Webinar Questions & Answers

Petroleum 238: A seven-year investigation of oilfield radioactivity
March 6, 2024

For the full webinar, see:
https://www.healthandenvironment.org/che-webinars/96737

The webinar participants posed a number of questions, some of which were addressed during the webinar. Dr. Larysa Dyrszka and Carmi Orenstein (Concerned Health Professionals of NY, CHPNY) and Justin Nobel offered the following responses, adding to information that was shared during the webinar.

1. Folks have mentioned that they wish information about health impacts was more readily available in impacted communities. Just wondering what form of information they think would be most useful? And who would the information need to come from for folks to believe it?

Larysa Dyrszka and Carmi Orenstein: We were able to partially address this during the webinar; it's a good question that is worthy of a long discussion. At CHPNY, we receive quite a lot of positive feedback about the information we compile and its utility, but we have not done a formal assessment of format and trust in the source. Perhaps some social science research has been done on these questions.

The fracking science Compendium https://concernedhealthny.org/compendium/ is free to search, excerpt from, download, print, and distribute. We review, and include in the entries, vetted, peer-reviewed scientific literature. We use social media to amplify the specific findings and we participate in various in-person and online forums (such as this recent webinar). We publish articles in the newsletter of the Science and Environmental Health Network. https://www.sehn.org/the-networker

It would be ideal to have the appropriate federal public health agency such as Agency for Toxic Substances and Disease Registry (ATSDR, https://www.atsdr.cdc.gov/index.html) involved in evaluating health impacts of fracking, and even do Health Impact Assessments (HIAs), because of their position. However, from experience, they seldom get involved. Presumably one can request help from them: take a look at their website to see whether and how they can assist. The first line of response usually is the respective state health or environmental agency. Each state has its own rules on environmental and health issues associated with the oil and gas industry, and poses difficulties. In our experience, people are more likely to accept federal and state agency findings and decisions.

2. Are you able to speak to the proposed use of CO_2 injection in fracking and how it may differ from the use of water and the hazards associated with it?

Larysa Dyrszka and Carmi Orenstein: There are similarities and differences. In short, the use of CO_2 as the drilling agent carries most of the risks of hydraulic fracking and introduces unique ones. There are still the risks of penetrating the shale and aquifers, the toxic and radioactive waste that comes to the surface, and the industrialization of land through the drilling itself and all the associated infrastructure. There is likely even some amount of water still required.

As for the unique risks, liquefied CO_2 is an asphyxiant. Liquefied CO_2 turns into carbonic acid with contact with water. Pipelines, trucks, railcars, and storage units holding supercritical CO_2 are vulnerable to catastrophic leaks; CO_2 is very corrosive when in the presence of even minute amounts of water. CO_2 pipelines are prone to "unzipping," which refers to long cracks that can release explosive clouds of CO_2 that hug the ground. There are many other above- and below-ground risks that accompany the idea of extracting shale gas with CO_2. See: https://www.sehn.org/sehn/2022/4/11/carbon-dioxide-fact-sheet. Also see SEHN's newsletter (https://www.sehn.org/the-networker) for several articles, with more to be published soon.

3. Do the medical and nuclear industries have stricter standards related to radiation exposure? Are there efforts to bring those same standards to the oil and gas industry?

Dr. Dyrszka: Yes, the International Atomic Energy Agency (IAEA) and the International Commission on Radiological Protection (ICRP) are both international agencies that protect health with regard to radiation. Although the United States is a member, it doesn't follow these recommendations for the oil and gas industry. The Resource Conservation and Recovery Act (RCRA) exemption probably has something to do with that, as they don't acknowledge that the material is hazardous.

The following is from the US State Department, the IAEA, and ICRP:

The International Atomic Energy Agency (IAEA) is a key player in the global nuclear safety and security framework. The IAEA's work includes:

- Promoting best practices and safety standards
- Identifying and implementing programs to help states apply these standards
- Preventing nuclear terrorism
- Protecting people, society, and the environment from the harmful effects of ionizing radiation
- Verifying that states are living up to their international commitments not to use nuclear programs for nuclear-weapons purposes

The International Commission on Radiological Protection (ICRP) is an independent organization that develops, maintains, and elaborates radiological protection standards, legislation, and guidelines. The ICRP recommendations are used by the World Health Organization (WHO) and the IAEA to implement radiation protection in practice.

