also charged with ensuring the protection of the underground waters of the state from waste and contamination (NRS § 534.020). NDEP will also regulate long term injection of water developed from oil or gas development under the Underground Injection Control (UIC Permit) guidelines of the United States Environmental Protection Agency.

NDOM strives to maintain as much transparency as possible whilst at the same time balancing the industry needs to protect certain proprietary surface and subsurface information for competitive oil and gas development purposes, and believes these requirements comply with the intent of the statute. (NRS § 522.119(1)(b) and (c).

Comment: We support oil and gas development and the associated HF activities when properly conducted with appropriate safeguards. We feel that water resources must be protected from contamination and best practices for reducing water use should be used for this scarce resource. Local government agencies should be consulted in the process and all local permitting and regulations must be followed. We do not think that simply posting information to a website provides adequate notice and that notice requires sending communications that new information has been added.

Response: We agree with the commenter and the proposed regulation was amended to an extent that is reasonable. Nothing in any permit approved by NDOM, and as a specific condition of the permit, relieves the operator of compliance with any other state, federal or local jurisdiction.

Comment: We recommend that the 14-day pre-notification be required for surface owners or their lessees, not all land owners within the area of review since owners directly affected by the operation will likely only be the surface owner. We further recommend language regarding the inability to find or reach the landowner.

Comment: We believe the agency is more appropriately responsible for providing notice to other regulatory agencies, property owners and the public through the formal permitting process and to the extent that operators are asked to provide notice there should be a standard format.

Response: The proposed regulation at Section 12 was modified to require notification of each owner of real property and any well operator within the area of review. NDOM believes the HF proponent can reasonably accomplish this by sending notice via the United States Postal Service to the owner of record of each parcel that is on file at the county assessor's office, and documenting the good faith efforts to provide notice.

Comment: The Division should clarify that the maximum amount or concentration of constituents may be disclosed to FracFocus as contemplated by the FracFocus template. Requiring the disclosure of actual concentrations could reveal trade secret information and for this reason no state requires this level of detail to be publically reported.

Response: NDOM generally agrees and some changes were made in the final revisions to the regulation. Section 12(1)(c) requires that before the commencement of HF, the operator shall disclose to the division the additives that are already on a NDOM approved list and proposed to be used including information that may be protected as a trade secret. Section 12(4) requires the post-HF disclosure to FracFocus to include the identity of each additive used in the HF fluid including the trade name and vendor and a brief description of the intended use of the additive. The identity and maximum concentration of each chemical intentionally added to the base fluid and the Chemical Abstracts Service Registry Number must also be included.

Section 12(5) of the revised regulation provides that if the operator requests that certain information be protected as a trade secret (as defined in NRS § 600A.030), the Division shall make findings to determine whether to protect the information. NDOM shall otherwise make information submitted pursuant to this section, except that information deemed proprietary, available for public inspection.

Comment: The Division has not addressed how it will handle trade secrets as part of the approval process for new chemicals. The purpose of the proposed list is not clear and we are not aware of any other state or governmental agency that has created such a list for regulatory purposes.

Response: If the Administrator determines to protect the information from disclosure, it will be confidential proprietary information of the operator, is not a public record and may only be disclosed to other agencies or in judicial proceedings in a manner which preserves the status of the information as a trade secret, (Section 12(5)).

Comment: The Division would be using significant amounts of time and resources to create an approved list of HF chemicals and a process for approving new chemicals that are not on the list in light of the substantial information available and the lack of risk from HF operations. The Division should not adopt the pre-approval requirement for HF chemicals.

Response: The Division disagrees with the commenter because to reference a pre-approved list of chemicals serves the dual purpose of disclosure of chemicals to the public, as mandated by the passage of SB 390, and to advise companies and proponents that there is a specific list of already approved chemicals from which to plan future HF operations.

Comment: A number of comments were received expressing concern over the frequency and duration of water quality sampling and the distance from the wellhead. Why is there a 4-year gap between the first and second subsequent sample? Annual testing seems more appropriate. Why is there no requirement for testing after the second subsequent sample?

Comment: The sampling area should be a three mile radius and sampling should continue every two years after HF for 10 years.

Response: The Division of Minerals generally agrees with the commenters and some changes were made in the final revisions of the regulation that clarify the intent of the sampling. The sampling times and the distance of one mile from the well bore where the formation stimulation occurs by HF operations was adopted from the Colorado rule (one-half mile), which was recently amended in that state, and also extends to include any surface projection of any lateral component of the wellbore.

The distance and duration of sampling must take into account probable fluid flow travel times depending on the permeability of the geologic formations encountered and accordingly, NDOM finds the sampling requirements to be based on sound scientific principles that have been duly considered in other major oil and gas producing states. NDOM realizes that, especially in

Nevada, there are many geologic and hydrologic variables that are considered when modeling fluid flow through oil or gas reservoirs and the surrounding confining formations and has the discretionary authority to require additional sampling on a case-by-case basis, (Section 9(5)).

Response to Comments on Chemical Disclosure

Comment: We strongly recommend that all chemicals used be fully disclosed on the FracFocus website. We must be able to know exactly what is being injected into the ground to protect our precious groundwater in this state. Another commenter added that each chemical in this specific operation be posted and to state precisely how far in advance it must be posted. State that all chemicals must be approved by the division and describe the process for requesting permission to use a chemical not on the list.

Comment: Most of the oil and gas industry are reluctant to disclose the amount and type of chemicals used during HF. There are some chemicals the company officials cannot identify but are regularly used. They are not required to disclose the chemicals which is very disturbing as we do not know the chemicals causing the bad effects.

Comment: It is extremely unethical to allow HF while the "Halliburton Law" is in effect. Congress should review and remove this egregious law.

Comment: The chemical mixtures are mixed with sand and injected into the fractures in the subsurface and the mixtures have been deemed proprietary. This does not allow for disclosure of the toxic chemicals thereby rendering any remediation impossible.

Comment: Hazmat inspections will be needed for the handling, loading and transporting of highly volatile chemicals.

Comment: Please clarify a process for how the Division will approve chemicals for the list on the NDOM website. We recommend the initial list is populated with all chemicals currently known to be used in HF and draw from the Chemical Disclosure Registry known as FracFocus.

Response: The Division of Minerals understands the concerns and generally agrees with the commenters and some significant changes were made in the final revisions of the regulation. Chemicals to be used in the HF process will already have been identified on an approved list on the NDOM website. NDOM intends to populate the initial list from the national registry FracFocus, and continue to evaluate and refine that list over time.

