Comment on *The SEAB Shale Gas Production Subcommittee Ninety-Day Report – August 11, 2011*

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August 14, 2011

The biggest single shortcoming of *The SEAB Shale Gas Production Subcommittee Ninety-Day Report – August 11, 2011* is failure to take into account the following equation:

assertion of best practice - strong accountability = ineffective PR

Here in the midst of Marcellus Shale country we are used to going to public meetings at which an industry representative speaks; palaver about "best practice" is routinely dished up in generous amounts at *every meeting*. We are sick of hearing it. All the companies say this, with no data to back it up. If the SEAB thinks that the public will be reassured by some formalized effort around so-called "best practice" without a formal mechanism of accountability for failing to meet it, you make a dire miscalculation.

What will be the consequence for failing to meet "best practice"?

The Ninety-Day Report is silent on this subject. That silence is unacceptable.

Will the federal government deny contracts for natural gas not produced according to "best practice"?

Will the EPA write these "best practices" into BAT requirements, and will BAT be applied to individual wells, pipelines, and compressor stations?

These would be consequences with some teeth. If the public is to be reassured that shale gas can be produced by horizontal hydraulic fracturing safely, ***we need to see the teeth***.

There are numerous other specific shortcomings in the Ninety-Day Report. Urgently needed are the following:

- Health-Based Pollution Regulations

Air quality regulations tend to be measured in units of pollutants such as tons per year. Health recommendations for exposure to toxic substance disease (e.g. ATSDR, OHSA) tend to be measured in units such as ppm for a given number of minutes. No one is facing the fact that these two measurement systems are incommensurable. Consider an EPA regulation that would allow a compressor station to emit 50 tons a year of some pollutant. The midstream company is *in compliance* if it emits 25 of those tons in a single week and the other 25 tons the rest of the year. How many toxic substance disease exposures is that 25 tons in one week? What is the weather during that week? Is there a temperature inversion? What amount of wind is there? What is the topography — does this compressor station sit in a topographic depression?

Air pollution regulations tend to take into account none of these things. We need air pollution regulations that specify explicitly:

The operator may not emit any pollutant at any time in sufficient quantity to cause toxic substance disease exposure.

We are a long way away from having such regulations.

- Air Pollution Regulations Must Clearly Apply to Individual Production Facilities

Air pollution regulations may look good on paper, but when the details are examined in the original regulese language, catch-words like “major source” have definitions which allow an individual well pad or compressor station to evade regulation. To the extent that regulations apply at all, they must be invoked by complex litigation using “aggregation arguments” which may be difficult to apply in practice. The public understands this. Air pollution regulations need to be written with a granularity that clearly applies to individual production facilities. It is not enough to say that 50 wells taken together may not emit pollution. Pollution must be regulated *at each facility*.

- Public Disclosure of All Pressure Anomalies

Public alarm over hydraulic fracturing has tended to focus on the contents and toxicity of fracking fluids. Notably absent from discussions of fracking is consideration of the enormous pressures used, and consideration of the ***whole-system consequences*** of such pressures. The pressures are so enormous (e.g. 15,000 psi) that the term weapons grade pressure is appropriate. There have been no fewer than 3 blowout accidents in Pennsylvania within roughly the last year. A blowout tends to be a highly public event, which receives wide press coverage. But what about a pressure anomaly that causes no surface eruption? Will it even be reported? Probably not. The public will not be informed, regulatory agencies will not be informed, no one outside the operating company will be informed. Here is the problem:

Any pressure anomaly may be evidence that a pathway for environmental contamination may have been opened.

Thus, all such anomalies need to be reported. Whether the cause is faulty well construction (e.g. flawed cementing), encountering an unpredicted geological feature, or anything else, disclosure of all pressure anomalies must be mandatory. It is *primary data* in evaluating the possibility of unanticipated pathways for environmental contamination.

- Public Disclosure of Microseismic Data

As above, microseismic data can indicate that a hydraulic fracture has “escaped” the narrow targeting intended by a well operator. Such data may also be indicative of connection to a pathway for environmental contamination. For these reasons, it must be disclosed.

- Public Disclosure of the Contents of Produced Water

Public disclosure of the contents of fracking fluids is badly needed, and a good step, but does not go far enough. Produced water may contain not only compounds not present in fracking fluid, and not normally occurring at the surface, but compounds resulting from underground chemical reactions between naturally occurring compounds and the fracking fluids. These reactions are not well understood. Produced water must be made available for independent 3rd party testing on a regular basis.

- Regulation of the Transport of Flowback/Produced Water as a Hazardous Substance

Flowback and produced water can contain numerous substances which are toxic and/or radioactive. Most natural gas production companies are reusing this water and transporting it from one well site to another. The call by the SEAB for cradle-to-grave tracking and manifesting of such water is commendable, but more is needed. Such water is typically transported in trucks that are either unmarked or completely disingenuously marked as e.g. “Residual Waste”. ***This is potentially hazardous material.*** Its transport must be regulated as such.

