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U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

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February 21, 2012

Mr. Jim Martin
Regional Administrator
US EPA, Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

Dear Mr. Martin:

On behalf of the Committee on Science, Space, and Technology, I want to express my appreciation for your participation in the February 1, 2012 hearing entitled *Fractured Science - Examining EPA's Approach to Ground Water Research: the Pavillion Analysis.* I have attached a verbatim transcript of the hearing for your review. The Committee's rule pertaining to the printing of transcripts is as follows:

> *The transcripts of those hearings conducted by the Committee and Subcommittees shall be published as a substantially verbatim account of remarks actually made during the proceedings, subject only to technical, grammatical, and typographical corrections authorized by the person making the remarks involved.*

Transcript edits, if any, should be submitted **no later than March 6, 2012**. If no edits are received by this date, I will presume that you have no suggested edits to the transcript.

I am also enclosing questions submitted for the record by Members of the Committee. These are questions that the Members were unable to pursue during the time allotted at the hearing, but felt were important to address as part of the official record. **All of the enclosed questions must be responded to no later than March 6, 2012.**

All transcript edits and responses should be submitted to me and directed to the attention of Taylor Jordan at Taylor.Jordan@mail.house.gov. If you have any further questions or concerns, please contact Mr. Jordan at (202) 225-5967.

Thank you again for your testimony.

Sincerely,

Andy Harris M.D.
Chairman
Subcommittee on Energy & Environment

cc: Rep. Brad Miller
Ranking Member
Subcommittee on Energy & Environment

Enclosures: Transcript and Member Questions

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
Subcommittee on Energy & Environment

Hearing Questions for the Record
The Honorable Andy Harris

Fractured Science: Examining EPA's Approach to Groundwater Research – the Pavillion Analysis
February 1, 2012

Mr. James Martin

1. Despite the release of a significant number of documents, EPA is still withholding information critical for making informed and useful comments on the Pavillion analysis. Attached is a letter dated February 8 to EPA Region 8 Enforcement Attorney Michelle Marcu outlining a number of items EPA has failed to disclose.

    a. Please provide a timeline for the disclosure of these documents and data.
    b. Explain why this information was not released at the time of the release of the draft report or on January 31 when EPA disclosed an additional 622 documents.
    c. Is making data unavailable to the public or only available subject to FOIA requests in compliance with EPA's peer-review procedures for studies such as the Pavillion report?

2. During the hearing I asked you about your response to the Department of Interior's Bureau of Land Management's (BLM) comments on the Pavillion draft. You stated you had not seen the comments. I have attached a copy of BLM's comments to these questions. Please provide a response to the concerns raised by these Federal experts.

3. In your testimony you noted that "we are in discussions with the U.S. Geological Survey about partnering in the sampling of the monitoring wells." USGS is the recognized expert in this area, and has been evaluating water quality and geology in this region of Wyoming since the 1880s. For example, the agency found in 1959 – before oil and gas production in the Wind River Basin began – that "the quality of water in the shallow aquifers generally is unsatisfactory for domestic use."

    a. USGS has also found elevated concentrations of potassium and chloride in Pavillion-area groundwater since the early 1990s. They also have evaluated of the complexity of the aquifer in the Wind River Basin, and have conducted extensive work on permeability near Pavillion. Were the experts from USGS consulted during the development of the plan for the monitoring wells or prior to the commencement to the drilling of the monitoring wells? If not, why not?

4. EPA chose to not classify the Pavillion investigation as a "Highly Influential Scientific Assessment," which would have required that the case be held to the highest scientific standards as well as the most rigorous peer review process available. According to the Office of Management and Budget as well as EPA's Peer Review Handbook, a highly influential scientific assessment includes any assessment that "could have a potential impact of more than $500 million in any year" OR that is "novel, controversial, or precedent-setting or that has significant interagency interest." Why was the Pavillion investigation not considered a highly-influential scientific assessment and subject to more rigorous peer review?

    a. In light of the fact that oil and gas activities generate almost $2 billion a year in revenues in Wyoming alone and that the going rate for one company's holdings in the Pavillion gas field was valued at $50 million before the EPA draft report, why did EPA find that the investigation could not "have a potential impact of more than $500 million"?
    b. In light of the fact that EPA's report generated international press coverage in 4 different languages within 24 hours of being released and that the report currently generates more than 600,000 search results on Google, why did EPA find that the investigation was not "controversial"?
    c. In light of the fact that, according to the first line of the Associated Press' coverage stated that EPA "announced....for the first time that fracking...may be to blame for causing groundwater pollution," why did EPA find that the investigation was not "precedent-setting"?
    d. In light of the fact that the Department of Interior, USGS, the CDC, SEC, and the Department of Energy are all examining hydraulic fracturing and that more than half of the wells in Pavillion are regulated by the Bureau of Land Management, why did EPA find that the investigation did not have "significant interagency interest"?