The operator may request by sundry notice permission to use a chemical not on the list at least 30 days in advance of HF. NDOM will make a copy of each approved application for permit to drill or approved sundry notice on the internet website maintained by the division. In addition, information submitted pursuant to Section 12 is available to the public for inspection. Following the HF operations, the operator shall submit a detailed report of the operations to the national internet registry FracFocus.

Response to Comments on Bonding Requirements and Financial Assurances

Comment: Bonding requirements are probably not adequate and are most likely insufficient to cover potential long-term environmental damage.

Comment: When you are developing regulations for oil and gas development keep in mind the public will be the ones to clean up the mess when industries fail or leave so we must be assured that funds will be available to address contaminated aquifers and abandoned wells.

Response: To ensure that a well is properly completed, operated, repaired and ultimately plugged upon abandonment, the existing regulation provides NDOM the discretionary authority to require the owner "obtain a bond in favor of the State of Nevada ***in a sum of not less than*** $10,000 for each well" or not less than $50,000 for multiple wells, (NAC § 522.230, emphasis added). For the purpose of the proposed regulation, the division focused on the mandate in NRS § 522.119 regarding HF and, although bonding was discussed in response to public comment, NDOM did not find it necessary to amend the bonding language. As noted, and if the division finds it necessary, NDOM may require bonds in higher sums under the existing code.

Comment: It was suggested that Nevada consider the applicability of multiple sections in the Colorado code regarding financial assurances required in that state and the commenter noted these were likely inspired by the large number of HF operations there. Some of these requirements include general liability insurance, an environmental response fund, financial assurances to land owners not parties to a lease, centralized extraction and production facilities, etc.

Response: The Division of Minerals agrees with the commenter that the scale of oil and gas development in Colorado is huge compared to Nevada and believes some of these to be worthy of consideration at such time that oil and gas development in this state expands significantly.

Response to Comments on Agency Authority and Elements Not Addressed

Comment: NDEP should have full regulatory authority over potential environmental impacts of HF operations and at a minimum, air quality and water quality permits be issued under NDEP.

Response: Existing regulations governing air quality and water quality will continue to be administered by NDEP for all oil and gas operations.

Comment: Several commenters suggested that HF activities be better regulated by NDEP for any potential environmental impacts. It was again suggested to refer to the Colorado code for guidance and generally the commenter concerns included elements not addressed in the proposed regulation, such as:

- Aesthetic and noise control and visual impact mitigation
- Odors, dust and hydrogen sulfide gas and flaring of gas
- Extraction and production facilities waste management and closure of pits

- Underground injection permitting
- Site inspections, surface reclamation and protection of wildlife

Response: NDOM believes that each and all of the elements not specifically addressed in the proposed regulation amendments to Chapter 522, are in fact already managed under other agency jurisdictions, principally NDEP, but also the Nevada Division of Water Resources (NDWR), and the United States federal regulations for underground injection control (UIC) and visual, cultural and surface reclamation requirements on public lands.

The HF program itself was adopted in NRS Chapter 522 because the Division of Minerals is the responsible regulatory agency for extraction of oil or gas. Nothing in any permit approved by NDOM, and as a specific condition of the permit, relieves the operator of compliance with any other state, federal or local jurisdiction. In addition, where there is overlapping administrative agency authority, the operator generally must comply with the more stringent condition. This principal may be true in a case where federal law may trump state law but the principal is generally also recognized where any conflict of law may exist.

Comment: Are the existing permits issued to Noble excluded from the regulations and is the $50,000 bond supposed to cover damages from a contaminated well?

Response: It has been the policy of NDOM to specify, by special conditions of approval in the existing permits , provisions that are consistent with the proposed regulation to ensure protection of groundwater, and existing law and regulation is in place to do so, (NRS § 522.040 and NAC § 522.260).

NRS § 522.040 (4) provides the purpose of the bond for all oil or gas development is to insure that each dry or abandoned well is plugged and to repair existing wells causing waste.

Comment: The regulations for HF are inadequate to safeguard Nevada's air, water, land and people's health and is not in the best interest of our state. Nevadans do not want HF in our state.

Comment: The plan to allow HF in Nevada does nothing to protect the health of the people and I would rather have water to drink and clean air to breathe and know that Nevada stood against HF.

Comment: On the basis of human rights I register my opposition to HF in Nevada. I am from the Shoshone-Paiute Tribes of Duck Valley and I feel I must do what I can to protect the water and natural resources that provide for all families.

Comment: I am deeply concerned and saddened by the idea of fracking in Nevada and I strongly oppose it.

Response: Arguments against HF or oil and gas development in general that seek to dismiss the regulations on grounds other than the merits are non-responsive to the task given to the agency to carry out the legislative mandate in NRS 522.119. NDEP and NDOM understand the concerns expressed by many commenters but the Legislature did not ban HF in Nevada but directed the

regulatory agencies to develop a program to update the existing regulation to ensure the protection of the environment. The agencies believe the proposed regulation carries out the intent of that mandate.

Response: Other areas of concern expressed by stakeholders may not be addressed here because they are outside the scope of assessing the effects of hydraulic fracturing on the waters of the State of Nevada.

Response to Comments on Penalties, Non-Compliance and Precision

Comment: The proposed regulation should be a "requirements specification" document that identifies each and every action required of the operator with a "shall' statement. As a condition of permit approval, the operator must state whether they are compliant with each requirement. The regulation must explicitly define the conditions under which the operator may begin, continue, resume or must cease operations.

Response: The Division of Minerals agrees with the commenter and changes were made in the final revisions of the regulation. Wherever possible, every requirement of the operator is a "shall" statement. In cases where cementing of casing and pressure testing operations failed to meet the standard set forth in the proposed regulation, the operator shall take any remedial action required by the Administrator to ensure compliance with the intent of protecting groundwater before the resumption of any further drilling or testing, (NAC§ 522.265 as amended).

Section 12 provides that, before the commencement of HF, the operator shall submit an affidavit with cement evaluation logs and results of pressure and mechanical integrity testing to ensure compliance with NAC § 522.260 (protection of groundwater). The operator shall not commence HF operations until they have complied with the provisions for groundwater sampling in Section 9. The operator shall cease HF operations if any change in annular pressure is observed suggesting communication with HF fluids, (Section 12(2)). These are some specific examples of why NDOM believes that, throughout the proposed regulation, sufficient safeguards are in place, at each specific phase of well construction and pressure testing, that the protection of underground sources of drinking water are protected before, during and after any HF operations. This is the agency responsibility and the legislative mandate set forth in NRS § 522.119.

