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Via U.S. and Electronic Mail

Trina Ozer
N.C. DENR
1601 Mail Service Center,
Raleigh, N.C. 27699
Shale_gas_comments@ncdenr.gov

Re: *Session Law 2011-276 Draft Study Comments*

Dear Ms. Ozer:

Please accept these comments on the Department of Environment and Natural Resources' study of hydraulic fracturing ("fracking") required by Session Law 2011-276 ("Draft Study"). The Southern Environmental Law Center submits these comments on behalf of itself, North Carolina Sierra Club, and Environment North Carolina. Overall, we believe DENR succeeded in identifying a significant number of important gaps in our understanding of hydraulic fracturing, its risks with respect to the environment and human health, and North Carolina's lack of a regulatory system that is capable of managing those risks. Because of these factual and a regulatory shortcomings, the Draft Study's conclusion, that fracking can be done safely, is unsupportable and, as described in further detail below, cannot be made based on existing information.

"The analysis is constrained by the limited information available at this time."¹

Deep in the Draft Study, DENR acknowledges the fundamental shortcoming of the study – that there simply is not enough information available to make a reasoned decision at this time. In fact, the agency goes on to specifically describe the limitations with respect to North Carolina, stating that "[w]e do not have detailed or comprehensive information on the extent and richness of the shale gas resource" in the state.² The estimates of potential reserves are based on a meager two wells with "significantly different values."

Continuing, DENR recognizes that "the depth and quality of groundwater resources in the Triassic Basins of North Carolina appear to be very different from conditions in the Marcellus shale" and that we do not yet know what those differences are or how they may affect public health and environmental effects of fracking.³ Critically, the Draft Study states that "North Carolina does not seem to have as great a separation between potential drinking water resources and the gas-producing zone" highlighting our collective ignorance regarding one of the key issues that the industry has cited as a primary protection against drinking water

¹ Draft Study at 304.

² Id.

³ Id.

contamination. In addition, the Triassic Basin is sprinkled with diabase dikes, formations that further complicate comparisons to other states. Moreover, a similar lack of separation and unusual groundwater circumstance appears to be important in the groundwater contamination EPA is studying in Pavillion, Wyoming, information that DENR was precluded from taking into account in this study due to the rushed timeline.⁴

Ultimately, that lack of information undermines any assertion that fracking can be done safely. The Draft Study acknowledges that “no comprehensive studies are currently available on the long-term impacts to health from hydraulic fracturing for natural gas, and DENR is not qualified to conduct such a study. DENR recognizes that questions remain about health impacts.”⁵ Initial studies about broad impacts to public health issues from fracking are just emerging⁶ or just beginning.⁷

A similar information deficit is apparent in the economic analysis. The use of the IMPLAN model for economic impacts is dubious, as that model does not consider the displacement effects of boom development (e.g., lost tourism revenue and so on) and generally doesn't look at counter-factuals (e.g., could the state benefit *more* from some other development mode). Therefore, the economic picture is no clearer than the environmental or regulatory view.

With the limited information on North Carolina's potential resources and the environmental and public health effects of extracting those resources largely unknown, it is not possible to determine whether fracking can be done safely.

Nonexistent or outdated regulatory programs preclude any estimate of the ability to adequately regulate known and unknown impacts of fracking.

Even if DENR had reliable information regarding the shale formation in North Carolina, environmental effects of fracking or public health impacts, it is clear that there is a substantial deficit of information regarding a potential regulatory structure. Much of the regulatory structure discussed in the report relies on nonexistent, undersized, or underfunded regulatory bodies. In terms of regulations that must be established, DENR identifies a need for the General Assembly or another entity to:

- conduct a comprehensive air and water quality sampling program;
- develop an air toxics program that addresses hazardous air pollutant levels within a parcel;
- survey water withdrawals and approve water management plans;
- revise oil and gas construction standards to suit horizontal drilling and hydraulic fracturing;

⁴ Id.

⁵ Id.

⁶ See Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources, available at <http://www.ucdenver.edu/about/newsroom/newsreleases/Pages/health-impacts-of-fracking-emissions.aspx>.

⁷ Draft Study at 2.

