

## Neslin, David

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**From:** Neslin, David  
**Sent:** Thursday, January 17, 2008 4:49 PM  
**To:** 'Judith Jordan'  
**Cc:** Lindblom, Steven; Tresi Houpt; Ed Green; GARCO Attorney  
**Subject:** RE: Rulison  
**Attachments:** Final Rulison Memo.doc

Judy:

This will follow up on our brief telephone conversation Monday and your e-mail of last Friday.

As we discussed, the concerns set forth in your e-mail relate to the drilling of new wells within one-half mile of the Project Rulison blast site and not to the drilling of new wells more than one-half mile and less than three miles from the blast site, and in preparing your e-mail you were unaware of my attached memorandum dated December 21, 2007 which addresses the Rulison issues. As I explained, all of the pending APDs are for locations more than one-half mile from the blast site, and the companies have committed that they will not file any APDs for surface or subsurface drilling operations within one-half mile of the blast site this year. Any future APD for a location within one-half mile of the blast site will be subject to a formal hearing before the COGCC and the applicant will have to demonstrate that such drilling will protect public health, safety, and welfare and the environment. The SAP will help ensure that the COGCC will have additional information for evaluating such an APD if and when it is filed. My reasoning for deciding to conditionally approve on a case-by-case basis pending APDs for locations greater than one-half mile from the blast site subject to the SAP, a limitation on the number of drilling rigs operating at one time, and other special conditions is set forth in my December 21, 2007 memorandum, which is attached for your convenience. That memorandum was posted on our website and provided to our commissioners, the companies, and Mr. Danielson on the date of its issuance; I apologize for not sending to you as well and regret that you were unaware of it in preparing your e-mail.

As we also discussed, I agree that it should be the responsibility of DOE and not the COGCC or the companies to prepare a further report on the Project Rulison area. I do not believe that such a report is necessary for us to determine that the conditional approval of APDs for locations greater than one-half mile from the blast site will protect public health, safety, and welfare and the environment. But I also appreciate the value of better communicating the extensive information available on this subject to interested members of the public, and I would support a request by Garfield County that the DOE do so.

With respect to the SAP, you should know that Mr. Danielson requested such a document. In an October 9, 2007 letter to the COGCC, Mr. Danielson asked for "an independently designed and managed overall monitoring plan for the site" and a "state of the art emergency preparedness – emergency response plan." The SAP responds to that request, among other things. The process for developing the final SAP has provided for input from the COGCC staff and consultants, the Department of Public Health, the Department of Energy, the County, and Mr. Danielson and his consultants. The SAP will be reviewed and updated annually as necessary through a process that includes input by the same groups.

Finally, I would like to take this opportunity to elaborate briefly on our consideration of the public health issues. As you know, our consideration of these issues has included work by four of our staff members, two consulting firms, and the Department of Public Health. The individuals involved have a broad range of experience in subjects including health physics, radiation regulation, and emergency preparedness.

Our staff and our subcontracted experts judged the public health risk posed by drilling more than one-half mile from the blast site to be extremely low. According to our consultants, the doses that can be postulated based on the Project Rulison radionuclides are small, much less than the background radiation dose that all Colorado residents receive annually from cosmic rays and other naturally occurring sources like radon, potassium-40 or uranium in the soil. The background radiation dose varies from place to place, but is generally assumed to be about 0.3 rem per year. Rem is a unit of radiation dose measurement. Public health decisions regarding radiation are normally made assuming a linear, non-threshold model of dose. That means that the risk (i.e. likelihood of getting cancer) is proportional to the radiation dose: when the radiation dose is zero the radiation risk is zero, and when the radiation dose is higher the risk is higher. In fact that may overstate the problem. In a position statement titled "Radiation Risk in Perspective" the Health Physics Society says "There is substantial and convincing scientific evidence for health risks following high-dose exposures. However, below 5 - 10 rem (which includes occupational and environmental exposures), risks of health effects are either too small to be observed or are nonexistent." (Source: [www.hps.org/documents/risk\\_ps010-1.pdf](http://www.hps.org/documents/risk_ps010-1.pdf)) So how much radiation dose might there be if Rulison radionuclides reach a production well? According to our consultants, very little.

And because of the sampling that will be done there would be plenty of warning in the form of elevated tritium results before a level that would pose a public health risk could be reached. In October 1973 a paper titled "Radiation Doses from Hypothetical Exposures to Rulison Gas" was published in the peer-reviewed journal Nuclear Technology by scientists from Oak Ridge National Laboratory; I will send you a copy of that paper by separate e-mail. As you know the Rulison gas was flared - it was never distributed nor used by members of the public. But the authors posed the question "what if it had been used?" They devised a scenario in which the gas was pumped at a rate to produce 1 million ft<sup>3</sup> per day after dehydration and CO<sub>2</sub> removal. The processed gas was assumed to be distributed through existing pipelines and entirely used in small communities near the well (Rifle and Parachute in the dose maximizing scenario). The Rulison gas was further assumed to represent a significant fraction of the gas used in those towns for three years. The average whole body dose to members of the exposed public was estimated to be 0.0006 rem for the first year of gas use. Subsequent years were less. It is this bounding hypothetical exposure scenario (among other lower dose scenarios) that the SAP is designed to prevent. In this hypothetical analysis the dose is about 0.2% of the background radiation dose for the year. It is about 0.01% of the dose (5 rem) that the Health Physics Society says poses risks of health effects that are either too small to be observed or are nonexistent. This is part of the reason that the COGCC staff judged the public health risk to be acceptable and the SAP to be adequate.

