

2014 AAPG Conference
Theme 6: Water Management and Induced Seismicity,
CO₂ Capture and EOR (DEG/AAPG)
Wednesday, April 9, 8:30 AM - 12:00 PM
Exhibition Hall

Interpretation of the Data Collected As Part of US EPA's Investigation at Pavillion, WY

US EPA released a draft report in 2011 asserting that, based on water sampled from two deep monitoring wells (much deeper than typical domestic wells and in proximity to natural gas-bearing strata) it installed, there were potential groundwater quality impacts from hydraulic fracturing of gas wells near Pavillion, Wyoming. This conclusion was hotly debated and refuted by many, ultimately leading to additional sampling of the two deep monitoring wells by both US EPA and USGS in April 2012. Neither agency attempted subsequent interpretation of the full dataset collected from the Pavillion monitoring program, and the investigation has now been transferred to the state of Wyoming. In this presentation, we evaluate all data collected at Pavillion and interpret them within the context of the regional hydrogeological setting and information on the construction and installation of the two deep monitoring wells. The chemistry of the groundwater samples obtained from these wells represents water in equilibrium with cement, which was pumped into the well annuli but not hydraulically isolated from the screened interval of the wells. Thus, the chemistry of water samples is in sharp contrast to what would be expected if fracturing fluid (predominantly CO₂ foam) had leaked upward into the strata in which the US EPA monitoring wells were screened. It is also clear that the vertical direction of groundwater flow in the area is downward, meaning that there is no mechanism to drive hydraulic fracturing fluid upward after a well stimulation. Overall, there is no evidence that the US EPA deep monitoring wells or shallower groundwater resources in the Pavillion area have been affected by hydraulic fracturing fluids. Furthermore, it is unlikely that groundwater samples from the deep monitoring wells will be able to provide useful information about potential groundwater impacts due to the severe effects of cement on water chemistry in the vicinity of these wells.