5. Under the Information Quality Act, "dissemination" of any scientific information by federal agencies is subject to certain standards, including peer review procedures, in order to ensure high scientific quality and to avoid regulatory actions driven by the release of potentially faulty information. To avoid these standards, the draft report on Pavillion was classified as a "pre-dissemination." What is a "pre-dissemination," and how does this designation apply to the release of a 120-page report which included conclusions and an accompanying press release sent to tens of thousands of people and media outlets?

6. Since drilling depth, casing, and materials requirements are regulated by the states, what protocol did EPA follow in drilling its monitoring wells? Why did the agency not apply for a permit or submit a drilling plan to the state of Wyoming? Did EPA follow all local and State regulations despite the fact that it did not apply for a permit?

7. EPA's finding of high pH in the wells is cited in the report as an indication of hydraulic fracturing's contribution through Potassium Hydroxide. However, according to the driller of these wells, the sparse quantities of this chemical used has near-neutral pH. However, materials used in developing EPA's monitoring wells, like dense soda ash, have a much higher pH value and more closely match EPA findings. What evidence can you provide that EPA's monitoring wells did not cause or contribute to elevated pH levels? Is it possible that cement intrusion and soda ash used in the drilling fluids were more likely to have caused the elevated pH?
    a. Can you explain why the potassium levels detected in EPA's first monitoring well declined by more than 50 percent from October 2010 to April 2011, while the potassium level in EPA's second monitoring well increased during that same period?

8. EPA does not indicate that the water it used to make the drilling fluids to drill the deep monitoring wells was properly tested. Is it possible that this water could have been a contributing source to the contamination?

9. As far as the actual installation of the monitoring wells is concerned, did the EPA take samples and perform baseline testing on the materials used, including sampling of the production water prior to it being pumped down the wellbore, sampling of the drilling mud in similar fashion, or sampling of the steel and other materials used in the construction of these wells?

10. How did EPA ensure that the monitoring wells were drilled into the same formation as the complainants' wells, thus sampling the bad water in question? If this is not the case, or the agency cannot ensure this, then how can the study be seen as addressing these initial complaints or questions?

11. How did EPA determine that their monitoring wells were sufficiently purged prior to sampling, in order to eliminate all borehole storage, and water introduced for development of the wells?

12. Did EPA complete a comprehensive review of background or baseline data for the chemicals of interest (especially methane, organic acids, and miscellaneous organic compounds) prior to completion of the study? Can they demonstrate that such an analysis was completed for the actual site, or by use of analogous settings? Are the methane concentrations observed in domestic wells atypical of analogous geologic settings?

13. The sampling methods used in this investigation did not follow standard EPA guidance for sample collection and processing, particularly for Superfund sites (i.e., low flow sampling protocols). Rather, the EPA used sampling methods that had not been approved by the Agency. Can you explain this deviation?

14. Did EPA complete an independent validation of laboratory data prior to issuance of the report, and if not, how did it address the presence of "target compounds" in blank samples, and the failure to confirm the presence of certain compounds (e.g. glycols) with multiple analytical methods?

15. During the hearing, you stated that EPA has eliminated several potential sources of contamination.
    a. For the shallow drinking water wells, what potential pathways of contamination did you identify? Provide a description of which pathways EPA has scientifically eliminated and the rationale for that determination. What potential pathways remain?
    b. For the deep monitoring wells, what potential pathways of contamination did you identify? Provide a description of which pathways EPA has scientifically eliminated and the rationale for that determination. What potential pathways remain?
    c. Does EPA believe that there is a single source of contaminants for both the shallow drinking water wells and the deep monitoring wells?

