GREAT BASIN RESOURCE WATCH

Working with Communities to Protect Their Land Air and Water

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State of Nevada
Commission on Mineral Resources
Division of Minerals
400 W. King Street, Suite 106
Carson City, Nevada 89703

State of Nevada
Attn: David Gaskin
Division of Environmental Protection
901 South Stewart Street
Carson City, Nevada 89701

Re: Second Revised Proposed Regulation of the Division of Minerals of the Commission on Mineral Resources LCB File No. R011-14 - Amendment of oil and gas regulations for oil and gas wells, wells intended for hydraulic fracturing and for geothermal wells.

Great Basin Resource Watch (GBRW) appreciates the time that the Division of Minerals (NDOM) and Division of Environmental Protection (NDEP) staff spent with us to discuss the revised proposed regulations. The meeting was informative and productive to our understanding of the division's perspective on the regulations.

In general, GBRW does not see that Nevada is ready for hydraulic fracturing. Senate Bill 390 from the 2013 legislative session which initiated this process in crafting hydraulic fracturing specific regulations should have required a moratorium on fracking until environmental analysis specific to Nevada is realized. For example, the state of New York has seen significant oil and gas hydraulic fracturing, and initiated a Generic Environmental Impact Statement ("GEIS") which sets parameters that are applicable statewide for SEQRA (State Environmental Quality Review Act) review of oil and gas well permitting in 1992. The most recent revision now in draft form was completed in 2011 in light of recent "high-volume hydraulic fracturing" activities. The state of New York defines high-volume hydraulic fracturing as "shall mean the stimulation of a well using 300,000 gallons or more of water as the base fluid in the hydraulic fracturing fluid per well completion."[1] This definition is consistent with the Nevada proposed hydraulic fracturing regulations.

Nevada does not have such an overarching examination hydraulic fracturing specific to our conditions and that evaluates state level resource impacts. The Bureau of Land Management has

[1] New York Codes, Rules and Regulations (NYCRR), Title 6, Part 560.2 subpart b, revised.

done some brief environmental reviews for specific exploration sites such as Mary's River and Huntington Valley, which provide some information, but many questions remain that need to be answered to develop optimal regulations. GBRW acknowledges the first report[2] in a series by the Desert Research Institute (funded by Noble Energy) that focuses on Nevada specific assessment for a Noble Energy hydraulic fracturing project. This is a step in the right direction, but the analysis GBRW expects to see from this series of reports should have been done before any hydraulic fracturing occurred and in advance of regulations. Therefore, it is important that the regulations be as encompassing as possible to try to compensate for this lack of analysis, and exercise a more precautionary principle approach. The regulations can then be revised as we understand the specifics for Nevada.

Permit and Public Process

Permits for hydraulic fracturing wells should be available for public review prior to finalizing, which includes a detailed plan of operations with the anticipated hydraulic fracturing scheme. It is our understanding that the NDOM does not have the process of posting draft permits for public review as does NDEP. Especially given the public concern over hydraulic fracturing, and in the interest of public engagement and transparency, the NDOM should follow at a minimum the same procedure that NDEP uses for air, water and water pollution control permits. This procedure is to post the draft permit for a 30 day public comment period, and process comments with agency responses, and then issue a Notice of Decision on the permit. In addition an appeal of a permit procedure should be installed, so that the public has recourse to an independent body, such as the State Environmental Commission.

Air Quality - Permitting and Monitoring

It is our understanding that an air pollution permit process will be applied under the existing regulations. However, there maybe some toxic gases unique to hydraulic fracturing operations that are not covered under existing regulations. NDEP needs to investigate this possibility and modify its permitting to include any of these.

Ambient air monitoring is also needed at oil and gas/hydraulic fracturing sites to assure that hydrogen sulfide is at acceptable levels and that methane gas is not being released excessively. Methane is a powerful greenhouse gas and there is data that indicates large releases from oil and gas (OG) operations.[3] There needs to be a provision to assure that hydraulic fracturing operations are not emitting excessive greenhouse gases.

