CHAPTER VI

IMPACTS of HYDRAULIC FRACTURING and NATURAL GAS DRILLING OPERATIONS on ROADS and SAFETY

High volume hydraulic fracturing (HVHF) relies on a significant amount of truck traffic to support operations. Heavy trucks deliver equipment, water and other fluids, and materials for all stages of the HVHF process, both to and from the drill site. In order to gain access to the desired drilling sites trucks may need to travel roads maintained by state and local agencies. Large increases in heavy truck traffic will have a significant impact on roads and bridges. It is because of this impact that the New York State Department of Environmental Conservation has said that State and local agencies should enter into road use agreements with the gas and oil companies responsible for the heavy truck traffic in order to mitigate its effects. Assessing the condition of roads prior to the expected increase in use will be necessary in order to have a baseline of road conditions. Road use agreements, road impact studies, road condition monitoring and ensuring proper follow through on agreements will all require additional resources from New York State Department of Transportation and local, municipal road crews.

The dSGEIS addresses the issue of transportation impacts and suggests mitigation measures. Information used in the dSGEIS regarding transportation was collected from several sources. They include the Independent Oil & Gas Association of New York (IOGA-NY),[1] New York State Department of Transportation (NYSDOT),[2] and a study prepared for the New York State Energy Research and Development Authority (NYSERDA).

The DEC provides estimated numbers of truck trips based on three different scenarios. The department uses "low", "average", and "high" development scenarios to produce three sets of numbers over a period of thirty years. [3] On the low development end we see the first year of operation requiring around 1.5 million heavy truck trips annually. This number increases and levels off by the tenth year at over 18 million heavy truck trips per year. On the high development end, the operation begins with about 11 million truck trips, increasing to 111 million truck trips after ten years. These figures are for New York State, excluding the eight counties of Broome, Chemung, Tioga, Delaware, Otsego, Sullivan, Cattaraugus and Chautauqua counties. Those counties have separate estimates that are specific to their circumstances. The high development scenario predicts over 500 million annual truck trips in New York State as a whole after ten years of production, continuing until year 30.[4] With the obvious increase in heavy truck traffic there is huge concern over the weight of the vehicles that are making all of the trips. Trucks used to haul water, sand, and materials can weigh 80,000 to 100,000 pounds.[5]

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[1] dSGEIS, 2011, Chapter 6, p.301.
[2] dSGEIS, 2011, Chapter 6, p.313.
[3] dSGEIS, 2011, Chapter 6, p. 308, table 6.63.
[4] Ibid.
[5] Tompkins County Impact Assessment: High volume Hydraulic Fracturing, 2011 p.71

Some of the truck trip estimates in the dSGEIS have errors in the calculations. NYSDEC commissioner Joe Martens also testified at a NYS Assembly Hearing on Hydraulic Fracturing on Oct. 6, 2011 that the truck trip estimates in the dSGEIS were underestimated by up to 300%. In its September, 2011 dSGEIS, the DEC predicted an average total truck trip estimate of 3,958 round trips per high volume well. A vertically fracked well requires about 1,810 round trips.[6] If one adds 300% to this figure, the per-horizontal-well estimate rises to about 15,832 trips. Since a well pad can have up to 16 wells, the number of trips could amount to 253,312. This is quite a difference from DEC's original estimate. When one considers the fact that gas-producing wells can be refracked several times during their average 30-year life span, the number of trips rises exponentially.

Major state roads and interstate highways are designed to withstand heavy loads. The county and the town maintain most roads in the Town of Rensselaerville, and these lighter duty roads are not designed for the heavy traffic that this kind of trucking would present. The impacts are numerous and costly. For example, the DEC asserts that most heavy truck trips are used to transport large amounts of water needed to horizontally frack a well (the number of truck trips is based on the assumption that each horizontal well will require 5 million gallons of water trucked to the site during early well pad development). These are mostly very short trips between actual water procurement and the well pad.[7] However, when one considers the total number of heavy truck trips required for equipment and materials, the potential for damage to local roads and bridges is extremely high.