- develop setback requirements that protect neighbors, adjoining property, wetlands, floodplains, water supply watersheds, and public lands;
- create a state stormwater program for oil and gas drilling;
- develop solid waste standards that account for:
 - radiation monitoring;
 - standards for landfills that accept exploration and production wastes;
 - fees for use of industrial landfills;
 - cover of wastes accepted into MSW landfills;
 - unknown interactions between wastes and liners; and
 - land application of waste;
- develop disclosure requirements and a method for disclosing fracking fluid constituents to the public;
- regulate contents of fracking fluids, including prohibition of diesel fuel;⁸
- create a data management system to collect baseline data, track production, facilitate public involvement, communicate with industry, and assist in permitting, inspections, and enforcement;
- prepare first responders to respond to a well blowout, chemical spill, or other emergency;
- develop a modern oil and gas regulatory program;
- establish procedures for coordinating permit review;
- define a system of taxes and fees that will support the regulatory program, environmental initiatives, and local governments;
- identify a source of funding to repair road damage;
- define the role of local governments in siting oil and gas facilities;
- conduct additional research on local governments, infrastructure, and economic impacts; and
- establish a scheme to allocate liability for environmental damage resulting from oil and gas activities.

DENR recommends, and we support, doing each of these things with “additional public participation opportunities.”⁹ This list represents a significant number of detail-filled tasks which are interdependent and whose outcome is uncertain. At this point, no specifics have been proposed for any of these programs or standards, and it is unclear which agency would be tasked with filling these substantial holes.

In other states, the developments of these programs have taken years and, in many cases, are still works in progress. During those processes, the proposals have changed and adapted with input from the public and the industry. One example of an evolving regulatory program is the disposal of fracking wastewater. In Pennsylvania, wastewater was initially sent to public treatment works, but those facilities were not equipped to handle the waste and discharges into streams harmed the aquatic ecosystems. Wastewater was then shipped to Ohio, where it was injected underground. But Ohio has recently become more cautious about underground injection

⁸ Any regulation of fracking fluids should also require the use of increasingly common non-toxic substitutes – an issue that was not addressed in the Draft Study and must be analyzed before judging whether fracking can be done safely.

⁹ Draft Study at 303.

in the aftermath of several fracking-related earthquakes. The Draft Study does not provide a solution to this persistent wastewater problem, yet the conclusion that fracking can be done safely assumes that one exists – even though other states have been unable to discover it.

Given that the Draft Study has not been able to accurately assess the environmental and public health risks related to fracking – primarily because of constraints due to limited information as described above – and that the study acknowledges that entire programs must be created or overhauled to deal with fracking, it is not possible to say that the state can safely regulate fracking. Each of the programs and standards described above will have numerous parts which relate to, and rely on, one another and must be viewed in total before any entity can reasonably determine that a program is protective.

That need is particularly acute with fracking, where experience in other states shows that if North Carolina were to effectively regulate fracking in a manner that prevented significant environmental and public health problems, it would be the first state to do so. For example, if cementing standards are inadequate, even reasonable setback regulations could not be protective. And, as discussed in the next section, an ideal regulatory program can be severely hampered by an inadequate inspection and enforcement program.

Robust inspections and enforcement are essential to any regulatory program.

Even if DENR were able to design a program that included regulatory standards that were universally determined to be protective of public health and the environment, those standards would only be as good as the inspection and enforcement program. As evidenced by recent disasters offshore – including the Deepwater Horizon explosion, spills in Brazil, and the ongoing natural gas platform emergency in the North Sea – as well as reports of violations from onshore gas producing sites, regulatory standards are frequently violated.

Three studies of onshore oil and gas development illustrate the importance of inspections and enforcement in regulatory schemes. In Arkansas, a group recently reviewed inspection records from natural gas drilling and production sites for inspections that occurred between July 2006 and August 2010.¹⁰ The analysis found that during that time more than half of the 538 inspections uncovered at least a single violation and that 544 violations were recorded in total.¹¹ Seventy five percent of those violations were for noncompliance with regulatory standards rather than paperwork or reporting requirements.¹² Fifty two percent of routine inspections, as opposed to inspections in response to a complaint, uncovered violations.¹³ Finally, the analysis found that the largest companies were responsible for a significant number of violations, with the largest operator in the state, Seeco/Southwestern, being cited for violations on 53% of its inspections.¹⁴

¹⁰ Arkansas Public Policy Panel, Violations of Water Quality Standards from Gas Production in Arkansas at 1 (Sept. 2011).

¹¹ *Id.* at 4.

¹² The report suggests that the remaining 25% of violations were less serious because they were paperwork or reporting violations. Given the nature of the industry and the chemicals used, failure to report appropriately or maintain proper records can create significant environmental and public health hazards.

¹³ *Id.* at 6.

¹⁴ *Id.* at 7.

