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Chapter 78 Final Draft Regs Public Comment

Submitted by: Melody Fleck, Moshannon Group Sierra Club Executive Committee 2015 MAY 13 AM 10: 59

Phone: (814) 954-7788

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- Marcellus Shale gas development generates enormous quantities of solid and liquid waste that are contaminated with industrial chemicals, petroleum, and radioactivity from the process and from contact with deeply buried naturally-occurring sources. Radioactive elements are introduced into the process with perforating gun assembly "shaped charges" and drill tips, according to Dr. Christopher Busby. Drill cuttings, mud, flowback and produced water have been found to be radioactive. Even the end-use gas contains radon and its home use increases the risk of lung cancer.
- There is no responsible way to get rid of this waste. Without proper means of disposal, responsible regulators would shut down the industry. Regulators who, with knowledge of the uncontained risks, fail to protect the public and fail to disclose the risks to the public, may be held liable for malfeasance, incompetence or neglect of duty.
- The public has a right to full disclosure of the risks of this industry. On April 10, 2015, Commonwealth Court refused Delaware Riverkeepers Network's right-to-know request for 57,000+ pages of raw data that DEP collected on radioactivity connected to PA gas development. Who is the DEP protecting?
- The industry uses its enormous power and politicians cave in to industry demands and hope, that with safety regulations, the industry can succeed and be used to build the economy of PA. This is failed leadership.
- Without admitting there is a huge radioactivity issue in the development of gas in PA, the safety regulations will be woefully inadequate to address the problem. Radioactive is mentioned only a few times in the Final Draft Chapter 78 regs; Uranium, Thorium, Radium, Radon, Barium, radiological are not mentioned at all.
- Dr. Marvin Resnikoff in his scientific report, entitled "Radon in Natural Gas from the Marcellus Shale" (2012), concluded that radon in Marcellus shale gas will significantly increase fatalities from lung cancer:
- In support, he cites the following. It is well known that radioactive radon-222 is present in natural gas. It's a decay product of Radium-226. "The radium concentration in the Marcellus Shale is 8 to 32 times [higher than] background radiation". The calculated "wellhead concentrations [of radon] in Marcellus shale are up to 70 times the average in natural gas wells throughout the US." "Being an inert gas, radon will not be destroyed when natural gas is burned in a kitchen stove." Radon gas breaks down into radioactive decay products (Polonium, Bismuth and Lead); these "solid fine particles . . . can be inhaled and subsequently reside in the lung".
- These radioactive decay products of radon also coat the interior of delivery pipelines and equipment; workmen and the public will have additional radiation exposures when the pipelines and equipment are opened for maintenance and repair. This information is contained in DEP's 2015 TENORM Report.
- Additionally, Dr. Resnikoff tells us that the Marcellus Shale formation is so much more radioactive than bedrock, that the gas industry uses the increased radioactivity of the Marcellus shale to locate it for prime drilling. This is a well known and accepted fact in the industry.
- This past summer truck loads of drill cuttings triggered radioactive alarms at landfills, causing truck loads to be turned away. Currently Ohio and West Virginia are still accepting drill cutting produced in PA. Since the ban, New York citizens are trying to stop their landfills from accepting drill cuttings from PA. It is irresponsible to continue gas development if there isn't a safe way to dispose of its enormous stream of waste. Dumping PA radioactive waste on neighboring states, does not make us a good neighbor and shows a total lack of concern for the people who live near these landfills. A few weeks ago, it was reported that water leaching from the Meadowfill landfill near Bridgeport, West Virginia, that accepts Marcellus Shale

cuttings, had huge dangerous spikes in the amount of radioactivity leaching from it.

