

January 21, 2014

INCOMPLETE

Colorado Oil and Gas Conservation Commission (COGCC)
Attn.: Mr. Chris Neidel, Northwest Region Environmental Protection Specialist
Routt County, Colorado

Subject: Drilling Pit Closure
Remediation Number: **5613**
Well Name: Lake 6-22
API No.: 05-103-10972
Physical Location: SENW Section 22 T1N R95W 6PM

Dear Chris,

was contracted by PetroHunter Operating Company (PetroHunter) to assist with the closure of a drill-cuttings pit associated with the Lake 6-22 well, located in the SE1/4 of the NW1/4 of Section 22, Township 1 North, Range 95 West, of the 6th P.M. (Latitude/Longitude: 40.04367/-108.04137) (Figure 1). The purpose of this letter is to present a complete summary of the drill-cuttings pit-closure activities, soil sampling results, and to request a “No Further Action” determination.

Initial Pit Closure Activities

PetroHunter contracted White Construction and Excavation, LLC (White Construction) to perform earthwork activities associated with closing the drill-cuttings pit. The excavation activities included excavation, stockpiling, mixing, backfilling, and contouring. The work was completed in November and December 2013.

Prior to backfilling, field staff were onsite to collect closure confirmation soil samples from the drill-cuttings stockpile, pit bottom, and background locations (Figure 2). A total of five discrete soil samples (Cuttings Pile NE, Cuttings Pile NW, Cuttings Pile SE, Cuttings Pile SW, and Cuttings Pile C) were collected from the drill-cuttings stockpile. All five soil samples were field screened for the presence of volatile organic compounds using a photoionization detector (PID). No elevated PID readings were observed for any of the five soil samples. Three discrete soil samples (Pit - N, Pit - C, Pit - S) were collected from bottom of the former drilling pit. Two discrete background soil samples (Background 1 and Background 2) were also collected from upgradient locations adjacent to the drilling pad. The soil sampling activities were conducted on November 13, 2013.

Selected soil samples from the drill-cuttings pile and pit bottom were packaged and shipped to ESC Lab Sciences in Knoxville, Tennessee (ESC) under standard chain-of-custody (COC) protocol for analysis of the COGCC Table 910-1 list of analytes. Background soil samples were submitted to

ESC for analysis of pH, sodium absorption ration (SAR), and electrical conductivity (EC).

Laboratory analytical results (Attachment A) for the closure confirmation samples documented the success of the pit closure effort, as all analytes were below the Table 910-1 Concentration Levels, with the exception of pH, SAR, and arsenic.

Arsenic concentrations exceeded the COGCC Table 910-1 maximum concentration levels in all the soil samples collected from the site (Table 1). All three discrete soil samples collected from the drill-cuttings stockpile (4.8 to 5.6 milligrams per kilogram (mg/kg)), and one of the three discrete soil samples collected from the pit bottom (4.6 mg/kg) exceeded both the COGCC Table 910-1 concentrations and the background concentrations (1.4 and 4.1 mg/kg). Background arsenic concentrations collected from a nearby location (Anderson 4-21) indicate background arsenic concentrations as high as 7.8 mg/kg. The soil types at these two locations are the same (Forelle Loam) and are made of up of the same parent rock material. Therefore, _____ believes the arsenic concentrations identified in the soil cuttings pile and pit bottom are all within the range of natural background concentrations.

SAR and pH concentrations in the closure-confirmation samples exceeded both the COGCC Table 910-1 and background concentrations. However, this material was replaced into the over excavated pit at a depth greater than three feet below ground surface and covered with a minimum of three feet of clean fill material.

Backfilling Activities

Prior to backfilling the pit, _____ drafted a letter to the landowner requesting authorization to backfill the overexcavated pit with mixed drill cuttings. A copy of the signed letter is included in Attachment B.

Following backfill activities, the area was re-contoured to the natural slope, and surface roughened to minimize any potential erosion prior to final reclamation activities. The work was completed on December 3, 2013 (Photographs 1 through 4).

Conclusions

Based on the soil data presented above, _____ believes the drilling pit has been successfully closed. Therefore, _____ on behalf of PetroHunter, is requesting a "No Further Action" determination for the closure of the drilling pit (Remediation Number 5612).

Please call me if you have any questions, comments, or concerns.

Sincerely,

Attachments