A similar story has unfolded in Pennsylvania. PennEnvironment analyzed inspection reports from 2008 through 2011 and found that 64 companies were cited for 3,355 violations during that time period.¹⁵ The group found that 2,392 of those violations posed a direct threat to the environment, including 650 instances of improper erosion and sedimentation control and 550 citations for faulty pollution control techniques.¹⁶ Cabot Oil & Gas Corp and Chesapeake Energy combined to cause more than 800 violations, with Cabot being cited, on average, for nearly 2 violations per well drilled.¹⁷

Finally, a report from the Democratic staff of the House Natural Resources Committee describes a similar scenario on federal public lands. That study found that 2,025 violations were issued to 335 companies in 17 states between 1998 and 2011.¹⁸ Surprisingly, the analysis found that some companies were cited for drilling without the proper permits or without giving required notifications.¹⁹ More than 20% of the major violations documented involved deficient casing and cement.²⁰ Despite finding numerous violations, enforcement actions and fines were scarce, with only six percent of violations resulting in monetary penalties, which were insignificant even when issued.²¹

These analyses demonstrate that even a strong regulatory program cannot ensure that oil and gas companies comply with the law. Without widespread inspections and meaningful enforcement, the best regulatory program cannot be protective. In light of recent budget actions and proposals to eliminate regional DENR offices, it is unlikely that DENR would be able to effectively monitor the oil and gas industry or enforce violations without a significant budgetary increase. In addition to the gaps in information identified above, the absence of an inspection and enforcement program to implement whatever regulatory program could be created would guarantee an ineffective program.

Emerging information and inadequate regulation: Air quality as an example.

As DENR notes in the Draft Study, “air emissions associated with oil and gas activities may include a number of potential contaminants with differing health and environmental consequences.”²² The issues surrounding air quality impacts demonstrate the weaknesses in our knowledge of air quality issues related to the industry, the effect on human health, and regulatory approaches in North Carolina and elsewhere which have successfully dealt with air emissions. It is critical that DENR assess what those health and environmental impacts are, and how to protect North Carolinians from them before fracking is allowed to occur here.

Shale gas development creates significant air pollution. A recent Colorado study found

¹⁵ PennEnvironment, *Risky Business: An Analysis of Marcellus Shale Gas Drilling Violations in Pennsylvania 2008-2011* at 1 (Feb. 2012).

¹⁶ *Id.* at 3.

¹⁷ *Id.* at 4.

¹⁸ Democratic Staff of the House Natural Resources Committee, *Drilling Dysfunction: How the Failure to Oversee Drilling on Public Lands Endangers Health and the Environment* at 20-21 (Feb. 8, 2012).

¹⁹ *Id.* at 18.

²⁰ *Id.* at 17.

²¹ *Id.* at 20-21

²² Draft Study at 134.

residents within a half-mile of fracking operations were exposed to hazardous air pollutants at five times acceptable federal levels.²³

To address some of these concerns, DENR must go beyond the Draft Study to:

- Collect baseline data of the air quality in areas where oil and gas exploration are proposed.
- Evaluate measures to ensure the minimization of the release of toxic chemicals and greenhouse gases into the atmosphere. Hydraulic fracturing can unleash volatile organic compounds and heavy metals into the air around well pads, especially when open pits are used to store drilling fluids and wastewater. Additionally, methane can leak into the atmosphere from storage tanks, leaking lines and throughout the supply chain, acting as a very potent greenhouse gas, and wasting the sought after product.
- Take advantage of information compiled with respect to U.S. EPA's proposed regulations for the oil and gas industry, and assess North Carolina's Air Toxics rules in conjunction therewith, to ensure that sources producing toxic air pollutants such as hydrogen sulfide, benzene, ethyl benzene, toluene, and xylene are regulated in a manner that protects human health.
- Reassess the use of property boundaries as the measuring point for ambient air levels for the air toxics.
- Assess the potential ozone impacts of fracking under existing ozone standards and the impacts under the 60-70ppb standard recommended by EPA, which could cause much of the area in the Triassic Basin to be designated non-attainment for ozone. Even short term increases in NOx emissions in those areas could contribute to an increase in ozone formation and impact future non-attainment designations.
- Identify and study other potential sources of air pollution related to natural gas extraction and production, including burning trash and burning brush to clear property for wells, and determine if North Carolina's open burning regulations are adequate to protect the public.
- Evaluate emission increases from mobile sources such as heavy-duty truck traffic associated with natural gas production, including higher emissions of NOx, VOC and PM2.5. DENR must analyze whether current North Carolina anti-idling and fugitive dust regulations are adequate to control these higher emissions or whether further regulation is required.

