UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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THE ADMINISTRATOR

The Honorable Matthew H. Mead
Governor of Wyoming
State Capitol, 200 West 24th Street
Cheyenne, Wyoming 82002-0010

Dear Governor Mead:

Thank you for your letters of December 20, 2011, and January 16, 2012, regarding our groundwater investigation at the Pavillion field in Wyoming. As I stated when we last spoke by phone, I share your belief that a collaborative approach is the most appropriate course of action at this site. The EPA has made every effort to work cooperatively with the State of Wyoming and other parties, and you have my commitment that we will continue to do so. At the same time, I am concerned that your letters do not recognize the rigorous, transparent and objective approach that has marked our involvement at Pavillion to date.

Our investigation of drinking water at Pavilion has been underway since 2009 and has been supported by an extensive commitment of scientific resources. We have conducted four phases of sampling, each of which was designed in consultation with the State. We have been measured and careful in our conclusions. Upon the completion of sampling from the deep monitoring wells, the EPA career scientists engaged in a meticulous evaluation of the data. That evaluation is reflected in our draft report. Our draft findings were subject to intensive review within the EPA and reflected limited consultation with outside experts.

The evidence supporting the likely role of fracturing in the observed contamination is exhaustively presented in our draft report. I draw your attention to the careful language with which our conclusions are couched. We make clear that the causal link to fracturing has not been demonstrated conclusively, and that our analysis is limited to the particular geologic conditions in the Pavillion gas field and should not be applied to fracturing in other geologic settings.

At my direction, our staff delayed the release of our draft report by several weeks to assure that a technical review could be conducted by the State, Encana and other parties. Our staff has shared extensive data with the State and devoted many hours to meeting with your experts and the Pavillion Technical Work Group. I met personally with Encana leadership and the EPA staff met at length with Encana technical representatives. We are continuing to expend significant effort responding to outstanding questions and requests.

As I have previously expressed to you, the EPA welcomes the State's willingness to support additional scientific investigation at Pavillion. This could include additional sampling of the EPA monitoring wells and further study of the potential fate and transport of contaminants in the Wind River formation. We are in discussions with our fellow agency, USGS, about partnering on additional sampling of the monitoring wells and understand that the State has approached USGS as well. We look forward to

meeting with the State, USGS and other parties to discuss how we can best work together to meet our common scientific objectives.

As a science-driven agency, we take seriously our obligation to meet high standards of scientific integrity and have carefully evaluated the questions raised about our sampling methods at Pavillion. I am enclosing a document that reviews the principal technical concerns you and others have expressed. Based on this careful review, the EPA stands behind the quality and reliability of our data.

At the same time, we have been clear that our report is a draft and that we plan to solicit public comment and convene an independent panel of experts to peer review the draft report. Peer review is the accepted tool for resolving issues about the adequacy of scientific methods and conclusions.

In this instance, we plan to convene a panel of five to seven experts in the relevant scientific and engineering disciplines. They will be unaffiliated with the EPA and screened carefully for conflicts of interest. We have this week published a Federal Register notice requesting public nominations of potential panelists. The EPA's contractor will review the submissions, contact selected candidates for additional information, and make the final selections after the 30-day nomination period closes. I encourage you to nominate qualified scientists and engineers from Wyoming to serve on the peer review panel. I expect that at least one person recommended by the State who meets the selection criteria will be named to the panel.

We are in the process of developing a charge for the panel and plan to share a draft with you and other interested parties to obtain feedback. After the charge is finalized, the panelists will meet publicly to consider and weigh their expert opinions on the charge questions. The public will have the opportunity to provide oral and written comments at that meeting. The panel will then submit their separate reports to the Agency, and of course those reports will be publicly available.

Your letter requests that we schedule a public listening session at a site convenient to Wyoming residents. I am pleased to report we plan to schedule the public peer review meeting in Cheyenne.

As requested by the State and Encana, we will soon announce an extension of the ongoing comment period on the draft report. To facilitate comment, we will be posting additional technical information on the EPA website, including written responses to the State's four-page list of questions. This comment period will later be augmented by the opportunity to comment to the peer review panel, as noted above.

In short, EPA will continue to act thoughtfully and transparently in our groundwater investigation. We greatly value our partnership with the State of Wyoming and are committed to continuing it. If you have further questions, please contact me or your staff may call Sarah Hospodor-Pallone, Deputy Associate Administrator for Intergovernmental Relations, at 202-564-7178.