- Prohibition of Open Impoundments

The SEAB's attention to the issue of air pollution is commendable. However, notably absent was consideration that an impoundment for produced water is a serious source of air pollution. Some unconventional gas extraction companies make a point of proclaiming they do not use impoundments and instead rely on "closed loop" systems; such companies emphasize this as part of their "best practice". The SEAB Ninety-Day Report did not even see fit to include closed loop containment systems in its list of best practices. As above, listing as a "best practice" is not sufficient. "Frack pits" should be prohibited.

Likewise, open impoundments for drill cuttings should also be prohibited. Both frack pits and drill cuttings may contain radioactive materials. There is an important point here regarding radioactivity. Radioactive constituents of the Marcellus Shale are often designated as so-called "NORM" — "naturally occurring radioactive materials". A radionuclide may be "naturally occurring" where it is found, a mile below the surface; that does not mean it is naturally occurring at the surface. If the purpose of the SEAB is to provide the mechanisms whereby the public may be reassured that production of shale gas is safe, attention should be taken note that

There is no issue likely to alarm the public faster and more effectively than radioactivity.

The blunt truth of the matter is that ***Marcellus Shale radioactivity is being swept under the rug, at all levels of government and industry***. This must stop!

- Research to Create Reasonable-Cost Real-Time Air Pollution Monitoring Equipment

The Internet has created new expectations on the part of the public for what is possible in the way of live 24x7 real-time monitoring. However, currently available technology for monitoring air pollution in real-time is extremely expensive. Items of such equipment include:

FLIR Cameras

FLIR (Foward-Looking InfraRed) cameras can "see" gas emissions in real time. A FLIR camera is basically an infrared camera tuned to the specific wavelength absorbed by gas emissions, i.e. MWIR in the 3-5 micron range. Such cameras have a price in the tens of thousands of dollars. Because the expensive part is basically electronic, one can hope that research will produce a much lower-cost MWIR sensor which can drastically reduce the price of a gas camera.

No one who saw the video from the real-time Macondo well "spill-cam" from the BP Gulf of Mexico disaster will ever forget it. The standard has been set. If the public is to be reassured, the standard is:

Every well and compressor station live on the Internet 24x7 with a web-gas-cam.

This can be achieved. Air pollution events in sufficient quantity to cause toxic substance disease exposure ***tend to be highly intermittent***. It is only with technology for Internet-connected monitoring live in real-time that such events can be caught. It is only with such technology low enough in cost that community groups and active citizens can buy it for themselves will the kind of verification be possible that will truly reassure the public.

PID Meters

A PID Meter (Photoionization Detector) can detect pollutants such as VOCs in real-time. While not as expensive as a FLIR camera, a PID meter capable of detecting e.g. benzene at a level at which it can be dangerous (ATSDR shows benzene dangerous at .5 ppm) costs several thousand dollars. Research should be able to bring this cost down substantially. For residents living near natural gas production facilities, a real-time VOC/NOx/HAP alarm — like a smoke detector — should be a natural part of being a safe homeowner. Right now these devices are way too expensive.

- Whole-System Regulation

It is simply not the case today that a facility such as a compressor station is regulated as a whole system. Specific equipment, such as compression engines and their associated air pollution control devices, may be regulated. But the facility as an integrated whole machine is often not regulated at all. Specific events such as pressure relief or blowdown typically are not mentioned in any regulation. Operators are not required to have any pollution control devices to mitigate such events. This issue is especially important for the regulation of greenhouse gasses. Cradle-to-grave calculation of greenhouse gas footprints may require attention to even “minor” amounts of fugitive emissions of methane. It is simply not practical to write regulations specifying every single pipe and valve and piece of machinery in a pipeline or compressor station. Major items of equipment can be enumerated, of course, but regulations need to be *written to the whole system*.

- Jurisdiction for OSHA

The extent of the Marcellus Shale is enormous, and encompasses residential areas. If exposure to a hazardous substance is unacceptable in the workplace, how can it be acceptable in a home, where there may be children, whose toxicity dosage is likely to be much lower than that of an adult? For that matter, a home may contain a workplace for a self-employed person. All standards for exposure to toxic substances that apply in the workplace should be applied in homes in close proximity to natural gas production facilities or natural gas production emissions accidents.

- The Halliburton Loophole Must be Repealed

There is simply no justification for exempting oil and gas production from any environmental laws whatsoever. These exemptions must be repealed. If hydraulic fracturing is as safe as the industry claims, the natural gas industry should be first in line at the door of Congress asking for a repeal of exemptions from the Safe Drinking Water Act, the Clean Water Act, the Clean Air Act, and all other forms of environmental legislation because they don’t need them. There is simply no step industry can take that will provide more reassurance to the public that unconventional oil and gas production is safe than for the oil and gas industry to announce that it does not consider itself special and does not require exemption from the same laws every other industry must live by. For industry to claim that hydraulic fracturing is safe but then turn around and maintain that it still requires exemption from such laws as the Safe Drinking Water Act is completely inconsistent. Such inconsistency is fundamental to public distrust of the Oil and Gas Industry. It is in the self-interest of oil and gas production companies to appear before Congress and ask for the Halliburton Loophole to be repealed because the industry doesn’t need it.

If the oil and gas production industry continues to insist that it needs the Halliburton Loophole, there is nothing the SEAB can do to repair the image of dishonesty the industry will be conveying.