Comment: One commenter went to great lengths and analyzed the perceived lack of precise definitions throughout nearly every section of the proposed regulation. The commenter recommended changes that more clearly define the time required to submit information and how it is to be submitted, what constitutes documentation, when information will be available to the public, when is the static water level made, and that written approval of NDOM be required at various stages of operator compliance. Comments that the terms "as soon as practicable", "immediately" and substantially similar" were echoed by others as imprecise. Specifically define how much "before" the commencement of HF that certification takes place and how is a sundry notice to be submitted?

Comment: During HF operations, define "monitor and record" and how frequently monitoring must take place. How long must recorded data be maintained and by whom? Define how the division is notified and how quickly in the event of a pressure deviation. Define the penalties for not reporting.

Response: The Division of Minerals generally agrees with the commenters and some changes were made in the final revisions of the regulation. Wherever possible, additional clarity for precision was added. The report documenting HF pressures shall be provided to the Division within 15 days. "Immediately" means exactly that, and "as soon as practicable" has been retained to provide some flexibility in some areas for reporting certain pressure test results or cement evaluation logs instead of more precise language. In fact, the Division questioned the use of the term but was advised by the Legislative Counsel that the term is the correct one for a regulatory body and is fully defensible.

NDOM and other regulatory agencies must have some discretion in administering the rule. Nevada is still in the early stages of oil or gas development and the agency does not anticipate the need for some of the suggested changes. The commenter makes some very good observations regarding tightening things up but NDOM finds the revised rule does indeed provide both sufficient specificity and agency discretion.

Comment: Increase penalties as $1,000 per day seems a pittance. Have some teeth in the regulations as deterrence.

Comment: Fines must be significant and revocation of permit must be the result of 2 to 3 violations. In addition to a very large bond, Nevada should set aside a percentage of revenue for cleanup.

Response: The Division of Minerals is authorized by Nevada Revised Statute § 522.120 to make findings that an operator has willfully violated any NDOM order or regulation and existing law provides the penalty of $1,000 for each act of violation and for each day of the violation and the operator may further be found guilty of gross misdemeanor. The penalties are recoverable by filing suit in the district court in the county where the violation occurred or where the defendant resides. Existing law also provides the authority for the division to seek an injunction in the district court to stop any person from violating or threatening to violate any regulation or order,(NRS § 522.130). Accordingly, changes to fines and penalties must be through the legislative process to amend the statute and are therefore outside the scope of this effort.

Response to Comments on Induced Seismicity

Comment: In some areas, HF has been known to cause tremors or earthquakes and although rare, people are reluctant to buy homes in HF areas causing a drop in property values.

Comment: Are there provision in place to make sure no drilling will be done in earthquake prone areas?

Comment: Nevada and the Great Basin are full of earthquake faults and disturbing the ground by cracking rock and injecting chemicals will cause unnatural destabilization that can cause large seismic earthquakes.

Comment: Will the HF procedures weaken the earth's crust and as an earthquake state, will this create more earthquake activity?

Comment: The language does not address resolution to possible conflict between a publically available USGS map and cross-section that may show a fault that is known to be absent from proprietary seismic data.

Response: The proponent of an HF operation must submit geologic and hydrologic information with the permit application that describes basin-specific and location-specific data (Section 10). The location of known or suspected faults within the area of the proposed HF stimulation must be included. If the operator discovers inconsistencies with respect to publically available and proprietary hydrologic or geologic information that the operator reasonably believes to be relevant with respect to potential contamination from HF, the operator shall disclose the inconsistencies to the division. This information will, at a minimum, help to develop a conceptual site model.

Some recent research suggests that the induced seismicity experienced in the mid-continent region of the United States may be triggered by long term reinjection of produced brines from unconventional gas development, not the HF process itself.[3] Existing regulations governing underground injection wells under the federal UIC program will continue to be administered by NDEP for all oil and gas operations.

The Division of Minerals recognizes the widely differing views on this subject and that there are many other sources of information. None of the commenters provided other specific documentation regarding induced seismicity. NDOM believes the proposed regulation includes sufficient requirements to develop a conceptual site model and if needed, has the discretionary authority to require such additional information to assess the effects of HF on the waters of the state.

Response to Comments on Water Quantity and Availability

Comment: Please stop HF in Nevada as we do not have the water and the people need it to live. I will actively work against anyone who supports the destruction of our water resources.

Comment: Considering that water is of major importance and also scarce in Nevada, I feel there should be a hold on HF for at least 5 years to study the impacts.

---

[3] Zhang, Y., et al. 2013. Hydrogeologic Controls on Induced Seismicity in Crystalline Basement Rocks Due to Fluid Injection into Basal Reservoirs. *Groundwate*r 51, No. 4: 525-538.

Comment: HF poses and unacceptable risk to Nevada and as the driest state in the nation how can we afford the millions of gallons of fresh water on this dangerous, industrial practice?

Comment: HF consumes millions of gallons for each well and water levels in this the driest state are even more alarmingly low than they have been in the past and there is no justifiable reason to allow it.

Comment: Nevada is suffering drought enough to give farmers loans to buy water and thinking of how rare water already is, it is not responsible to allow HF. The water is much more needed to maintain the natural environment and to sustain residential and agricultural needs.

Comment: Where is the water coming from? Ranchers are being kicked of grazing lands, rivers are dry and water is already over allocated.

Comment: As residents of the Duck Valley Indian Reservation we depend on continued availability of water for our economic sustenance and our water rights remain in the adjudication process and have not been finalized. No hydraulic fracturing permits should be approved within our watershed prior to finalizing that process.

Comment: Any proposed HF rules should carefully consider the conservation of Nevada's water resources. We believe it might be feasible to produce natural gas by waterless HF that may possibly include injecting pressurized liquid CO2 and thereby also sequestering the CO2.

Response: NDOM believes that concerns regarding water quantity and availability will be properly addressed through the continued administration of the water law set forth in NRS Chapters 533 and 534 by the Nevada Division of Water Resources (NDWR), Office of the State Engineer. Oil or gas drilling operations commonly apply for and obtain permission from the State Engineer to use groundwater on temporary basis to support the drilling and completion of a well. This "waiver for temporary use" does not become a water right per se as it is truly temporary in nature and expires after the oil or gas well is completed or plugged, (See NRS § 534.050). Water use beyond drilling and completion and for HF may require the operator to follow the formal water right process.