Sincerely,

Lisa P. Jackson

Cc: Ken Salazar, Secretary of the Interior

Enclosure

Responses to Questions and Inaccurate Information in Casper Star-Tribune Article "EPA Report: Pavillion Water Samples Improperly Tested" (dated 27 December 2011)

Responses to Jeremy Fugleberg's (Casper Star-Tribune) questions:

Question 1. The EPA's memo in the lab data report for the April 2011 testing phase states (on p. 2) that some of the samples gathered during the phase were analyzed past their hold times due to floor maintenance at the EPA's lab in Golden, Colo., and their results were qualified as estimated.

a. *What happens to the quality of analysis for samples analyzed past hold times?*

Answer: The effect that extended holding times may have on analytical results depends on the nature of the contaminant. For volatile organic compounds (VOC), the analytes being discussed in this case, extended holding times would be expected to lower measured concentrations because these compounds generally degrade or transform in sample containers over time. This would lead to an underestimation of the amount of VOCs present in the initial sample. Regardless of the holding time, detection of a VOC is conclusive evidence of its presence in the sample. Confidence in this conclusion is strengthened by the fact that split samples were analyzed at another EPA lab within the appropriate holding time and VOCs were found in those samples as well. Hold times were not exceeded for other contaminants.

b. *Why weren't new samples gathered and processed to replace the past-deadline samples?*

Answer: In fact, split samples were taken and analyzed in a different EPA lab. The split samples did not exceed holding times and analysis of those data indicated the presence of VOCs at higher concentrations than those found in the samples that did exceed holding times. Because the objective of this particular analysis was to determine if VOCs were present, the data were determined to be valid and reliable for this purpose. No additional sampling was necessary.

The exceedance of hold time (an additional two days beyond the specified 12 days) occurred only for VOCs, not for the other contaminants detected in the sample analysis. It is not standard practice at EPA or other laboratories to automatically disqualify samples with hold time exceedances. Rather, the standard practice is to evaluate whether the sampling results are meaningful and reliable in view of the study objectives. VOCs generally degrade or transform in sample containers over time. Therefore, for VOC analyses, it is expected that the concentrations of VOCs would be lower if the samples were analyzed past their recommended holding times, not that the detection of VOCs was erroneous. Under the circumstances in this case, EPA concluded that additional sampling would not have materially changed the detection of VOCs.

c. *Is the failure to gather new samples consistent with EPA's standard practice for such testing?*

Answer: EPA did not gather new samples because this was not necessary. EPA's standard practice, like that of other laboratories, is to flag exceedances of the normal sample hold times. As stated above, the impact of these exceedances on the validity of the data is then determined, taking into account the objectives of the investigation. In this situation, split samples were taken and analyzed in a different lab. Those samples did not exceed holding times and analysis of those data indicated the presence of VOCs at higher concentrations, as is consistent with shorter hold times. It is our

conclusion that the VOCs were in fact detected and additional sampling would not have generated different results. Hold times were not exceeded for other contaminants.

d. *What effect did the use of estimates have on the draft report's conclusions?*

Answer: The data used in the draft report were actual measured results, not estimates. Because the holding times were exceeded, we can infer that concentrations of VOCs reported in the draft report were lower than actual concentrations. This was further supported by the fact that split samples were taken and analyzed in a different lab. Those samples did not exceed holding times and analysis of those data indicated the presence of VOCs at higher concentrations. Thus, the exceedance of holding times did not call into question the detection of VOCs, and in fact resulted in an understatement of their likely concentrations.

e. *Why were those results, qualified as estimated, not notated as such in the draft report?*

Answer: The data for VOCs were flagged in the supplemental information and data reports, because the samples exceeded their holding time in the lab prior to analysis. However, the significance of these exceedances was evaluated during the quality assurance/quality control (QA/QC) process. It was determined that this did not affect the validity of the sampling results due to the fact that the exceedance of holding times did not change the conclusion that these compounds were detected at levels well above background levels. For this reason, the results were not flagged in the draft report.

Question 2. The draft report shows a photo of the water truck (Fig. C5, on p. C4) used to "transport water to mix mud." There is no indication from either the lab data reports, field notes, or draft report if water from that truck was tested prior to use in the wells. Was the truck's water tested prior to use in the well?

Answer: The study workplan, which was reviewed by the State of Wyoming, Encana and others, did not call for taking samples of water used to mix mud. Sampling of such water is not standard practice. Notably, the two wells received water from the same truck, but different contaminants and contaminant levels were found in the deep monitoring wells. This strongly suggests that the contamination did not come from the truck.

Question 3. Why didn't the EPA conduct additional testing phases with the deep monitoring wells prior to publication of the draft report?