- The levels of radioactivity vary from well to well and from the top to the bottom of each well. The regulations do not acknowledge that the differential treatment of drill cutting from the top and bottom of the well are due to their relative radioactivity, which lacks candor. If we can't even mention in the regulations that the bottom cuttings are more radioactive, how can the issues be addressed and regulated?
- Public representation is missing from DEP's Oil & Gas Technical Advisory Board (TAB). The 7 voting members are petroleum engineers and geologists and one coal mining engineer. The gas industry objected to John Quigley's appointment of members of academia and environmental community to TAB even though they are non-voting members. This board should represent the public and have professionals on it who advise about the health issues caused by the toxic and radioactive elements of gas drilling. It is ludicrous for the industry, that is regulated, to sit at the table and determine how it will be regulated. This is not the purpose of the DEP; its purpose is to protect the public from harm. Making sure the industry succeeds should not enter into the decision-making if it is to have any credibility.
- Bringing radioactive material from 6000+ feet in the earth, shielded by layers of rock, to the surface and into close contact with people, wildlife and ecosystems changes the character of the material and creates a more dangerous situation.
- There is no explanation for the 90 day storage of drill cuttings at well heads except for the convenience of the industry. Due to the variation in the amount of radioactivity within each well, the radioactivity should be determined with a radiation detector. Using the arbitrary point of where the casing ends is not useful in sorting the less dangerous drill cuttings from the more radioactive ones. Some wells are cased to the bottom of the well bore, so all of these drill cuttings would be treated as less dangerous even though we know that the radiation rises abruptly at the Marcellus formation.
- Given the radioactivity of the drill cuttings, the proposed regulations offer no protection for workers or the public, walking above the pits, or our groundwater. The top of the highly radioactive cuttings would be only 18" underground and the pits would be only 20" above groundwater. While a plastic liner will stop alpha radiation, it will do nothing to stop gamma radiation and is unlikely to effect beta emissions. The rule of thumb is that paper stops alpha; aluminum stops beta; but only lead casing contains gamma radiation.
- From contact with the radioactive drill cuttings, the pits and plastic liners are likely to be contaminated with radiation. This short gap measure creates an additional stream of radioactive waste and will require considerable additional DEP oversight cost to assure it is implemented, which the taxpayers of PA will foot.
- Landowners can not legally consent to disposal within 200 feet of their homes without full disclosure of the risks. Any disposal should be reflected in deeds to the property to assure that future purchasers know what is on the site.
- There is no "beneficial use" for radioactive waste from the oil & gas industry, such as surface spreading. Pit disposal is not safe. Punctures will occur and long term monitoring is required.
- There is no safe radiation dose and even low doses of radiation cause changes in blood chemistry, according to the EPA. Bringing deep-earth, shielded radiation to the surface makes it more dangerous and failing to responsibly address the problem exposes communities, natural ecosystems, our drinking water, and air to contamination.
- These comments pertain to conventional and unconventional drilling. The DEP NORM Report of 1992 demonstrates that conventional produced water is radioactive. Despite that finding over 20 years ago, DEP has been complicit in allowing brine spraying on secondary roads for de-icing and dust control. The 2015 DEP TENORM Report found that unconventional produced water is 25 times more radioactive than conventional produced water. It found that occasional recreational users of conventional brine-sprayed

roads are exposed to radiation, more study is needed to see how the brine migrates off the roadway and continuing this practice was questioned. People who live along these roads 24/7 and crops and livestock raised along them are being exposed to radiation and yet DEP continues to permit it.

- Throughout the 2015 DEP TENORM Report, with its misleading synopsis, the facts bear up the truth that gas development increases radiation risks to workers and the public. Publicly Owned Treatment Works (POTW) workers can receive 72% of their yearly exposure of radiation from their jobs plus background radiation. Truck drivers hauling produced water and filter cake are getting excessive radiation exposures. Spills at POTWs and landfills are likely and need remediation. And end users of the gas could get 17.8% of their yearly radiation exposure from unvented gas cooking and heating.

- The TENORM Report even recommends ADDING Radium to the PA Spill Protocol. Meaning it isn't there and isn't being looked for now. If it isn't being looked for, it won't be found.

- Currently, radioactive waste from this industry is allowed to be dumped in PA landfills under a 1:50 dilution theory. Mixing radioactive waste with regular garbage does not render it safe nor does it protect landfill workers while on the sites or the public from effluent leaching from the landfills.

- From the 1992 DEP NORM Report and the 2015 TENORM Report, there is no denying that the current administration and DEP has explicit knowledge of the risks to the public and is not doing enough to protect the public and regulate the industry.

- Nothing in this scenario gives me any comfort that the industry is being regulated at all. The public deserves better.

- This industry came to PA to profit and it will leave when it is done. The politicians who allowed the degradation of PA will eventually be called to account when the cancer rates rise, our water is destroyed and our property values plummet. We, the loyal citizens of the state, will have the mess to clean up. There are undoubtedly mini-superfund sites all over PA from illegal dumping and state-approved disposal.

- This insanity needs to end and order must be restored. Pennsylvanians have been here working and building PA, its small businesses, tourism, organic farms and agriculture; we are not here today, gone tomorrow extractors. We raise our families here, educate and pray for the next generation, and pay our taxes. For six generations, my family has been proud to call Pennsylvania "home". My ancestors gave their blood in wars to protect it, their sweat building businesses and farms, and their tears putting loved ones in its hallowed ground. Our forefathers set aside state lands to protect headwaters and keep a bit of the sacred wildness for all to see and enjoy, not for it to be despoiled by leasing to balance the short-term state budget.

- An old Greek saying is that a nation is great when old men plant trees they will never sit beneath. Where is that leadership now when PA needs it most? Global warming demands that we act now to curb fossil fuel use. Dr. Michael Mann warns that we have only 20 years to end our dependence on fossil fuels. Some climate scientists believe we have passed tipping points from which irreversible effects will flow.

- There are amazing opportunities for PA to reverse course and be a world leader in renewable energy. We have people who are willing, resourceful and committed to building a bright future. We need leaders with vision and principles.