The question of the amounts of water to support drilling operations and to support proposed HF operations has been a topic of concern throughout the country. Research by the United States EPA has provided data indicating historical water use for HF operations at somewhere between 350,000 gallons (about one acre foot of water) in some areas to as high as 2 to 4 million gallons (7 - 11 acre feet) at several different shale plays in the nation. The amount of water needed in the hydraulic fracturing process depends on the porosity and type of formations and the well depth and length, fracturing fluid properties, and fracture job design.[4] Preliminary data from HF stimulation in Nevada so far shows water use on the order of 350,000 gallons per well. As best management practices, operators will recycle as much water as

[4] *Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources,* Office of Research and Development US Environmental Protection Agency Washington, D.C. ,November 2011, **EPA/600/R-11/122**

possible not only as a show of good faith but also to recycle HF liquids that must be contained at the surface.

The HF program itself was adopted in NRS Chapter 522 because the Division of Minerals is the responsible regulatory agency for extraction of oil or gas. Nothing in any permit approved by NDOM, and as a specific condition of the permit, relieves the operator of compliance with any other state, federal or local jurisdiction. In addition, where there is overlapping administrative agency authority, the operator generally must comply with the more stringent condition. This principal may be true in a case where federal law may trump state law but the principal is generally also recognized where any conflict of law may exist.

Other areas of concern expressed by stakeholders may not be addressed here because they are outside the scope of assessing the effects of hydraulic fracturing on the waters of the State of Nevada.

Response to Comments on Migration of Fluids into Underground Sources of Drinking Water

Comment: Farmers and agricultural crops are greatly affected by HF as well water gets contaminated due to the seepage of chemicals into the ground. Contaminated water can cause health problems in poultry and livestock. Crops and timber loss is a common problem due to deterioration of water quality. The chances of polluting aquifers during fracking increases and one small mistake can lead to contamination of ground water both near the well and at distant places.

Comment: HF is dangerous and potentially catastrophic to our environment and I would certainly hope the damage done in Ohio, Colorado, Texas and other states would weigh on your decision.

Comment: We oppose all fracking in the State of Nevada due to how disastrous HF is on air quality and to our groundwater supply. We reserve the right to protect the health of our people and our land from any pollutants that come from fracking.

Response: Existing regulations governing air quality and water quality will continue to be administered by NDEP for all oil and gas operations. NDOM technical specifications for construction, pressure testing and operation of oil or gas wells are designed to ensure the effects of HF are confined to the wellbore and to prevent the migration of injected or liberated fluids from the HF stimulation to reach underground sources of drinking water. As provided in the original (1953) statute defining the duties of the Division (NRS § 522.040), this is the regulatory approach designed to control the source of any potential contaminants to the well and to prevent the migration of fluids above or beneath the surface.

NDOM believes that, in addition to monitoring the annular and well head pressures during the HF process to confirm the wellbore mechanical integrity both inside and outside the casing, that the requirement to sample existing water sources will additionally confirm that there was no migration of fluids.

Response: Other areas of concern expressed by stakeholders may not be addressed here because they are outside the scope of assessing the effects of hydraulic fracturing on the waters of the State of Nevada.

Comment: What are the provisions to regulate the disposal of radioactive oil filter socks?

Response: Existing regulations governing the disposal of solid waste will continue to be administered by NDEP. Oil filter socks are produced by straining fluids in the oil production process and not during the drilling or HF of a well.

Comment: What are the provisions to regulate the handling and disposal of flow back water from HF?

Comment: Why do the tanks have to be made of steel? Why can't we divert into a plastic lined reserve pit?

Response: The Division of Minerals provided requirements in the initial draft and some changes were made in the final revisions of the regulation regarding the handling of flow back fluids. The operator shall contain all liquids that are returned to the surface and discharged from the wellbore and shall contain all liquids in enclosed tanks or in a manner prescribed by NDEP, (Section 12(3)).

Comment: Although the research and EPA suggest that HF can be done safely with proper isolation through cement it is not fail safe and many communities around the country have experienced water pollution.

Comment: Have the consequences of fracking been adequately investigated and what tests have been completed and what were the results of the testing?

Comment: I have concerns that inadequate attention has been paid to pollution of deep aquifers and disclosure of proprietary chemicals.

Response: The Division of Minerals has reviewed a number of recently published peer-reviewed professional papers. Some research has suggested that under some conditions there could be fluid migration along naturally occurring fractures in less than 10 years after HF and the author made recommendations of requiring subsurface mapping of faults and possibly setback requirements between faults and HF, as well as the need for more complex modeling and data.[5] In contrast, other research indicates that while it may be possible to propagate a fracture to the ground surface from deep unconventional reservoirs (more than 6000 feet) by HF, it is generally not practically feasible to do so because the pressures required to increase fracturing over the full

[5] Myers, T. 2012. Potential Contaminant Pathways from Hydraulically Fractured Shale to Aquifers. *Groundwater* 50, No. 6: 872-882. See also, Author's reply to Saiers and Barth comment cited below, pages 828-830.

depth are not sufficient in HF.[6] Other research suggests maximum fracture heights from the HF wellbore do not exceed 500 meters.[7] HF affects a much smaller thickness of rock than that of the overburden and elevated pressures are short lived and localized to the fracture network.[8] Suggestions of high vertical flow rates and short travel times are not supported by the body of literature on the hydrogeology of sedimentary basins as the vertical permeability is dominated by the least permeable layer, among other constraints[9] and fluids injected during hydraulic stimulation would exhibit a greater tendency to move laterally rather than vertically.[10]

The NDOM technical specifications for construction, pressure testing and operation of oil or gas wells are designed to ensure the effects of HF are confined to the wellbore and to prevent the migration of injected or liberated fluids from the HF stimulation to reach underground sources of drinking water. As provided in the original (1953) statute defining the duties of the Division (NRS § 522.040), this is the regulatory approach designed to control the source of any potential contaminants to the well and to prevent the migration of fluids above or beneath the surface. NDOM believes that, in addition to monitoring the annular and well head pressures during the HF process to confirm the wellbore mechanical integrity both inside and outside the casing, that the requirement to sample existing water sources will additionally confirm that there was no migration of fluids.

HF has been used for over 60 years and the cases where the migration of fluids (liquids or gas) into underground sources of drinking water have been and are being studied by the United States EPA, both retrospective and prospective case studies.[11] Additional research suggests that the primary reason for fugitive gas migration is due to uncemented annuli in areas of historic drilling operations, improperly plugged wells nearby or inadequate cementing of the annular space behind casing.[12] The proposed regulation addresses each of these areas of concern.

---

[6] Royal Society/Royal Academy of Engineering. 2012. Shale Gas Extraction in the UK: A Review of Hydraulic Fracturing. June 2012, London, UK. **www.raeng.org.uk/shale** . Citation adapted from: Jackson, R.E., et al, 2013. Groundwater Protection and Unconventional Gas Extraction: The Critical Need for Field-Based Hydrogeological Research. *Groundwate*r 51, No. 4: 488-510.

