

Pinedale Anticline Project Area Technical Report

Evaluation of Potential Sources of Low Level Petroleum Hydrocarbon Compound Detected in Groundwater November 2013

BLM

- 1. Why is there a groundwater study being conducted on the Pinedale Anticline?**
 - a. Multiple detections of hydrocarbons have been found since 2006 in water wells used for industrial operations in the Pinedale Anticline Project Area (PAPA). The source of these detections was undetermined. In response to these hydrocarbon detections, the 2008 PAPA Supplemental Environmental Impact Statement (SEIS) Record of Decision (ROD) required the BLM, in cooperation with Wyoming Department of Environmental Quality (WDEQ) and Environmental Protection Agency (EPA), to complete a process under the *Regional Framework for Water-Resources Monitoring Related to Energy Exploration and Development* to characterize the PAPA aquifers, modify the current monitoring program as necessary, and identify mitigation for all potential sources of the hydrocarbon detections.

- 2. Who is participating in the groundwater study?**
 - a. The BLM is cooperating with the Wyoming Department of Environmental Quality (WDEQ), the Environmental Protection Agency-Region 8 (EPA), and the proponents of the Pinedale Anticline 2008 Gas Development program: SWEPI, QEP, Inc., and Ultra Resources (USQ or Operators). The contractor for this study is AMEC, Inc. in cooperation with NewFields Mining and Energy Services, LLC.

- 3. Why is the BLM publishing the Low Level Petroleum Hydrocarbon Compound (LLPHC) report?**
 - a. The BLM is providing this report under the Interim Groundwater/Aquifer Pollution Prevention, Mitigation and Monitoring Plan (Interim Plan) published in December 2008.
 - b. The LLPHC report provides an evaluation of sources of petroleum hydrocarbon compounds potentially contributing to previously identified detections within the regional Wasatch aquifers located beneath the Pinedale Anticline.
 - c. It is the intent of the BLM and our agency partners to fully inform and engage the public in the ongoing groundwater study on the Pinedale Anticline and provide accurate dissemination of the results of this study.

- 4. Are there other reports that will be published, and if so, when will they be published?**
 - a. No additional reports will be provided under the Interim Plan. The last remaining task as required by the SEIS ROD is a Final Groundwater/Aquifer Monitoring, Mitigation and Pollution Prevention Plan (FGMP).
 - b. The FGMP will include:
 - i. Identification of additional best practices and/or further groundwater protection mitigation for oil and gas development.
 - ii. Monitoring network design and associated Sampling and Analysis Plan.
 - iii. Recommendation regarding the water supply well moratorium
 - c. A completion date for this report has not yet been identified but initial work has commenced.



5. What sources did BLM evaluate under this investigation?

- a. Specific hydrocarbon fluid materials evaluated under this study include: produced water, condensate, flowback fluids associated with hydraulic fracturing, water well pump/pipe thread material, non-aqueous phase liquid (LNAPL), and carbonaceous shale.
- b. Additional samples of gases were collected from production wells and water wells.
- c. Methods of investigation used in this study are documented in the LLPHC Plan of Study and Sampling and Analysis Plan. The agencies previously accepted these documents and concluded that the study design was adequate for identifying potential sources of petroleum hydrocarbon compounds in the Pinedale Anticline.

6. What does this report say about the quality of water in the Wasatch Formation?

- a. Of the 34 water wells sampled, two water wells have hydrocarbon detections that do not meet State and/or Federal drinking water standards.
 - One nested well pair had sample results exceeding federal and/or state water quality standards for Benzene and Toluene; these two wells are located on an existing well pad with known contamination issues. The hydrocarbons at this location most closely resemble formation fluids and may be associated with a Plugged and Abandoned gas well on the same well pad. This location is currently enrolled in the WDEQ voluntary remediation program (VRP) for source investigation and cleanup actions.
- Two water wells have hydrocarbon materials resembling oil-based mud but concentrations remain below State and/or Federal drinking water standards. The source of the oil-based mud is identified as back siphoned materials from a dirty tank and/or reserve pit at both locations.
- One water well has free product (LNAPL) floating on the surface of the water. The source of this material is unknown. The State of Wyoming is providing oversight of this location.

7. Why has this report taken so long?

- a. The agencies have undertaken a thorough review of this report to ensure that the Sampling and Analysis Plan, and Plan of Study, have been complied with and to ensure that the results are supported by the data provided.
- b. Permitting and installation of the subject wells for the larger Interim Plan study took more time than anticipated due to delays associated with access and unexpected water well installation field conditions.

8. Do the Agencies involved in this study support the conclusions of the report?

- a. BLM, in cooperation with our partner agencies for this study, have concluded that the report complies with the sampling and analysis plan and the plan of study previously prepared to guide the identification of potential sources.
- b. The BLM is evaluating the results of this study in cooperation with our partner agencies. The information and findings of the report will be used to guide the development of the Final groundwater/aquifer pollution prevention, mitigation and monitoring plan.

9. Is groundwater contaminated?

- a. The report concludes that there is no widespread impact to groundwater in the PAPA from oil and gas development.
- b. Detections of diesel range organics are most likely associated with water well pump installation materials.
- c. Detections of gasoline range organics are associated with the gas in the water. The gas in the water is predominantly naturally occurring.
- d. Two water wells have detections of hydrocarbon compounds in exceedance of federal or state water quality standards and one well has free product in the well. These sites are receiving oversight through State of Wyoming programs.

10. If my drinking water well is impacted (with detections exceeding state and/or federal water quality standards), what regulatory agency has responsibility for oversight?

- a. If waters of the state of Wyoming are impacted, it is the Wyoming Department of Environmental Quality's (WDEQ) responsibility to investigate the cause of the impact and to determine who is responsible for the impact to groundwater. Once the source and extent of the impact are determined, the WDEQ will decide what additional environmental actions may be required by whom.

11. Is the water supply for Pinedale or Boulder at risk from oil and gas related impacts?

- a. Water supplies for these communities are not at risk from oil and gas development activities. Current development is located in areas where groundwater flows away from these communities.

12. Where can I find out more information regarding the VRP program?

- a. <http://deq.state.wy.us/volremedi/index.asp>

13. What happens to the wells that have been released from the VRP program?

- a. The FGMP will evaluate the need for these wells to undergo continued monitoring. With the approval of the Wyoming Oil and Gas Conservation Commission, the Wyoming State Engineer's Office, and BLM, these wells could also be plugged and abandoned, or the water right could be transferred to a new permit holder.

14. What do the results say about the data collected under the 2000 PAPA ROD?

- a. Results suggest that data collected under method 8015B, may not accurately represent sources of hydrocarbons due to oil and gas development.
 - i. The data collected under 8015 is highly variable over time, and sample to sample.
 - ii. The Sublette County Conservation District (SCCD) is commended for the data they have collected and the work they have done to date.
 - iii. This report considered the SCCD data during development of the sampling and analysis plan used to collect the data for the LLPFC.

15. Where can I find more information regarding the PAPA Interim Groundwater Study and associated reports?

- a. http://www.blm.gov/wy/st/en/field_offices/Pinedale/anticline/resources/water.html