4. a) Some of the workers in gas/oil extraction are unionized. What is their response to learning about the workers' risks?

Justin Nobel: Except for a few very select parts of the industry, such as certain workers at large facilities like oil refineries or petrochemical plants, oil and gas workers are not unionized. As I

believe I mentioned during the event, attempts by workers to unionize may draw suspicion and retribution from employers.

b) What should we be advocating for from OSHA re this issue?

Dr. Dyrszka: Similar to what they have done with silica sand exposure: OSHA should monitor, recommend protections, and enforce the recommendations.

Justin Nobel: While OSHA has done very little on this issue, letters to OSHA are recorded in a variety of ways and serve as an important record, so I advise everyone who is interested and has time to send one (Complaints to OSHA can be filed here: https://www.osha.gov/workers/file-complaint). The most valuable letters are letters from workers themselves, as this is something actionable, meaning OSHA has certain steps they are then required by law to take in order to assess a worker's allegations. Of course, getting a current worker to publicly come out against their employer in this manner is rare, but it is important to know when approaching OSHA.

Letters to OSHA from local, county, and state officials on these matters would also have particularly important value, and serve as important records, although they would not be actionable in the same way that a worker's letter would be.

c) What other legislation or regulations should we be supporting and who are the advocates (meaning what organizations) that are working on this?

Dr. Dyrszka: Work to reverse the environmental and health exemptions from the federal laws meant to protect human health and the environment. Here is a summary of exemptions https://earthworks.org/files/publications/FS_OilGasExemptions.pdf

In addition, states all have different rules and regulations, so check with trusted NGOs in your state or region.

Justin Nobel: In North Dakota, reach out to Lisa DeVille, who was on the call and now, amazingly, part of the North Dakota legislature, or Scott Skokos with Dakota Resource Council. In Montana (an important oil and gas state), try Dustin Ogdin at Northern Plains Resource Council. In Ohio, I would connect with either Ted Auch of FracTracker Alliance, Megan Hunter of Earthjustice, or Anton Krieger of Buckeye Environmental Network. I know there are some allies for legislation. In Pennsylvania, I would reach out to State Senator Katie Muth, who has put forward some important legislation on this issue, or someone at Center for Coalfield Justice like Heaven Sensky, or Mountain Watershed Association, like Stacey Magda, as they are following these issues closely. In New Mexico, I would connect with either Silas Grant of the Center on Biological Diversity, or Melissa Troutman of WildEarth Guardians. In Texas, connect with Virginia Palacios of Commission Shift, who has fantastic knowledge on oilfield waste issues and is following these issues closely in Texas and really trying to change the dialogue in that state. Most emails and contacts for these groups should be easily searchable. Feel free to say I suggested you reach out.

6. All 3 of us have been diagnosed with long-term chronic hydrocarbon toxicity exposure in 2021/2022. Are there specific doctors we should be seeking out?

Dr. Dyrszka: Occupational health doctors are usually fairly well informed. Look to major medical centers where they can also do research.

Justin Nobel: Even if you are not from Pennsylvania, I think someone at the Southwest Pennsylvania Environmental Health Project would be well positioned to discuss these exposures with you. Try reaching out to Director Alison Steele. Again, emails should be easily searchable and feel free to say I suggested you reach out.

7. Dr. Dyrszka, how can a community obtain a health study to determine the amounts of hazardous chemicals and/or radioactive isotopes in their body? Our population is majority young and we have an increase in population in comparison to the rest of rural ND. In addition, our population already has high health risks in diabetes, high blood pressure, cancers, and now, with the industrial extraction project, came the drug traffic culture.

Dr. Dyrszka: Regarding toxicological studies, especially radioactive ones, I would suggest a major medical center with a director who specializes in such issues. Dr. Schultz is one such person, though other major medical centers might also be helpful.
https://toxicology.grad.uiowa.edu/people/michael-k-schultz

To look at several risks for a population, you could ask for a Health Impact Assessment (HIA). I had mentioned the one that was done in the Inupiat population when an EIS was being planned before oil and gas exploration could be allowed. Because it was a reservation, a federal agency and federal laws were invoked (NEPA). Here is that study:
https://www.researchgate.net/publication/266821136_Alaska_Inter-Tribal_Council's_Health_Impact_Assessment_Project_Description_of_a_ground-breaking_initiative_and_potential_applications_for_US_Tribes (ask the author for the full text) and a follow up recommendation by the author
https://www.healthaffairs.org/doi/abs/10.1377/hlthaff.2011.0050. Here is a thesis by a Princeton student that explores HIA in Alaska: https://www.princeton.edu/~pphr/Alexa_Glencer_10.pdf

8. Are the radioactive footprints of specific drilling sites unique? If so, with sufficient testing, would it be feasible to link exposure pathways (e.g. contaminated air, water, soil in specific areas) with specific sources?