[7] Jackson, R.E., et al. 2013. Groundwater Protection and Unconventional Gas Extraction: The Critical Need for Field-Based Hydrogeological Research. *Groundwate*r 51, No. 4: 488-510.

[8] Flewelling, S.A., and M. Sharma. 2014. Constraints on Upward Migration of Hydraulic Fracturing Fluid and Brine. *Groundwate*r 52, No. 1: 9-19.

[9] Ibid.

[10] Saiers, J.E., and E. Barth. 2012. Comment on "Potential Contaminant Pathways from Hydraulically Fractured Shale to Aquifers." By T. Myers. *Groundwater* 50, No. 6: 826-828.

[11] *Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources,* Office of Research and Development, US Environmental Protection Agency, Washington, D.C. , November 2011, **EPA/600/R-11/122**

[12] Jackson, R.E., et al. 2013. Groundwater Protection and Unconventional Gas Extraction: The Critical Need for Field-Based Hydrogeological Research. *Groundwate*r 51, No. 4: 488-510.

Response to Comments on Technical Recommendations

Comment: The operator shall submit pressure curves documenting the cementing operations. Why do they have to be curves? Setting surface casing to 500 feet could be problematic and a provision for a variance should be included. Requiring a cement bond log before drilling out the shoe is basically impossible and the logs should be run during the next phase of drilling.

Response: The Division of Minerals generally agrees with the commenters and some changes were made in the final revisions of the regulation. The surface casing is one of the new minimum standards in place for HF and may only be considered for a variance under extremely unusual cases. The pressure testing and cementing operations records must be sufficient to determine the mechanical integrity of the section of casing in question. The capital cost of equipment to provide these records is less than $10,000. The cement evaluation reporting requirement was amended to provide the flexibility to run the logs right after drilling ahead or during the next stage of completion.

Comment: The requirement for an intermediate casing string for HF well completions may make the drilling cost prohibitive for some of the smaller companies.

Response: The intermediate casing string is another of the new minimum standards for HF and is similar to other states and several other states call for cementing the intermediate to surface.

Comment: Some liners are run to resolve hole problems and cementing these liners is not necessary in all cases and can add an additional $50,000 to the well. In addition the new cementing requirements and pressure reporting will require the use of professional well-field service companies that could add another $150,000 per well and is unreasonable. Running cement bond logs will add a half day to drilling and additional costs in rig time and log run.

Comment: Requiring pressure curves will require third party cementing service companies adding expense to the well and we recommend changing the language to “all pressure data and supporting information related to the cementing operation.

Response: The intermediate casing string is another of the new minimum standards for HF and is similar to other states that have recently completed a review of their regulations that were the subject of great scrutiny both from the industry and the environmental community. NDOM believes these requirements are consistent with the “source control” objectives of the entire regulation. The Division amended some of the cementing reporting requirements to provide for the opportunity for small operators to accomplish the cementing objectives without the use of a service company. The cost of running cement evaluation reports will be an additional expense that will be required on all casing strings below surface casing. This balances the statutory mandate given to the agency to insure wellbore integrity in return for the opportunity to potentially develop new resources through HF operations.

Comment: It would be difficult to provide recorded HF pressures after each stage as it is a potentially very busy time and could the data be provided after all stages? Also, a 10% annular pressure change could occur from temperature considerations. Regarding the FIT or casing shoe

test, perhaps this should be the ability of the shoe to handle pressures on the order of the heaviest expected mud weight at its equivalent circulating density (i.e. with friction added).

Comment: Consider using a cut-off pressure in psi instead of a percentage change in pressure.

Response: The Division of Minerals generally agrees and some changes were made in the final revisions of the regulation. Annular pressure changes that suggest HF fluids communication is the trigger to stop the HF process and reporting must be done within 15 days of each stage, (Section 12(2)). The FIT was amended to provide better language in the new Section 10 of NAC 522.265 on page 23.

Comment: Please clarify the language describing hydrocarbon zones above which 500 feet of cement must be set.

Response: The Division of Minerals generally agrees and some changes were made in the final revisions of the regulation in the new Section NAC 522.265 (4) that cementing of intermediate or production casing strings be cemented 500 feet above the shoe or 500 feet above any known hydrocarbon-producing zone of interest.

Response to Comments on Third Revised Draft Regulation Dated July 24, 2014

Agency Note: Most of the comments reviewed above were received early on during the review of the proposed regulation dated February 25, 2014. The regulation was then amended as a result of NDOM and NDEP review of the comments and the second revised text was received from the Legislative Counsel on June 25, 2014. After some additional revisions, the Third Revised Proposed Regulation dated July 24, 2014 was received from the Legislative Counsel and was made available to the public on the internet web page maintained by NDOM. Public comment was solicited on this revised regulation until August 15, 2014. Agency response to the summary of comment received prior to that date and at the adoption hearing is set forth in this section. If additional comments are not specifically addressed in this section, it is because they have already been addressed in the sections above. Every effort was made to be responsive in all areas of concern that were raised in the public comment process.

Comment: Research of several sources regarding whether the oil and gas industry is exempt from CERCLA or other federal environmental regulation confirm that the industry is not being truthful and cannot be trusted as they must in fact comply with a number of requirements. The limited exploratory wells drilled in Nevada have been used as a measure of how safe things are but this is a poor comparison to other boom regions of the country. To gamble with the depletion and contamination of our aquifers and air for an outdated method of energy extraction simply defies explanation. We must take the time to study the facts and not rely on industry claims.

Comment: Our concerns with HF in Nevada are extensive and very serious and thinking of exchanging our water and our livelihood for natural gas/oil is absurd. We have sun and wind and

alternative ways to brighten our children's future. Please reconsider following the mistakes of your fellow politicians. Nevada is too precious and fragile.

Comment: Are you commissioners willing to accept liability if my groundwater becomes contaminated from HF? I have talked to everyone involved with the approval process and remain unconvinced that my groundwater is not going to be affected. I will not be able to test for HF fluids since the ingredients are proprietary and this fluid never leaves the ground. There is no plan B if fluids are not contained.

Comment: HF results in dangerous and unregulated air emissions including silica dust during mixing at the surface and organic compounds could be emitted as flowback returns to the surface and is deposited in pits or tanks open to the atmosphere.

Comment: There needs to be provisions for regulating toxic gases unique to HF and to assure HF operations are not emitting excessive gases.

Response: Existing regulations governing air and water quality will continue to be administered by NDEP for all oil and gas operations. In addition, the existing NDOM regulation provides that no gas may be permitted to escape into the air without division approval with exceptions for safety and testing and the disposition of gas produced must be reported.