According to the DEC, damage could range from minor cracking in the road surface to complete road failure. It would also mean the need for extra maintenance for bridges, traffic devices and storm and runoff structures.[8] Maintaining and repairing roads with their current use is a job that the state and towns struggle with already. *"Maintenance and repair of the road infrastructure in New York currently strains the limited budgets of the New York State Department of Transportation (NYSDOT) as well as the county and local agencies responsible for local roads. Heavy trucks generally cause more damage to roads and bridges than cars or light trucks due to the weight of the vehicle. A general rule of thumb is that a single large truck is equivalent to the passing of 9,000 automobiles (Alaska Department of Transportation and Public Facilities 2004). The higher functioning classes of roads, such as the interstate highways, generally receive better and more frequent maintenance than the local roads that are likely to receive the bulk of the heavy truck traffic from the development of shale gas*."[9]

There are also operational and safety impacts on road systems due to the heavy traffic. The number of accidents and on-road breakdowns are likely to increase, requiring the response of police and towing services. And, the cost for needed safety improvements would increase. A new turn lane would average between $17,000 and $34,000, while an intersection signal installation could cost up to $150,000.[10] Added to this is the much higher cost of addressing

[6] sGEIS, 2011, Chapter 6, pp.302-303.
[7] dSGEIS, 2011, Chapter 6, p.310.
[8] dSGEIS, 2011, Chapter 6, pp. 310-311.
[9] dSGEIS, 2011, Chapter 6, p.311.
[10] dSGEIS, 2011, Chapter 6, pp. 314-315.

capacity and flow restraints because of high truck traffic and the volume of employee traffic, upwards to $1,000,000 per lane, per mile.[11]

In order to mitigate negative impacts on roads, the well drilling operator must develop a transportation plan that evaluates pre-impact conditions so that any potential damages to roads and infrastructure can be fairly assessed. An accurate assessment of current conditions by using a baseline survey can prove beneficial to both the local municipality and the operator. *" Baseline surveys should include information for local, state and interstate roads. State and interstate highways are surveyed annually while state secondary roads are surveyed every two years (NYSDOT 2010). However, local municipalities may not have the funds, equipment, or staff to survey local roads on a regular basis. Therefore, it would be the responsibility of the operator to conduct a baseline survey of local roads in accordance with methods described in the NYS traffic survey methods manual (NYSDOT 2010). The results of a baseline survey of local road conditions should be combined with an assessment of the existing heavy truck traffic on the local roads and the relative amount of project-related traffic to develop a road condition study. This road condition study would be used to assess the proportion of the cost of road repairs that would be the responsibility of the operator. For example, if the road condition study concludes that the well operator would double the existing heavy truck traffic, and the road condition study indicates that a deterioration of pavement condition during the heavy traffic period of the project would occur, then the operator would be required to have an agreement in place to pay for the work required to repair or prevent the road deterioration."*[12]

Under NYS highway vehicle traffic laws, local municipalities retain control over their roads. The power to implement measures to prevent or minimize road impacts belongs to the local municipalities. It is, according to DEC, the local municipality's responsibility to make road use agreements with gas drilling companies. Municipalities would have to include guidelines that insure payment would come from the drilling companies for road damages. In addition, once a well is completed and producing gas, presumably a municipality can collect revenues via ad valorem taxes. However, it may be difficult to prove that road damage was caused solely by gas drilling operations. Also, a municipality cannot fully depend upon anticipated tax revenues as a back up for financing road repairs. (See Chapter 7 p. 8 of this report for further discussion.)

ROAD SPREADING

A closely related issue regarding road impact is road spreading, one method for the disposal of produced brine from gas well drilling. Prior to 1984, brine was disposed of in a pit adjacent to the drilled gas well, where it was allowed to infiltrate into soil and/or evaporate. Later, brine pits were not considered environmentally acceptable due to the high potential for groundwater contamination. In 1988, the following three methods for brine disposal were identified: 1) road spreading brines for deicing and road stabilization (dust control), 2) discharge to surface waters through permitted facilities, and 3) underground injection. Costs for these methods added a significant financial burden to gas producers in NYS. By offering brine to municipalities as a

[11] dSGEIS, Chapter 6, p. 315.
[12] dSGEIS, Chapter 7, p. 137.