When well servicing operations take place in zones known to contain at or above one hundred (100) ppm hydrogen sulfide gas, as measured in the gas stream, the operator shall file a hydrogen sulfide drilling operations plan (United States Department of the Interior, Bureau of Land Management, Onshore Order No. 6, November 23, 1990)

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.

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[2] Schumer, Rina and Greg Pohll, "Preliminary Assessment of Hydraulic Fracturing Fluid Concentrations and Hydrologic Conditions in Noble Development Area #2, Upper Humboldt River Basin," Desert Research Institute, February, 2014.

[3] Johnson, Jeff, "Methane's Role In Climate Change," Chemical and Engineering News, July 7, 2014, Volume 92 Issue 27, pp. 10-15.

Water Quality – Permitting and Monitoring

The groundwater protection approach of NDOM and NDEP is to assure proper installation and operation of the wells that prevent leakage and flag leaks during operation. GBRW certainly supports this element of groundwater protection. The well construction and testing regiment in the proposed regulations appear to be stringent enough to achieve this goal. The other element of groundwater protection is the establishment of a complete baseline and routine monitoring is also critical to detect any contamination that could occur as a result of operator error, equipment malfunction, or other contamination migration pathways that are assumed to be unavailable at this time. It is the groundwater monitoring aspect that GBRW remains in disagreement with the agencies upon.

The current environmental analysis by the state of New York is that, "activities associated with high-volume hydraulic fracturing pose a risk of causing significant adverse impacts to Primary Aquifers and, therefore, such operations may not be consistent with the long-term protection of Primary Aquifers."[4] A Primary Aquifer is defined as "highly productive aquifers presently utilized as sources of water supply by major municipal water supply systems." This concern is sufficient that the New York draft GEIS recommends the following:

- Barring the placement of high-volume hydraulic fracturing well pads over Primary Aquifers and an associated 500-foot buffer to provide an adequate margin of safety from the full range of high-volume hydraulic fracturing activities.
- require a site-specific SEQRA review (like an environmental impact statement) for placement of high-volume hydraulic fracturing well pads that are proposed to be located over Principal Aquifers or within a 500-foot buffer.

Clearly, New York is very concerned about impacts of hydraulic fracturing on groundwater, and unlike Nevada New York has done a detailed environmental review with full public involvement. Many of the locations where hydraulic fracturing is proposed in Nevada may not fall under the full definition of New York's Primary Aquifer, since they may not be high volume municipal sources, but Nevada potentially impacted aquifers are commonly used by agricultural operations, so clean water is also very important.

In Nevada it is illegal to "degrade" (contaminate) groundwater, and given the concern and potential to impact groundwater from all aspects of hydraulic fracturing operations including production fluid and hydraulic fracturing fluid spills we need to cover all the bases in protection of our groundwater. GBRW continues to see the need for a groundwater model analysis and proper placement of groundwater monitoring wells. NDOM and NDEP staff expressed to GBRW the concern of overly onerous regulations in the context of requiring dedicated groundwater monitoring for each permitted well. Ideally, the groundwater analysis and monitoring system would be for an oil and gas field, which would define a larger area. However, a company is not required to submit permits for a well field, and it is possible (although unlikely) that there will be only one well in a region. GBRW recommends that NDOM and NDEP at least consider well field analysis and monitoring as an alternative permitting process. One way to approach this is to define a well field as representing a minimum area (perhaps on the order of 1,000 acres) including the horizontal extension of the hydraulic fracturing wells, which would

[4] New York State Department of Environmental Conservation, *Revised Draft Supplemental Generic Environmental Impact Statement On The Oil, Gas and Solution Mining Regulatory Program, Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reservoirs,* September 7, 2011. p. 7-40.
http://www.dec.ny.gov/energy/47554.html

then be the "area of review." Another approach would be to specify a minimum number of wells for a hydrographic basin or specific aquifer as a well field.