The Department of Public Health independently reached a similar conclusion. Among other things, it estimated that existing fractures from the underground blast could extend 1000 feet from the blast site and that a safety margin of 25% or 250 additional feet is appropriate. It similarly estimated that the fractures from a new production well could extend 1000 feet from the well and that a safety margin of 25% or 250 additional feet is appropriate for this purpose as well. Combining both of these estimates yields an "interim no drill zone" of 2500 feet or about one-half mile from the blast site, within which the fracturing from a new well could theoretically intersect the fractures from the blast. The Department therefore recommended that APDs should not be approved within one-half mile of the blast site until additional information is available indicating that a smaller distance is protective. The Department further recommended that requiring sampling and analysis plans, including action plans for responding to elevated sampling results and incident response plans, would protect public health in connection with APDs located more than one-half mile from the blast site. The very conservative nature of the Department of Health's estimates is illustrated by comparing them to similar estimates discussed in a 1998 literature review by former COGCC Director Brian Macke, which is available on the COGCC website, and in the September 2007 simulation report by the Department of Energy, which I believe you previously received. Mr. Macke's literature review discussed several models indicating that the outer radius of the blast fracture zone would be only about 213 to 220 feet, or less than one-fourth the distance estimated by the Department of Public Health. The Department of Energy's simulation report discussed some of the same models and similarly estimated that the blast fracture zone would extend only about 64 to 84 meters, or about one-fifth to one-fourth the distance estimated by the Department of Public Health; the simulation report also discussed actual gas well fracturing results in similar geologic formations and concluded that fractures from a new production well would likely extend only about 46 to 122 meters, or about one-seventh to one-third the distance estimated by the Department of Public Health, and that longer fractures would be unlikely to remain open, conductive conduits for fluid flow. This suggests that the Department of Public Health, like the COGCC staff and consultants, has taken a cautious and conservative approach to this issue. As part of its work, the Department of Public Health also discussed the incident response plan from the SAP with the County's Emergency Manager, Jim Sears.

Please be aware that the above summaries do not reflect all of the data, reports, and other information considered, or all of the analysis, evaluation, and other work undertaken, by the COGCC staff, the COGCC consultants, or the Department of Public Health regarding the health and environmental issues associated with the Rulison area. They are not intended to describe all of the work that we have done or the reasoning that we have relied upon. They are merely intended to help you understand the seriousness with which we have approached these issues and some of the reasoning for our conclusions.

Thank you again for your participation in this process.

With best wishes,

Dave

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**From:** Judith Jordan [mailto:jjordan@garfield-county.com]  
**Sent:** Friday, January 11, 2008 5:28 PM  
**To:** Neslin, David  
**Cc:** Lindblom, Steven; Tresl Houpt; Ed Green; GARCO Attorney  
**Subject:** Rulison

David,

Just a quick update on Rulison. First, thanks for the opportunity to comment on the sampling plan. But given that you and Steve called and asked whether we thought there was a threat to public health, I thought it only fair to let you know where things stand from my perspective at this juncture. Hopefully, my answer to your previous question was clear-that I didn't have sufficient information to determine whether there seemed to be a threat. That in itself may constitute a sense of potential danger. As I mentioned to Steve at the meeting around the Holidays, I believe that a proper environmental investigation of the site should be conducted and the results should be shared with the public through a written report and public meeting(s). I believe it is the responsibility of DOE to undertake this investigation, not COGCC and not the operators. Further, I think DOE needs to do this by hiring a third-party consultant-to allow for as much objectivity and credibility as possible. From a public health protection standpoint, I believe it is as important to communicate as it is to acquire the information in the first place. Making minor tweaks to the sampling plan and proceeding as per the operators' intent does not address this concern.

Various COGCC staff folks repeat that there are reports on websites. I don't think it's reasonable to expect citizens or the county to perform searches of COGCC and DOE websites for relevant reports, pull them down, analyze them and compile them into English for public consumption. If all the relevant data are already there, then we at Garco and the public have a right to expect DOE to step up to the plate and communicate adequately.

The October report was nice, but all it did was pose one scenario, based on many assumptions that the lay public and scientists alike question. And I only just learned today that there is no physical barrier on the surface at the site. That seems pretty absurd.

The sampling plan by all appearances is a thinly veiled attempt to placate the neighbors. For the most part, the operators need only provide notice (if the operators choose to do so) of hits after the fact. Where is the opportunity for public health protection once radioactive gas is already in the commercial pipeline?

There is so much gas drilling activity in Garfield County that the operators can't get the rigs mobilized to other sites fast enough. It's not necessary to divert rigs from other locations to Rulison when questions of public health haven't been properly answered. I believe that COGCC, the county and citizens should demand that the feds conduct a proper investigation and that drilling shouldn't proceed until that has been done. Once it has been done, and if there's really no significant issue of concern, then have at it. But until then, I think we have a responsibility to insist that DOE deal with this responsibly. Hopefully, this gives you a fair notice of my thoughts about the site in case we should happen to lodge objections. I don't know that we will, as yet, but my intent would not be to surprise you.

Best Regards,  
Judy

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