Answer: A primary objective of this investigation was to determine if ground water was contaminated, and if possible, to identify the source of the contamination. The testing to accomplish this objective took many months and the results were carefully analyzed. Once the presence of ground water contamination was established clearly, there was no need to perform additional sampling and analysis. We released the data and information we collected as quickly as possible so that the public, State and other stakeholders were aware of our results and conclusions and to begin the public peer review process, which could not go forward if the draft report was not in the public domain.

The report is a draft subject to public comment and independent peer review. If the public comment process or peer review results indicate that additional data needs exist, either to confirm the initial results or determine the nature and the extent of the contamination (size and direction of the potential contaminant plume), then additional sampling can be conducted.

Question 4. Is the use of only two testing phases that included the EPA's deep monitoring wells consistent with either the EPA's standard practice for such testing?

Answer: Yes. As previously discussed, a primary objective of this investigation was to determine if ground water was contaminated and, if possible, to identify the source of contamination. The data collected satisfy this objective. EPA's standard practice for testing is to determine what data are necessary to meet the objectives of the investigation. The use of two testing phases that included the deep monitoring wells was therefore appropriate in this instance.

The Casper Star-Tribune article contained statements attributed to representatives from the Wyoming Water Development Commission. Several of these statements contain inaccuracies, as explained below:

5. Statement on Quality Assurance and Control Protocols: *"They didn't follow their own protocol they would've required of other people doing this same type of work."*

Response: EPA did, in fact, follow its own protocol. This investigation was subject to EPA's highest level Quality Assurance Project Plan (QAPP). Both an independent contractor and an EPA QA manager conducted audits of data quality as well as on-site audits of technical systems in the laboratories and the field to ensure compliance with the QAPP. If a sample did not go through the proper procedure, the incident was flagged during the QA/QC process, reported, and necessary steps were taken to ensure the analysis reflected sound science.

As noted above, the QA/QC process did identify one set of samples for VOCs where the lab exceeded holding times by approximately two days. The protocol called for such exceedances to be noted but did not require that the samples be disqualified. Instead, following the protocol, these events were flagged and carefully evaluated when drafting the report. Upon review, it was determined that the VOC samples were meaningful and relevant in determining the presence of VOCs, . This conclusion was supported by the fact that split samples were taken and analyzed in a different EPA lab. Those samples did not exceed holding times and analysis of those data indicated the presence of VOCs at higher concentrations. Since a primary objective of the study was to report on the presence of contaminants in the monitoring wells and there was no question that VOCs were detected, the exceedance of holding times for the VOCs did not impact the conclusions of the report.

EPA would have followed an identical approach in reviewing monitoring studies submitted by other government bodies or the regulated community.

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6. Statement on the Presence of Organic Compounds in Blanks: *"The EPA also found contamination in pure water control samples....contamination that shouldn't be in the samples and could indicate the well samples are marred."*

Response: It is common to find trace amounts of impurities in water control samples. The presence of such impurities is not a legitimate reason to discard data unless the range of contaminants and their concentrations in the control samples are similar to or greater than those detected in the water samples. In this case, different organic compounds were found in the water control samples and deep monitoring wells and, where there was overlap, the levels in the wells were orders of magnitude higher than the levels detected in water control samples.

7. Statements on Purge Volume Prior to Sampling:
"The EPA...didn't purge the test wells properly before gathering samples.... To properly test such water wells, they must be first purged three times to make sure fresh water from the surrounding formation flows in for testing."

Response: The EPA purged one well three times. Because the second well was a low yield well and it was not technically feasible to pump three well volumes, EPA used a different, but appropriate technique for purging the well before sampling. EPA purged the well until only formation water entered the well screen. Samples were collected after stabilization of general water quality parameters, as recommended in EPA guidance on low flow sampling (common practice in EPA field investigations). Field crews monitored pH, redox potential, specific conductance, dissolved oxygen, and temperature with a multiparameter probe during well purging and collected water samples when these field parameters had stabilized. There are no rigid requirements for purging wells prior to sampling – especially in regard to low yielding wells. The purpose of purging is to collect a representative sample of formation water. EPA field scientists applied sound and widely accepted practices in purging to accomplish the goal of sampling formation water.

"We're not sure they produced out all the water that may have seeped out of the formation during the drilling process or well development."

Response: EPA conducted confirmation sampling and analysis to ensure that contamination of the monitoring wells did not occur during the drilling process or well development. Findings from this analysis showed that the materials and additives used in the drilling and development of the wells were different from the compounds found in the deep monitoring wells. Therefore, the well drilling could not have been a source of the compounds found in the wells. Furthermore, the compounds found are used in hydraulic fracturing activities and are not naturally occurring. This evidence supports the preliminary findings that the contamination was a result of hydraulic fracturing activities.

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