At the outset, the state must maintain existing protections. Of particular concern with respect to air quality is the current proposed amendment to N.C.'s Air Toxics Program that could be adopted as early as next month. Under that proposed legislation, North Carolina's Air Toxics rules "shall not apply to any air emission source that is subject to any requirement under 40 C.F.R. Parts 61 and 63 (as amended) or 42 U.S.C. § 7412(j) as amended." North Carolina's Air Toxics program regulates some very harmful toxins that are not regulated federally. However, the amendment means that the State will not be able to regulate sources that emit pollutants on the federal Hazardous Air Pollutants list, but also emit pollutants exclusive to North Carolina's

²³ See Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources, available at <http://www.ucdenver.edu/about/newsroom/newsreleases/Pages/health-impacts-of-fracking-emissions.aspx>.

state Toxics Air Pollution list. An example is hydrogen sulfide, a highly toxic and flammable gas that can have extreme impacts on the human nervous system, and is emitted into the air from natural gas production operations. If the exemption described above is enacted, then it appears that fracking activities in North Carolina will be exempted from the Air Toxics program, and DENR will not have the authority to regulate hydrogen sulfide emissions from these operations.

That result is counter to the recommendations of the recently completed STRONGER report. During the STRONGER meetings held in Raleigh in late 2011, the STRONGER team noted that North Carolina's Air Toxics rules would be helpful if fracking were to come to North Carolina. In fact, the Air Toxics Rules were one of the few programs that the report cited favorably. In its report, STRONGER noted that the N.C. Air Toxics Program regulates benzene and hydrogen sulfide which are both emitted in the fracking process. If the proposed amendment to the Air Toxics Rules is enacted, that protection will be lost. DENR should reconsider the amendment to the Air Toxics Rules and ensure that fracking operations are not exempted.

Lack of information and regulatory structure undermines conclusion that fracking can be done safely.

DENR should be commended for much of what is in the Draft Study. In numerous places, the agency acknowledges that we simply do not have enough information to fully understand the environmental and public health risks associated with fracking and lack baseline information about the potential shale gas resource in North Carolina. We have inadequately funded, developed, and staffed regulatory agencies with limited understanding of the oil and gas industry. That level of openness is essential if the State is to fairly evaluate the impacts of fracking and make an informed decision about whether fracking should be permitted in North Carolina and, if so, what rules must be put in place. Despite the candid acknowledgment that we do not yet know the effects of fracking, what the extent of industrial activity would be in North Carolina, or how we would regulate it, the Draft Study concludes it can be done "safely as long as the right protections are in place."

Jumping to this conclusion after recognizing the agency's substantial deficit in information and North Carolina's overwhelming lack of regulatory infrastructure to manage the oil and gas industry is reckless and undercuts the valuable work the agency has done compiling the Draft Study. Before DENR could legitimately venture to make that conclusion, the agency would, at a minimum, need to:


1. Review ongoing studies of public health and environmental impacts of fracking when they are concluded, including EPA's analyses and other state investigations, and draw appropriate inferences to North Carolina;
2. Conduct thorough analyses regarding the geology of the Triassic Basin, including a detailed fracture and fault study as well as an analysis of the effect of diabase dikes on migration of fracking fluids;
3. Prepare a realistic estimate of the number of wells North Carolina would support, identify water sources for those wells, and evaluate the potential effect on human and environmental uses of existing water supplies;

4. Evaluate the proposed changes to existing regulatory programs, including the Air Toxics Program and potential loss of DENR regional offices under this year's budget;
5. Develop and evaluate each of the additional regulatory programs listed above, paying particular attention to the interaction between the programs and coordination of the proposed permitting process; and
6. Develop an inspection and enforcement scheme that ensures that the State has a sufficient number of qualified inspecting facilities, and that companies who consistently violate environmental regulation pay fines and restrictions that deter future violations.

The Draft Study makes clear that we have much to learn regarding North Carolina's geology and hydrology as well as the effects of fracking on both. The Draft Study also makes clear that DENR does not know if fracking can be done safely or what must be contained in the detailed regulatory structure that would manage the industry. The final study should be revised to reflect this uncertainty.

If you have any questions regarding these comments, please contact me at (919) 967-1450 or ggisler@selcnc.org.

Sincerely,



Geoffrey R. Gisler

cc:

Will Morgan, Sierra Club
Elizabeth Outz, Environment North Carolina