Response: NDOM technical specifications for construction, pressure testing and operation of oil or gas wells are designed to ensure the effects of HF are confined to the wellbore and to prevent the migration of injected or liberated fluids from the HF stimulation to reach underground sources of drinking water. As provided in the original (1953) statute defining the duties of the Division (NRS § 522.040), this is the regulatory approach designed to control the source of any potential contaminants to the well and to prevent the migration of fluids above or beneath the surface.

NDOM believes that, in addition to monitoring the annular and well head pressures during the HF process to confirm the wellbore mechanical integrity both inside and outside the casing, that the requirement to sample existing water sources will additionally confirm that there was no migration of fluids.

Comment: We do not believe a 300 foot setback between well and water source is adequate.

Response: The Division of Minerals considered the setback rules from 20 other states for building setback and 12 states for setback to water sources and found 300 feet to be the average and a reasonable compromise.

Comment: Sampling requirements do not include gross alpha and beta and this is a huge omission and it is very important to have this as part of the baseline analysis.

Response: The Division examined and discussed the Colorado rule with officials in that state on this issue and concluded that at this time there is not a demonstrated need for this additional level

of testing. NDOM will continue to review this topic with NDEP and other states and has the discretion to include additional levels of sampling if warranted.

Comment: Oil and gas service companies use HF products containing numerous chemicals that are possible known carcinogens or regulated under the Safe Drinking Water Act or the Clean Air Act.

Response: The Division of Minerals understands the concerns and generally agrees with the commenters and some significant changes were made in the final revisions of the regulation. Chemicals to be used in the HF process will already have been identified on an approved list on the NDOM website. NDOM intends to populate the initial list from the national registry FracFocus, and continue to evaluate and refine that list over time.

The operator may request by sundry notice permission to use a chemical not on the list at least 30 days in advance of HF. NDOM will make a copy of each approved application for permit to drill or approved sundry notice on the internet website maintained by the division. In addition, information submitted pursuant to Section 12 is available to the public for inspection. Following the HF operations, the operator shall submit a detailed report of the operations to the national internet registry FracFocus.

Comment: Oil and gas operations are a significant threat to water and wells in California produced 3 billion barrels of waste water in 2011 or 15 times the amount of oil produced and this waste can reach aquifers and drinking water. Unlined surface pits in California and New Mexico have caused numerous instances of groundwater contamination in the last three decades. Injection wells are a threat and the UIC program may be insufficiently protective of groundwater.

Comment: Increased seismicity has been connected to the injection process and there must be an analysis of potential risk of increased seismic activity and potable water contamination from this process.

Response: Some recent research suggests that the induced seismicity experienced in the mid-continent region of the United States may be triggered by long term reinjection of produced brines from unconventional gas development, not the HF process itself.[13] Existing regulations governing underground injection wells under the federal UIC program will continue to be administered by NDEP for all oil and gas operations. NDOM regulates the construction of injection wells but they are operated under the UIC permit.

Comment: HF requires enormous amounts of water – typically between 2 and 6 million gallons per HF well and this can lower water tables and affect biodiversity and as Nevada is the driest state this is cause for concern.

---

[13] Zhang, Y., et al. 2013. Hydrogeologic Controls on Induced Seismicity in Crystalline Basement Rocks Due to Fluid Injection into Basal Reservoirs. *Groundwate*r 51, No. 4: 525-538.

Comment: I oppose HF in Nevada primarily because water is our most precious resource in this the driest state and every drop of groundwater is precious and must not be squandered or polluted.

Response: NDOM believes that concerns regarding water quantity and availability will be properly addressed through the continued administration of the water law set forth in NRS Chapters 533 and 534 by the Nevada Division of Water Resources (NDWR), Office of the State Engineer. Oil or gas drilling operations commonly apply for and obtain permission from the State Engineer to use groundwater on temporary basis to support the drilling and completion of a well. This "waiver for temporary use" does not become a water right per se as it is truly temporary in nature and expires after the oil or gas well is completed or plugged, (See NRS § 534.050). Water use beyond drilling and completion and for HF may require the operator to follow the formal water right process.

Comment: The state and federal agencies are ill-prepared to protect the health and safety of Nevada citizens from the potential ravages caused directly or indirectly from HF. There must be a moratorium against further HF development pending a thorough study and the development of sufficient regulations.

Comment: Permits for HF should be available for public review prior to finalizing, especially given the public concern and in the interest of transparency, NDOM should follow the same procedures of NDEP and to allow public comment and an appeal process for the decision.

Comment: Citizens of many states where the HF boom is ongoing have experienced terrible health complications primarily with groundwater contamination and Nevada is perfectly positioned to lead the renewable energy revolution rather than HF. I strongly oppose HF in Nevada as does nearly every Nevadan I know.

Comment: Please do not allow HF in Nevada as, like New Mexico, there is not enough fresh water to sacrifice for this potentially dangerous method of energy extraction.

Comment: On behalf of our 4000 supporters in Nevada we urge you to ban HF as a dangerous process that has driven down property values and contaminated air and water across the country.

Comment: The evidence that HF is destroying the planet is overwhelming and I cannot comprehend that Nevada is preparing to allow it and I am begging you to come to your senses and say no to HF.

Comment: There are towns in Texas that did HF and now have no drinking water as it was poisoned or dried up and hundreds of cancer causing chemicals are used and we must say no to HF in Nevada.

Comment: We live in a desert and water is our most precious resource and I believe that as responsible adults we have a tremendous responsibility to our future generations and I encourage you to say a very firm NO to HF.

Comment: In opposition to HF I must ask that if we are threatening our own existence through over population, climate change, pollution and destruction of our biological environment, can this quagmire we have orchestrated actually be defined as successful?

Comment: Our goal as a nation and as a state is to protect public health and it is imperative we know the implications of HF on our citizens and a moratorium is needed to allow science time to study the method further. An unbiased party must be responsible for developing the HF program. Not only will HF scar the land but very few permanent jobs will be created at the risk of contaminating our water and air.

Response: Arguments against hydraulic fracturing (HF) or oil and gas development in general that seek to dismiss the regulations on grounds other than the merits are non-responsive to the task given to the agency to carry out the legislative mandate in NRS § 522.119. NDEP and NDOM understand the concerns expressed by many commenters but the Legislature did not ban HF in Nevada but directed the regulatory agencies to develop a program and to update the existing regulation to ensure the protection of the environment. The agencies believe the proposed regulation carries out the intent of that mandate.