16. The report published December 8, 2011 is identified as a draft report and EPA has indicated that the report will be finalized after the upcoming peer review. Does this mean EPA's investigation of the Pavillion ground water is complete? Will there be more investigative phases associated with the public drinking water supply associated with the initial objective of investigating the reason for the foul smelling, bad tasting private drinking water supply? Will there be additional investigative studies associated with the presence of frac fluids?

17. In your testimony, you state that EPA had three external scientists review the sampling data and analysis.

    a. When were these three experts provided the information and how long a period did they have to review the information? Please provide dates.
    b. Please submit a complete list of the data and analysis the three experts were provided.
    c. Did the experts review the draft report or the conclusions? Were these experts aware of EPA's conclusions when they were provided with the sampling data and analysis?
    d. Please provide the Committee with the names of the three experts and their qualifications.

18. How will the peer review process work? Who will select the members of the peer review panel? Will the peer review panel have access to all the data and analysis, including data and information EPA has withheld from the public? How will the charge questions be developed? With the panel be asked to give a unanimous review, or will the comments from individual panelists comprise the review?

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February 8, 2012

VIA EMAIL AND REGULAR MAIL

Michelle Marcu
Enforcement Attorney
US EPA Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

Re: Freedom of Information Act Requests – Pavillion Field Area

Dear Michelle:

As you and I have discussed repeatedly, we, as counsel for Encana Oil & Gas (USA) Inc. ("Encana"), are very concerned about the US Environmental Protection Agency's ("EPA's") continued failure to expeditiously and fully respond to our December 2011 Freedom of Information Act ("FOIA") request letters to the EPA regarding the EPA's draft report on groundwater quality in the Pavillion Field Area ("Draft Report").

On December 16, 2011, you requested and Betsy Temkin and I identified priority documents for EPA's response. The overriding priority was data first and communications second. More specifically, we agreed that the information requests 1.1 through 1.14 in the Region 8 FOIA letter were of higher priority than requests 1.15 through 1.20. After learning that Region 8 would manage responses by Region 3, Office of Research and Development, and Kerr Laboratories, we confirmed that EPA would apply a similar prioritization to the other three FOIA letters. Since then, we have had numerous conversations with EPA confirming those priorities, answered your questions, and prepared an Excel spreadsheet to help expedite EPA's response.

On January 31, 2012, EPA finally posted on its website certain responsive records. A few more records were posted on EPA's website later last week. However, those postings and records do not include many of the priority records. We have also not yet received EPA's required response, with a complete or partial schedule for responding to our requests and EPA's position on costs. Yesterday, you and Mike Boydston advised me that the letter is still under review internally.

The continuing delays are untenable under FOIA and preclude interested stakeholders from undertaking a fair and complete review of the Draft Report. We are eight weeks into this process and we are still without key data and related records. For example, as early as December 20, 2011 we advised EPA of the need to make available EPA's mass spectra data and that we would "appreciate Region 8's providing the mass spectra this week [December 20 – 24] or next week [December 27-30] if at all possible." EPA still has not provided any of its mass spectra data; two months after EPA issued the Draft Report. Another example is during our December 20, 2011 telephone conference, we requested the soil gas data as a priority. We still have not received any soil gas data from EPA, even though Objective 2 of Phase 3 specifically addressed soil gas data.

In a further effort to focus EPA's production of the requested documents, we request that EPA give top and urgent priority to the following specific records:[1]

1. ***Method validation work for all non-CLP analyses***, including di- through heptaetheylene glycol, adamantine and methyl-adamantane, tri(2-butoxyethyl) phosphate, squalene, caprolactam, and 2-butoxyelthanol phosphate. EPA's not having provided these documents is particularly troublesome given Regional Administrator Martin's testimony last week that EPA used its standard procedures, when these analytical methods are not EPA's standard methods.

2. ***For CLP analyses, Level 4 data packages and associated validation packages.*** These records are critical to the evaluation of the Draft Report and are an essential element of transparency.

3. Documentation (including field notes and chain of custody records) of ***the specific locations at which the July 7, 2011 PAV 01 and PAV 02 water samples were obtained.*** EPA's procedures require that the source of samples be identified and yet these samples do not have any such identification in any records that EPA has provided to date.

4. All ***soil gas data and analyses***, see above.

5. All ***mass spectra data***, see above.

6. Records of or related to all "***citizens' complaints of taste and odor problems***" referenced on page 39 of the Draft Report. Also, the Congressional Research Service's January 25, 2012 report on the Draft Report references at page 1 and elsewhere "a public petition." If such a record exists, that should be provided.