At the same time GBRW notes that regulations and regulators have been historically needed so that companies do not pollute the environment and impact public health, and that should be the focus of regulators. Even as recently as 2008-2009 toxic flowback/produced water was discharged and diluted into publicly owned treatment works under permit.[5] Regulators should be focused on the protection of the environment and impact public health, so if there is only one well then that company gets to bear the costs of the needed hydrogeographic analysis and monitoring that later permitting will benefit from.

The monitoring system would include the "available sources" as described in the draft regulations, but also include other dedicated monitoring wells as needed to complete the monitoring scheme. This scheme needs to be able to intercept any potential contamination from the hydraulic fracturing operations and sample groundwater at a level as suggested by the groundwater model. The sampling regiment should also include at least an annual sampling. Annual sampling after closure of the well field should be for at least 5 years.

Section 9 subsection 2 in the proposed regulations allows for an exemption from groundwater sampling. As implied above GBRW does not support allowing such an exemption. However, a modification of the regulations using the well field approach could allow for this in the case of permitting one or two wells.

Water samples should be analyzed for all of the following: pH, specific conductance, total dissolved solids (TDS), dissolved gases (methane, ethane, propane), alkalinity (total bicarbonate and carbonate as $CaCO_3$), major anions (bromide, chloride, fluoride, sulfate, nitrate and nitrite as N, phosphorus), major cations (calcium, iron, magnesium, manganese, potassium, sodium), other elements (barium, boron, selenium and strontium), presence of bacteria (iron related, sulfate reducing, slime forming), total petroleum hydrocarbons (TPH) and BTEX compounds (benzene, toluene, ethylbenzene and xylenes), and gross alpha and beta. Field observations such as odor, water color, sediment, bubbles, and effervescence shall also be documented.

GBRW emphasizes that the gross alpha and beta is not in the current revised regulations and this is a huge omission. It is very important to have this as part of the baseline analysis. The radioactivity in flowback water is often in the form of radon gas, which can move through different pathways than water. Due to its chemically inert nature radon can migrate through considerable underground strata. Thus, it is one of more likely contaminates.

Wastewater

GBRW supports the requirement in the proposed regulations to store flowback wastewater in on-site containers. It is our understanding that this wastewater is to be disposed of using deep injection. NDEP should investigate other means of disposal in view of problems with injection in other states. Increased seismic has been connected to the injection process[6], and the Great Basin is also seismically active. GBRW recommends that prior to injection, as part of the permitting

[5] Urbina, Ian, "Regulation Lax as Gas Wells' Tainted Water Hits Rivers," New York Times (Feb. 26, 2011).

[6] C. J. de Pater, S. Baisch, "Geomechanical study of Bowland Shale seismicity, Synthesis Report" (Cuadrilla Resources, Ltd., 2011); Reuters, "Ohio earthquake was not a natural event, expert say s," Reuters, 2012; National Academy of Sciences, Induced Seismicity Potential in Energy Technologies (National Academies Press, Washington, DC, 2012).

process, there be an analysis of potential risk in increased seismic activity and potable water contamination from this process. In some locations it may be necessary to dispose of the wastewater in a different manner such as shipping offsite. This action also poses some risks that need to be evaluated as well.

Wastewater should also be sampled and analyzed fro the same constituents as the water and monitoring wells. Flowback fluids are often quite radioactive and could yield a low-concentration radioactive waste that must be handled appropriately and has potential on-site human health implications.