Response: Other areas of concern expressed by stakeholders may not be addressed here because they are outside the scope of assessing the effects of hydraulic fracturing on the waters of the State of Nevada.

Comment: We believe the DRI hydrologic investigation is a step in the right direction but should have been completed before any HF in Nevada. We continue to call for a groundwater model and installation of monitoring wells at least over a potential well field area. It is the groundwater monitoring aspect with which we continue to disagree with the agencies.

Comment: Long term sampling must still be required even if operations do not last very long or the well does not produce hydrocarbons because the concern is the injection and migration of the HF fluids. We feel the law requires water quality monitoring and this regulation envisions specific instances where this will not occur. While we understand the argument that no other state requires it, Nevada should have a higher standard as water is more scarce.

Comment: Why is there still no sampling well required if there are no other water sources in the area and there is evidence available of potable water sources up to 14,000 feet deep and water is far more valuable to allow any exceptions of the sampling requirement in SB 390.

Comment: Pressure testing is not fool-proof and a monitor well must be required. We cannot be 100% sure that HF is safe.

Response: The proponent of an HF operation must submit geologic and hydrologic information with the permit application that describes basin-specific and location-specific data (Section 10). The known location and depths of all water sources within the area of the proposed HF stimulation must be included together with the source of water to be used in the operation. In many remote areas, the operator may drill a temporary water source well near the location to support the drilling and completion operations for the oil or gas well and hence this water source

would then be included for monitoring. This information will, at a minimum, help to develop a conceptual site model.

NDOM recognizes the substantial cost associated with requiring the operator to install a monitoring well, and knows of no other state that does. NDOM also recognizes the potential confusion with designing a well to monitor all underground sources of drinking water and the potential for creating another pathway for the migration of fluids in the monitor well itself. However, as a result of the mandate in SB 390 and as provided in NRS § 522.119(1)(a), NDOM and NDEP may exercise their authorized discretion and require such additional information as is needed on a case-by case basis to assess the effects of HF on the waters of the state.

Response: Water quality monitoring is recommended by a number of organizations as industry best practices to establish baseline groundwater quality[14]. In addition, the general concept of establishing baselines for environmental indicators, such as groundwater quality, is a show of good faith and will ultimately reduce liability[15]. In the initial review of the permit application, and throughout the operation and plugging of the well, NDOM staff will continue to be guided by their statutory mandate and the intent of the regulation to protect the waters of the state from contamination.

Comment: We still do not see a compelling reason why trade secrets must be protected, especially on public lands near groundwater sources.

Comment: If even a slight risk to the aquifers of Nevada exists, no HF must be permitted without a disclosure of the chemicals used.

Comment: Without the knowledge of the specific agents and chemicals used in this practice, the manner and means of various messes that could occur and how to deal with the possible contamination risks all seem too high to allow HF to go forward in my judgment.

Response: The Division of Minerals understands the concerns and generally agrees with the commenters and some significant changes were made in the final revisions of the regulation. Chemicals to be used in the HF process will already have been identified on an approved list on the NDOM website. NDOM intends to populate the initial list from the national registry FracFocus, and continue to evaluate and refine that list over time.

The operator may request by sundry notice permission to use a chemical not on the list at least 30 days in advance of HF. NDOM will make a copy of each approved application for permit to drill or approved sundry notice on the internet website maintained by the division. In addition, information submitted pursuant to Section 12 is available to the public for inspection. Following the HF operations, the operator shall submit a detailed report of the operations to the national internet registry FracFocus.

---

[14] Appalachian Shale Recommended Practices Group, *Recommended Standards and Practices,* **http://asrpg.org/pdf/ASRPG_standards_and_practices-April2012.pdf** , (April 2012)

[15] International Energy Agency, *Golden Rules for a Golden Age of Gas, World Energy Outlook Special Report on Unconventional Gas,* **http://www.worldenergyoutlook.org/goldenrules/** , (May 29, 2012)

Response: Section 12(5) of the revised regulation provides that if the operator requests that certain information be protected as a trade secret (as defined in NRS § 600A.030), the Division shall make findings to determine whether to protect the information. NDOM shall otherwise make information submitted pursuant to this section, except that information deemed proprietary, available for public inspection.

Response: If the Administrator determines to protect the information from disclosure, it will be confidential proprietary information of the operator, is not a public record and may only be disclosed to other agencies or in judicial proceedings in a manner which preserves the status of the information as a trade secret, (Section 12(5)).

Comment: Why was the hearing scheduled in Elko and not near the large population areas of either Clark or Washoe County?

Response: The Division found that the northeastern part of Nevada was most likely to be affected by future oil or gas exploration operations.

Comment: We recommend edits to use a different name for the area of review to avoid confusion with the federal UIC regulation and suggest editing the section on requiring additional sampling to include statistically significant changes in the water chemistry.

Response: The Division disagrees and does not believe there will be confusion with the term area of review and additionally finds that the administrator must maintain broad discretion to require additional monitoring to comply with the intent of the legislative mandate in SB 390.

Comment: Our frustration with BLM and the sale of leases nearby stems from their lack of involvement with the public. The State's regulatory scheme needs to be an open process and we ask that you extend the public comment period to allow for multiple public meetings throughout the state.

Comment: This regulation has not provided for sufficient public process and has been flawed and non-transparent. Why not meet again in December? Can we not postpone the decision to allow for more public involvement?

Comment: The HF technology is well established and I do not believe the regulation was rushed and have confidence in the regulators to protect the groundwater.

Response: The Commission on Mineral Resources (CMR) first generally considered the mandate set forth in SB 390 at their August 15, 2013 quarterly meeting, and then directed the Division of Minerals (NDOM) to move forward with drafting a regulation and developing the program to address hydraulic fracturing at their October 10, 2013 meeting.

NDOM and Division of Environmental Protection (NDEP) staff met informally with stakeholders prior to developing the draft regulation on November 21, 2013. Stakeholders

included individuals that had provided direct comment regarding SB 390 during the legislative session.

NDOM developed the initial draft regulation and presented it to the public and the CMR at the Commission meeting on January 16, 2014. The CMR considered public comment on the proposed regulation that was submitted at the meeting and voted to file the draft regulation with the Legislative Counsel for the administrative review process as set forth in NRS 233B. NDOM then delivered the proposed regulation to the Legislative Counsel on that date.

As provided in NRS 233B and for all agency proposed regulations, the Legislative Counsel completed their review and approved the revised text of the proposed regulation and returned it to NDOM on February 25, 2014.