Justin Nobel: Dr. Mark Engle, formerly of the U.S. Geological Survey, and now at the University of Texas El Paso has done some powerful work fingerprinting oilfield waste. Dr. Avner Vengosh at Duke, and Zac Hildenbrand also at Univ of Texas El Paso are other researchers doing this work. While you might not be able to determine if a brine spill came from Well A or Well B both in Formation X, they would be able to determine whether a spill came from Formation X or Formation Y. This type of close monitoring is exactly where the research needs to go, and it is headed there. Check out Dr. Detlev Helmig's Boulder AIR site, https://bouldair.com/. Essentially, if you set up a robust network to monitor for emissions you can start to track emissions to specific sources, and Dr. Helmig has added radioactive emissions

to the suite of contaminants his research team looks for. I am presently helping them put a paper forward for publication on this very issue.

9. As genetic mapping of specific cancer mutations becomes more nuanced, could it be possible to demonstrate causal links between radon/radium exposures and specific cancer types?

Justin Nobel: The million-dollar question. Talk to Dr. Logan Spector at the Univ of Minnesota, he is an epidemiologist and rare cancer researcher. My opinion is, yes, this is possible. I have asked Dr. Spector this very question. Unfortunately, part of the problem, he tells me, is there are not enough researchers taking the time (and professional risks) to go down these rabbit holes and look for answers. And the answers may or may not be there, and the links may or may not be able to be made. I believe they can be, but again, that's my opinion.

10. What's happening to the groundwater due to fracking?

Dr. Dyrszka: We were able to address this during the webinar; please also check the many references in the fracking science Compendium https://concernedhealthny.org/compendium/. Briefly, it depletes groundwater if they use it for fracking; it contaminates groundwater when spills occur and when casings crack.

11. Here in my part of Australia is following with everything being classified as beneficial waste. I helped get them to have to test for radon etc when they do a new frack - but gas co got it changed to 3 ok tests and they don't need to do more. To me common sense is that more radioactive stuff can come up through entire process. Am I right?

Dr. Dyrszka: It makes sense that once fracking has caused the fissures, radon can start coming up anytime after the cracks/fracks have formed. In an Australian study from 2013, Tait used radon as a tracer to predict GHG emissions. He found a ~3-fold increase in maximum 222Rn concentration inside the gas field compared to outside of it. There was a significant relationship between maximum and average 222Rn concentrations and the number of gas wells within a 3 km radius of the sampling sites. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3621574/

Justin Nobel: The study Dr. Dyrszka just mentioned is incredible and one of my favorites. Perhaps try reaching out to one of the authors and engaging them on this issue.

12. Do we have any links between fracking and fluctuation of radon levels, in West Virginia we have seen 10 PCI fluctuation within weeks?

Dr. Dyrszka: I don't know about West Virginia specifically, but I am not surprised that levels fluctuate. Levels of radon inside Pennsylvania homes have risen since the start of the fracking boom, and buildings in heavily drilled areas have significantly higher radon readings than areas without well pads, a difference that did not exist before 2004. Similar patterns have been documented in Ohio. North Dakota has elevated levels of radon as well. Elevated radon levels (greater than 4 pCi/L) are found in 63% of homes in North Dakota. https://www.epa.gov/sites/default/files/2014-08/documents/north_dakota.pdf

Look to our Compendium for additional studies of radon in homes. https://concernedhealthny.org/compendium/.

13. Justin, I know you worked on the Fairmont site with Dr. Yuri in West Virginia. Are you aware of the Rutledge area of Charleston and the EPA involvement, with the health studies? The mass release found with the H2s well?

Justin Nobel: I am not aware of this issue but thank you for bringing it up and please feel free to pass along some material and inform.