NAC 522.380 "Procedure for underground disposal of water" is quite brief (not quite ½ page). NDEP should include a notification process that shall describe the proposed operation and shall state that any person who would be directly and adversely affected or aggrieved by the authorization of the underground disposal into the propose injection zone may file, within 30 days of notification of injection, a written request for a public hearing before the Commission. The notice shall also state that additional information on the operation of the proposed disposal well may be obtained at the NDOM office. This procedure could be incorporated into the initial permit, but if the injection well is permitted separately, which appears to the case now, it should be included in the existing permit process. The principle here is very important, a clear path for public redress of deleterious actions by the operator. It is not clear in the Nevada regulations that a specific notice would be publically filed with the option for appeal.

Financial Assurances

The Colorado regulations[7] contain a section titled "Financial Assurance and Oil and Gas Conservation and Environmental Response Fund (sections 701 through 712), which was most likely inspired by the large number of hydraulic fracturing operations in the state. The state of Nevada should review these sections for applicability to Nevada.

Bonding amounts for drilled wells contained in NAC 522 are probably not adequate. These regulations appear to be based on traditional oil and gas extraction and are most likely insufficient to cover potential long-term environmental damage. Again, to supplement the bonding requirements for drilled wells the state of Colorado has included a number of additional financial assurance provisions that Nevada should include for hydraulic fracturing operations:

1. *General liability insurance* – "All operators shall maintain general liability insurance coverage for property damage and bodily injury to third parties in the minimum amount of one million dollars ($1,000,000) per occurrence. Such policies shall include the Commission as a "certificate holder" so that the Commission may receive advance notice of cancellation." [section 708][7]
2. *Oil and Gas Conservation and Environmental Response Fund* – "The Commission shall ensure that the two-year average of the unobligated portion of the Oil and Gas Conservation and Environmental Response Fund is maintained at a level of approximately, but not to exceed, four million dollars ($4,000,000), and that there is an adequate balance in the fund to address environmental response needs" [section 710][7]
3. *Financial assurances to land owners* - "Operators shall provide financial assurance to the Commission, prior to commencing any operations with heavy equipment, to protect surface owners who are not parties to a lease, surface use or other relevant agreement with the operator from unreasonable crop loss or land damage caused by such operations." [section 703][7]

[7] State of Colorado, *Complete Rules*, Colorado Oil and Gas Conservation Commission.

4. *Centralized extraction and production (E&P) waste management facilities* – "An operator which makes application for an offsite, centralized E&P waste management facility shall, upon approval and prior to commencing construction, provide to the Commission financial assurance in an amount equal to the estimated cost necessary to ensure the proper reclamation, closure, and abandonment of such facility" [section 704][7]
   N.B.: Such facilities may not be in the works for Nevada, so this provision may be added later.
5. *Natural gas gathering, natural gas processing and underground natural gas storage facilities* – "Operators of natural gas gathering, natural gas processing, or underground natural gas storage facilities shall be required to provide statewide blanket financial assurance to ensure compliance with the 900 Series rules in the amount of fifty thousand dollars ($50,000), or in an amount voluntarily agreed to with the Director, or in an amount to be determined by order of the Commission. Operators of small systems gathering or processing less than five (5) MMSCFD may provide individual financial assurance in the amount of five thousand dollars ($5,000)." [section 711][7]
6. *Surface facilities and structures appurtenant to Class II commercial underground injection control wells* – Operators of natural gas gathering, natural gas processing, or underground natural gas storage facilities should be required to provide statewide blanket financial assurance in the amount of fifty thousand dollars ($50,000), or in an amount voluntarily agreed to with the NDEP. Operators of small systems gathering or processing less than five (5) MMSCFD may provide individual financial assurance in the amount of five thousand dollars ($5,000)."

Additional Elements of the draft regulations that need to be included

In our comparison of regulations concerning hydraulic fracturing by other states it appears as though many aspects of the Nevada regulations are incomplete and not even under consideration. The Nevada Administrative Code (NAC) Chapter 522 was clearly written largely for traditional oil and gas extraction, where only a small section specific to hydraulic fracturing. GBRW views the hydraulic fracturing procedure as distinctly different than traditional extraction methods and thus requires more detailed and specific regulations, of which other states have seen the need.