The Draft Report obviously has become a matter of substantial public interest. Encana has been requesting records relating to each phase of the investigation since the investigation

[1] In identifying these priorities (as well as those previously provided), we do not in any way waive responses to all of our December FOIA requests nor do we agree, EPA's protestations notwithstanding, that EPA has been responsive to our FOIA requests.

began several years ago. Those records should have been provided as Encana requested them. At the very least, EPA should have provided the public with the full documentation of the information on which EPA relied simultaneously with the release of the Draft Report. Unless the documentation is made available very soon, EPA will have to extend the public comment and suspend the peer review process to ensure both processes serve their intended purpose. To do otherwise is to politicize the scientific review process and bias it in EPA's favor.

EPA has warned repeatedly that the cost of responding to our FOIA requests will be substantial. Meanwhile, over the last two months, a number of public figures and organizations have requested that EPA make available the very same information this firm has requested in order to support the public comment and peer review process. At this point, the requested documentation should be made available, in the public interest, free of any charge, as provided for under 40 C.F.R. § 2.107(1), as the requested information is essential to meaningful public comment and a meaningful peer review and clearly satisfies the other criteria for a public interest fee waiver.

On the issue of costs, you have said that responding to the FOIA requests requires substantial commitments throughout the Agency for lawyer time to review records for "privilege' and other legal considerations before EPA provides them. However, most of the requested documents are highly technical scientific documentation of the investigation or communications among technical or scientific personnel. EPA's technical staff is fully capable of identifying and providing such documents, and very little attorney review of them should be necessary.

Given all the time that has passed since the FOIA requests were submitted and the numerous conversations, we anticipate at this point receiving the priority records, a schedule for the other requested records, and detailed cost estimates in the next couple of days. We also look forward to receiving all of the responsive documents in time for our client and others to review and evaluate them for both the public comment and peer review processes. If the requested documents are not made available very soon, we will request that EPA extend the public comment period on the draft report to accommodate the review and evaluation of the missing information.

Very truly yours,

Nea Brown

Linnea Brown

LNB:lf

NOV 3 0 2011

Tom Doll <tom.doll@wyo.gov>

Comments from BLM - EPA teleconference, Nov 21 2011

2 messages

Kaminsky, Jon F <jkaminsk@blm.gov> **Fri, Dec 2, 2011 at 1:32 PM**
To: Tom Doll <tom.doll@wyo.gov>, "John Corra (john.corra@wyo.gov)" <john.corra@wyo.gov>
Cc: "Osvald, Karl S" <kosvald@blm.gov>, "Claypool, Larry K" <lclaypoo@blm.gov>, "Cerovski, Stuart A" <scerovsk@blm.gov>

John and Tom-

As you heard me state at the WOGCC meeting on November 30, 2011, Stuart Cerovski and I made similar comments and had similar questions to those presented by Gary in that meeting. Our comments and questions arose during BLM's earlier EPA briefing conducted via teleconference on November 21, 2011. In light of what was presented on November 30, 2011 at WOGCC, and due to the fact that during BLM's earlier meeting it was not clear where our comments were going... i.e., were our comments being written down, or tabulated for follow-up, etc., I wanted to share for the record what was communicated during our meeting and what our comments and questions were.

Please refer to the attached document. As I stated, we share much of the same concerns that others on the working group expressed at the WOGCC meeting. While I do not necessarily disagree with the science of what has been done so far, I think we are far from ready to conclude anything from what has been gathered and presented.

Jon

Forward to Tom & Gary

JON F. KAMINSKY, P.G., LHG

Asst. Field Manager/Geologist, Minerals & Lands

Bureau of Land Management, Lander Field Office

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BLM comments & questions raised during EPA briefing to Lander Field Office 21Nov2011.docx
20K

John Corra <john.corra@wyo.gov> **Sat, Dec 3, 2011 at 2:33 PM**
To: "Kaminsky, Jon F" <jkaminsk@blm.gov>
Cc: Tom Doll <tom.doll@wyo.gov>, "Osvald, Karl S" <kosvald@blm.gov>, "Claypool, Larry K" <lclaypoo@blm.gov>, "Cerovski, Stuart A" <scerovsk@blm.gov>

Thanks! These are additive and I appreciate your views. We may want to talk about a joint letter to EPA on what we believe is needed for next steps.

