

**COLORADO**Oil & Gas Conservation
Commission

Department of Natural Resources

SAND CREEK MONITORING WELL PROJECT SUMMARY – MEMO TO FILE, REMEDIATION PROJECT #9445

2/8/2015

Actions completed on the Sand Creek Monitoring Well Investigation through January 31, 2015 include:

- Noble Energy, Inc. submitted and COGCC approved a Form 27 Site Investigation Workplan. COGCC assigned Remediation Project #9445 and project documents can be viewed in the Remediation Project file.
 - Conducted a thorough review of Division of Water Resources records to determine the need for additional water well sampling. Noble and COGCC met on January 7, 2016 to review and finalize the list.
 - Six water wells were identified for sampling and a Noble contractor conducted the sampling on January 19-20, 2016. COGCC witnessed Noble's contractor sample 4 of the 6 water wells:
 - 3 water wells are located within ½ mile of the Sand Creek MW and are completed in the shallow aquifer at depths of less than 40 feet.
 - 3 water wells are located within ½ and 1 mile of the Sand Creek MW and are completed in the Laramie Fox Hills (LFH) aquifer at depths ranging from 270 feet to 440 feet. Additional shallow water wells are located between ½ mile and 1 mile of the Sand Creek MW, but were not targeted for sampling pending results of the initial 6 water samples.
 - Initial results indicate that none of the 3 shallow water wells sampled contain detectable concentrations of dissolved gases. Two of the LFH water well samples contain dissolved methane at concentrations < 1 milligram per liter (mg/l) and no ethane or propane. Noble reports that stable isotope analysis of methane confirms this methane to be biogenic in origin.
 - Noble completed a structural contour map of the Upper Pierre that shows that the Sand Creek MW is located on a local structural high point where stray gas would likely accumulate.
 - Noble completed a downhole camera inspection of the Sand Creek MW and identified that gas is entering the well at a depth of 125 feet or below.
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- Noble presented their initial engineering review of oil and gas wells to COGCC Staff on January 28, 2016:
 - Noble reviewed 57 oil and gas wells present within $\frac{3}{4}$ mile of the Sand Creek MW
 - Noble identified 4 wells for further analysis which will include the following actions in the field beginning on or around February 4, 2016:
 - Gas analysis if possible (2 of the wells are temporarily abandoned per the HZ offset policy). Analytical results will be compared with gas in the Sand Creek MW.
 - Casing pressure test
 - Additional logging to examine the casing integrity and cement integrity
- Noble and COGCC are discussing the recompletion of the Sand Creek MW to prevent migration of the stray gas up the wellbore and potentially impacting the shallow aquifer located at approximately 40 – 70 feet below the ground surface in the area.
- Noble and COGCC plan to reconvene and review additional data in middle to late February.