On February 27, 2014, and as provided in NRS § 233B.0603, NDOM issued the Notice of Intent to Act Upon a Regulation and Notice of Workshops to receive public comment. The Notice was sent to all interested persons on the agency established mailing list and was posted on the NDOM internet web page. The Notice was also sent to all oil, gas, and geothermal producers in Nevada, each county library, the State Library and Archives, the Legislative Building, and each facility where the workshops would take place. The time and place for each workshop was set forth in the Notice for March 17, 2014 in Carson, March 19, 2014 in Elko and March 21, 2014 in Las Vegas. At each of the workshops, full opportunity was provided all wishing to comment or submit written comments on the proposed rule. The date for submitting written comments was extended to March 28, 2014.

The proposed regulation was then amended as a result of NDOM and NDEP review of the comments and the second revised text was received from the Legislative Counsel on June 25, 2014. After some additional revisions, the Third Revised Proposed Regulation dated July 24, 2014 was received from the Legislative Counsel and was made available to the public on the internet web page maintained by NDOM, and written comment was solicited on this revised regulation until August 15, 2014. Additional comment was received at the public hearing on August 28, 2014.

Names and addresses of persons submitting written comments on the proposed regulation of the Nevada Division of Minerals of the Commission on Mineral Resources, submitted with Informational Statement as provided in NRS 233B.066

Jennifer Eisele Shoshone Paiute Tribes Duck Valley Indian Reservation Owyhee, Nevada	Andrea Juillert-Overt daerice@yahoo.com
Jim Garza White Pine County Ely, Nevada	Amanda Esposito Las Vegas, Nevada esposito5585@yahoo.com
Michelle Cure Wells Band Council Te-Moak Tribe of Western Shoshone Wells, Nevada	John Farley Reno, Nevada jefarley63@gmail.com
Donna Lamb Nye County Water District Pahrump, Nevada	Janice Keiserman Petition to stop fracking 180 pages of signatures Las Vegas, Nevada
Steve Litsinger Stagecoach, Nevada	Petition to NDOM and Governor To stop fracking in Nevada 1905 signatures Las Vegas, Nevada
Allen Moss Reno, Nevada	Bob Fulkerson Progressive Leadership Alliance of Nevada – PLAN Reno, Nevada bfulkerson@planevada.org
Tim Donohoe SRK Consulting Reno, Nevada	Shannon Salter Las Vegas, Nevada shannon.salter@gmail.com
Joe Bryan Northern Nevada Nations jbcrossingworlds@gmail.com	Jerry Walker Consulting Geologist Reno, Nevada jerry_reno@charter.net
Raquel Arthur AIMNNV raquelarthur@yahoo.com	David von Seggern, Chair Toiyabe Chapter Sierra Club Reno, Nevada
Nancy Gammie CRSDC ngammie@yahoo.com	John Hadder Great Basin Resource Watch Reno, Nevada

Jacques Maye Reno, Nevada	Catherin Boyd Western States Petroleum Association Sacramento, California cathy@wspa.org
Susan Jamerson Austin, Nevada	Gregg Kozlowski MAKOIL INC Lake Forest CA makoil@msn.com
Tasha Dietrich Reno, Nevada tasha.wiedfeld@gmail.com	Steve Barnes Grant Canyon Oil and Gas steve@breckenergy.com
Debbie Walmsley Gardnerville, Nevada tndwalsmley@charter.net	Kevin Vorhaben Noble Energy Inc Denver Colorado
Rob Telbs CSN Las Vegas, Nevada	Bill Ehni Consulting Geologist Ehni Enterprises Carson City, Nevada ehnient@aol.com
Chris Hyepock Candidate for Governor Las Vegas, Nevada	Ben Enis ENIS LLC/EnisWindGen Henderson, Nevada benenis@cox.net
Christian Gerlach North Las Vegas, Nevada christian.franciso.gerlach@gmail.com	Thomas Jackson Baker Botts LLP Halliburton Energy Services Inc Houston, Texas
Ralph Sacrison rsacrison@frontiernet.net	Petition to NDOM and Governor To stop fracking in Nevada 2,093 signatures Las Vegas, Nevada
Pedro Ormaza Elko, Nevada ormaza@frontiernet.net	Kyle Davis Davis Strategies Reno, Nevada www.davis-stategies.com
Tara Younker Las Vegas, Nevada kittygirl_kittygirl@yahoo.com	Dr. Michael Branch Reno, Nevada
Richard Lorson Reno, Nevada	Eleanor Bravo Corrales, New Mexico

Patricia Collie Las Vegas, Nevada patinvegas2003@yahoo.com	Thomas and June Esposito Sparks, Nevada
Mariah Gonzales Northern Nevada gonzalem1@sou.edu	Sam Schabacker Western Region Director Food & Water Watch Denver, Colorado
Lindsey Manning Shoshone-Paiute Tribes of Duck Valley Owyhee, Nevada	Karen Gradington Henderson, Nevada Dawn Harris Reno, Nevada dawnharris.22@gmail.com
Linda Gillaspy Reno, Nevada	Donald Molde, MD Reno, Nevada
Kenna Medlin Las Vegas, Nevada ezr2c@aol.com	Jill Ransom RN Reno, Nevada sierramoon@sbcglobal.net
Kathleen McDaniel Las Vegas, Nevada k.mcdaniel1@cox.net	Debra Amens, Counsel Reese River Basin Citizens Against Fracking LLC Austin, Nevada
John Lusar Elko, Nevada	Theresa Shamanka theresashamanka1953@gmail.com
Jean Pagni Reno, Nevada	Barbara Elsbrend Williams Carson City, Nevada barbaragain13@gmail.com
Kelly Beeson Mesquite, Nevada kbeeson1369@gmail.com	Dawn Harris Petition to NDOM and Governor To stop fracking in Nevada 130 pages of signatures Reno, Nevada
Donna Vega Las Vegas, Nevada donnavegalv@aol.com	Dawn Harris Petition to NDOM and Governor To stop fracking in Nevada 110 pages of signatures Reno, Nevada
Deborah Gordillo Las Vegas, Nevada gnd@6163@gmail.com	Janice Keiserman Petition to stop fracking 192 pages of signatures Las Vegas, Nevada

Dave Cencula davcen@yahoo.com	Hayley and Jesse Baumgartner Spring Creek, Nevada hayleybeen@yahoo.com
Bernard & Bernadette Arias Henderson, Nevada bjarais@gmail.com	Steve Fisher Gillman Springs, Nevada rpgpublicity@gmail.com
Rob Mrowka Center for Biological Diversity Las Vegas, Nevada www.BiologicalDiversity.org	

The sign-in sheets for the attendees of the workshops are available from the agency and will be made available for viewing on the Nevada Register of Administrative Regulations.