[Quoted text hidden]

E-Mail to and from me, in connection with the transaction of public business, is subject to the Wyoming Public Records Act, and may be disclosed to third parties.

NOV 3 0 2011

Summary of BLM comments and questions raised during EPA briefing to Lander Field Office

November 21, 2011

Background:

On November 17, 2011, Ayn Schmit of the US EPA sent an email to Jon Kaminsky about scheduling a "follow-up meeting to further discuss our monitoring well data and any questions or thoughts that BLM might have regarding the data and its implications." LFO responded in the affirmative and agreed to meet by teleconference on November 21, 2011. Attendees from EPA included Ayn Schmit and Greg Oberley (Region 8) and Rick Wilkin and Dom DiGiulio from the EPA Ada lab. BLM attendees included Jon Kaminsky (Lander Field Office Asst. Field Manager for Minerals and Lands), and Stuart Cerovski (Resource Advisor for Wind River – Bighorn Basin).

Meeting notes:

From this meeting BLM was advised of the following:

- Additional Monitoring was "probably not going to happen due to resource constraints." BLM response: I objected to the two rounds of sampling at two locations (MW01, MW02) that were constructed for the purposes of yielding reliable water quality samples. My experience on working in groundwater remediation (ironically under the oversight of the EPA at other locations in the intermountain west) has been that at bare minimum, four quarters of sampling was required to ensure the annual hydrologic cycle accounted for. I also questioned the statistical validity of the two locations.
- According to the EPA, what has happened so far was "not a nature & extent study, but rather a presence absence investigation."
- According to the EPA, "historically methane had been reported in the area at shallow depths, but there was little evidence that this observation was widespread. There were no clear spikes on mud logs suggesting a correlation between methane detected and proximity to production zones with respect to domestic wells." There was mention of suspected "preferential pathways" that EPA assigned to absence of cement as indicated by cement bond logs and "enhanced gas migration." BLM response: I stated that I was not sure this was anything more than speculation and should not be characterized as a "finding or conclusion." Stuart Cerovski raised an issue about the monitoring wells only testing a specific zone and there should not be any surprise that gas is present considering the gas play in the vicinity. I also stated that the lack of a clear link between methane spikes on gas well e-logs and production zones for domestic water wells did not indicate anything out of the ordinary to me because the domestic wells were completed generally much higher in the geologic section, and such a link at this time would only suggest a direct vertical connection has the migration pathway. Such a direct vertical migration pathway ignores the vertical and horizontal anisotropy and heterogeneity that is demonstrative of the Wind River Formation. Basically, my takeaway from this line of reasoning what that if there were no shallow gas spike recorded on e-logs on gas wells drilled near domestic wells, then there is

no naturally occurring shallow gas, and any gas present in domestic wells is due to these "enhanced gas migration" mechanisms, and I am not sure we are ready to conclude that.

- There were several references to a "plume" of contamination. BLM response: I questioned the use of the term "plume" due to the lack of three-dimensional water quality data indicating size, vertical and horizontal extent of any groundwater plume in the area of study. My recommendation was to just refer to the data collected so far, as "contamination detected at two monitoring wells installed and screened in intervals above gas producers and below domestic wells."
- I raised the question of the abnormally high pH values at the monitoring wells and stated that I had never seen groundwater quality of that nature outside of any industrial setting. My immediate suspicion was contamination of completion materials (bentonite, soda ash, cement, etc). I also stated that completing monitoring wells with mud rotary introduces issues such as reduced effective porosity of the formation, water chemistry changes (pH, etc.), and that some organic polymers provide environments for bacterial growth which can affect the reliability of sapling results. I also questioned the likelihood of driving down shallow contamination into deeper intervals during the drilling process. Mud rotary also make it difficult to tell where the hole is making water and therefore identify favorable areas to perforate. My experience in environmental monitor wells installation was generally reverse circulation with filtered air, and cuttings and water samples taken at regular intervals during the drilling process to rule out shallow contamination being pushed down, or contamination being introduced by the rig. EPA response: They did not feel that any of this was an issue.
- EPA stated that the high pH values were probably due to KOH used as a component in frac fluids. EPA conducted titration experiments that indicated that the water chemistry was significantly sensitive to KOH due to a low buffering capacity. For some of the deeper waters, it took very little KOH to result in high pH. BLM response: I continued to question pH on the basis of well completion materials, and also stated that since frac'ing employed CO2 frac foams, would we not expect carbonic acids to form in the groundwater therefore, lowering pH. EPA agreed that CO2 would be expected to form such acids in a non-buffering environment (and therefore lower pH), but had no particular opinion on what the result would be from that in terms of pH observed in the groundwater.
- EPA stated that what was detected in monitor well water sample results correspond with what they stated was in frac fluids and MSDS's for the frac fluids. BLM response: I was not sure we had a handle on what was historically used in frac fluids and its only been recently that the make-up of frac fluids was shared with the regulators.
- I questioned the presence of DRO and GRO analytes in the water samples from the monitoring wells, and also the hits in the domestic wells. How did these constituents get to these deeper wells? Would finding such constituents be out of the realm of expectation for a formation naturally yielding hydrocarbons, including some measure of condensates?\
- I questioned the appearance and disappearance of multiple analytes detected at the monitor wells between phase 3 and 4. If truly a groundwater plume, I expected closer results.