Regulations focusing on the following aspects should be added to the Nevada regulations. GBRW recommends that Nevada use the state of Colorado regulations for language on the following:

1. *Aesthetic and noise control* – "The rules and regulations in this section are promulgated to control aesthetics and noise impacts during the drilling, completion and operation of oil and gas wells and production facilities." [section 801][1] There is a provision in Colorado regulations that local governments can apply to the Colorado Oil and Gas Conservation Commission (COGCC) for exemption from these regulations.
2. *Visual impact mitigation* – "Production facilities, regardless of construction date, which are observable from any public highway shall be painted with uniform, non-contrasting, non-reflective color tones (similar to the Munsell Soil Color Coding System), and with colors matched to but slightly darker than the surrounding landscape." [section 804][1]
3. *Odors and dust* – "Oil and gas facilities and equipment shall be operated in such a manner that odors and dust do not constitute a nuisance or hazard to public welfare." [section 805][1]
4. *E&P waste management* – "The rules and regulations of this series establish the permitting, construction, operating and closure requirements for pits, methods of

E&P waste management, procedures for spill/release response and reporting, and sampling and analysis for remediation activities." [section 901]

5. *Pits and closure of pits* – NAC 522 lacks detail in this aspect of hydraulic fracturing operations and in particular there are no specifics regarding pit reclamation. GBRW again recommends reviewing the Colorado code sections 902 through 905.[1]
6. *Management of non-E&P waste* – "Certain wastes generated by oil and gas-related activities are non-E&P wastes and are not exempt from regulation as solid or hazardous wastes. These wastes need to be properly identified and disposed of in accordance with state and federal regulations." [section 907A (a)][1]
7. *Venting or flaring natural gas* – "The unnecessary or excessive venting or flaring of natural gas produced from a well is prohibited." [section 912 (a)][1] there are exceptions to this requirement in subsequent subsections.
8. *Hydraulic Fracturing specific reclamation* – The Colorado regulations dedicates significant sections to reclamation of hydraulic fracturing facilities in sections 1001 through 1004 that spans eight pages of regulatory detail. These sections should be reviewed for inclusion and adaptation for the Nevada regulations.
9. *Measurement of produced and injected water* – "The volume of produced water shall be computed and reported in terms of barrels on the basis of properly calibrated meter measurements or tank measurements of water-level differences, made and recorded to the nearest one-quarter (1/4) inch of one hundred (100%) percent capacity tables." [section 330a[l1]
10. *Site investigation, remediation, and closure* – "This section applies to the closure and remediation of pits other than drilling pits constructed pursuant to Rule 903.a.(3); investigation, reporting and remediation of spills/releases; permitted waste management facilities including treatment facilities; plugged and abandoned wellsites; sites impacted by E&P waste management practices; or other sites as designated by the Director." [section 909][1]
11. *Protection of wildlife resources* – "Prior to the preparation of a Comprehensive Drilling Plan or the submittal of a Form 2A for a proposed new oil and gas location, an operator shall review the Sensitive Wildlife Habitat map and the Restricted Surface Occupancy map maintained by the Commission on its website and attached as Appendices VII and VIII to determine whether the proposed oil and gas location falls within Sensitive Wildlife Habitat or a Restricted Surface Occupancy area. The operator shall include this determination in the Form 2A or Comprehensive Drilling Plan." [section 1201][1]

In closing, GBRW finds the revised proposed regulations an improvement over the initially proposed regulations, and still not adequate. If adopted as is GBRW looks towards possible future improvements. Given the uncertainties surrounding hydraulic fracturing and its potential impacts on the specific environments in Nevada and the incompleteness GBRW remains concerned that these proposed regulations will not provide sufficient protection of public health and the environment.

GBRW is open to continued discussion of the proposed regulations and our comments here.
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Sincerely,

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