cost effective way to de-ice roads, it saves gas producers significant sums of money in waste disposal fees.[13]

Road spreading has a seasonal nature, with some municipalities in NYS already using this brine to control dust on back roads and to control road ice during the winter months. However, questions have been raised concerning the safety of this use. As early as 1992, the DEC recognized potential environmental issues due to improper application of brine on roads. The department pointed to possible runoff issues and spills.[14] Also, brines are less desirable than solid salt for deicing roads, as the refreezing of the liquid brine may result in slippery icy surfaces.[15]

NORM (Naturally Occurring Radioactive Materials)

Marcellus shale is known to contain NORM concentrations at higher levels than surrounding rock formations and can be brought back to the surface during gas well drilling.[16] NORM is found in flowback fluids, cuttings, and in produced brine and can also accumulate in well casing pipes in the form of scale or sludge. Radium – 226 is the primary radionuclide of concern from the Marcellus shale.[17] Because it is soluble in saline water and has a long radioactive half-life of about 1,600 years, Radon gas is a primary health concern as radium - 226 decays. Because of this, beginning in 2009, the DEC prohibited the use of flowback water for road spreading.[18]

However, it is still possible to use produced brine for this purpose. Any company that wished to use brine for road spreading would first have to have a BUD and 364 permit issued before removing brine from a gas well site.[19] The Department will evaluate BUD petitions on a case by case basis, and limit the volume and frequency of road spreading with produced brine. However, it is unclear how DEC would make a final determination. Since Governor Cuomo has said he would not increase DEC staffing at the beginning of high volume gas drilling operations in New York State, there is a serious question of how well the Department can monitor road spreading. Contaminated produced brine flowing into streams and ponds is environmentally damaging, and the potential for radium – 226 being present in the brine is hazardous to human health.

ROAD SAFETY

There is general appreciation for the low amount of traffic in the TOR as described in the Comprehensive Plan, and natural gas drilling operations will dramatically change that picture in the TOR. According to the dSGEIS, the increased amount of truck traffic and general increase in vehicular traffic would most likely cause an increase in the number of breakdowns and accidents

[13] "Disposal/Recovery Option for Brine Waters From Oil & Gas Production in NY," (Energy Authority Agreement NO. 1591-ERER-RIER-91), Mark Matsumoto and others, State University at Buffalo, October 9, 1992.
[14] GEIS, 1992, Chapter 15, p.10.
[15] "Disposal/Recovery Option for Brine Waters From Oil & Gas Production in NY," pp. 2 - 20.
[16] dSGEIS, Chapter 4, p. 35.
[17] Ibid.
[18] dSGEIS, 2011, Chapter 7, p.61.
[19] dSGEIS, 2011, Chapter 7, p.6.

in the TOR.[20] These potential breakdowns and accidents would place an extra burden of time, money, and personal risk on local fire and ambulance volunteers. There is also concern about the potential spills and accidents from trucks transporting hazardous materials and wastes and the impact on safety personnel and the environment.[21] Additional costs for emergency services and needed road safety improvements, such as turn lanes, installing new signal lights and intersections, would be expensive and fall on the local municipalities. It is a rule of thumb when thinking about emergency preparedness that all emergencies are local. First responders to accidents, explosions, chemical spills and other disasters will almost always be county and local safety and/or health departments.[22] Since resources for Public Health Emergency Preparedness and Response for New York State Department of Health (NYSDOH) and Local Health Departments has declined over the past ten years, it has been increasingly difficult for the agencies to effectively deal with disasters. Adding potential accidents due to hydraulic fracturing could severely impact their effectiveness.[23] The obvious subsequent question is how will an increase in potential disasters impact an already increased response and financial burden on local communities?

The impact of the gas drilling industry on roads and bridges as well as the potential for health hazards as a result of road spreading with produced brine, raises many questions that have as yet gone unanswered.

[20] dSGEIS, Chapter 6, p 314.
[21] dSGEIS, Chapter 6, p. 315.
[22] "NYSACHO Report To High-Volume Hydraulic Fracturing Advisory Panel of New York State Department of Environmental Conservation," published by the New York State Association of County Health Officials, January 12, 2012, p.5.
[23] NYSACHO Report, pp. 5-6.