- I asked about the pit contamination. EPA response was that while there was contamination detected in pits, it was fairly shallow in nature and did not approach the levels in the monitor wells. BLM response: 33 pits could be a source of contamination and would there be a difference just in the amount of degradation in shallow groundwater compared to deeper groundwater.
- In general, I questioned that lack of site data which would lend to a reliable conceptual model. There is no data on horizontal and vertical gradients, artesian pressures, hydraulic conductivity data, and a general lack of data of the complex geology, a lack of understanding of inputs from significant irrigation, and therefore a lack of understanding of migration pathways, fate and transport. To me, this represents a serious lack of data if one is going to arrive at a specific source for the observed contamination. Is contamination moving up, down, horizontally? By what mechanisms...diffusion, advection? If truly a plume, is there a specific source, and where in this plume are the monitor wells situated?
- Stuart Cerovski raised the question of the gas in the area in relation to the observed "blow-out" at a domestic well drilled earlier ast the Meeks place. This well blew out at about 700 feet. The fact that the gas "blew" for days (a week?) suggests a significant in-place source rather than gas that just migrated into position from an improperly completed well somewhere in the vicinity, or along some preferential pathway created by frac'ing.
- EPA stated that there is not enough data to determine who is responsible, Encana or Tom Brown. BLM response: That statement is dependent on whether or not it can be shown that fracing is responsible in the first place, and I am not sure we are there yet.
- EPA stated that their next step was to release a draft report and subject it to peer review. BLM response: I stated I thought it was too early to release anything beyond raw data at this point. Arriving at conclusions at this stage is hasty in my opinion.

I would also state as that I would have had additional comments if some of the issues that were revealed at the November 30, 2011 meeting were shared during our earlier briefing. I definitely would have relayed concern over the well development process, the observed turbidity in the monitoring wells, the seemingly lack of hydraulic connection to the formation that at least of the monitor wells demonstrates, lack of site specific well performance measures (slug testing, etc.), lack of understanding of true static water level in the monitor wells, and the relative small water purged from the wells in comparison to the amount of fluids added to the wells during the drilling, installation, and development processes.

I also later raised the question that if the presence of MTBE was being used as a tie to frac fluids, its use in fuels has been since 1979 (in place of tetraethyl lead), and its use has been decreasing since the 2000's in favor of ethanol, there might be other constituents of fuel that should be present as well. Therefore, since a great deal of gas wells were constructed before 1979, would the presence of lead further provide evidence that frac fluids are responsible for the contamination? EPA response: we will look into this.

As a closing remark, I have no particular opinion one way or the other with regard to whether frac fluids are responsible for the contamination detected out at Pavillion. My objection at this point, is that the nature and extent of the contamination, possible pathways, and the site conceptual model are not yet understood to the degree at which I would be comfortable assigning the source to anything, including hydraulic fracturing.

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
Subcommittee on Energy & Environment

Hearing Questions for the Record
The Honorable Brad Miller

Fractured Science: Examining EPA's Approach to Groundwater Research – the Pavillion Analysis
February 1, 2012

Mr. James Martin

1. Mr. Martin, did the EPA need to apply for a permit from the state of Wyoming to drill the two monitoring wells?