

October 16, 2018

Ms. Karen Shanahan Olson  
Senior Program Manager  
PDC Energy, Inc.  
1775 Sherman Street, Suite 3000  
Denver, Colorado 20203

**RE: PROPOSED SUPPLEMENTAL INVESTIGATION AND SAMPLING PLAN  
FORMER SITZMAN 1U TANK BATTERY  
NWSW SEC 27 T5N R65W  
REMEDATION #: 11252**

Dear Ms. Olson:

This report has been prepared by Tasman Geosciences, Inc. (Tasman) to summarize the proposed supplemental investigation and sampling work plan for the former Sitzman 1U tank battery (Site). This report was prepared in response to the Condition of Approval (COA) issued by the Colorado Oil and Gas Conservation Commission (COGCC) on August 20, 2018.

#### **Drilling, Soil Sampling, and Well Installation**

Twelve (12) soil borings will be advanced within and surrounding the former excavation area using hollow stem auger drilling methods. Soil borings will be advanced to 27 feet below ground surface (bgs), approximately 2 feet below the final depth of the excavation. Lithological descriptions and volatile organic compound (VOC) concentrations measured by a photoionization detector (PID) will be documented for all soil borings.

Soil samples will be collected from the saturated interval of each boring below the depth of the excavation sidewall samples. Soil samples will be collected at the depth intervals which are most likely to be impacted, based on field-measured VOC concentrations. Samples will be submitted to Summit Scientific Laboratories (Summit) for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX) and total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by United States Environmental Protection Agency (USEPA) Method 8260B, and TPH – diesel range organics (DRO) by USEPA Method 8015.

It is anticipated that groundwater will be encountered between 15 and 20 feet bgs. Therefore, monitoring wells (BH01 – BH12) will be installed at all twelve (12) boring locations.

#### **Well Development, Surveying, and Groundwater Sampling**

Following installation, monitoring wells will be developed using a combination of an inertial pump and surge block to remove sediment emplaced during installation activities.

The twelve (12) Site monitoring wells will be gauged and sampled once groundwater levels indicate at least an 80% aquifer recharge. Depth to water will be measured from the north side of the well casing to the nearest 0.01-foot using an oil-water interface probe (IP). Groundwater levels will be used to calculate the groundwater elevation in each well in feet above mean sea level (AMSL), based on the new surveyed top of casing elevation. Groundwater flow direction and gradient will be calculated using the elevation data.

Groundwater samples will be collected from each Site monitoring well using low flow sample collection methods to minimize aquifer drawdown. Wells will be purged until water quality parameters reach stabilization, at which time groundwater samples will be collected from the wells. Samples will be submitted to Summit for analysis of BTEX by USEPA Method 8260B.

Results of the supplemental site investigation and sampling work plan will be provided to the COGCC during the fourth quarter 2018.

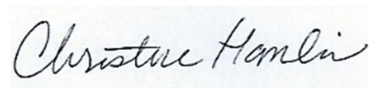
#### **Landowner Requirements**

Per the directive of the landowner, groundwater samples collected from the wells located on their property will be submitted for an expanded analyte suite. Analytical results for these constituents will be provided to the landowner directly under separate cover.

Should you have any questions regarding this report or the activities discussed herein, please contact me by phone at (720) 409-8791.

Sincerely,

Tasman Geosciences, Inc.



Christine Hamlin  
Program Manager

#### **Enclosures:**

Figure 1 – Proposed Soil Boring and Monitoring Well Location Map





DATE:	October 2018
DESIGNED BY:	C. Hamlin
DRAWN BY:	D. Arnold



**PDC Energy, Inc. – DJ Basin**  
**Former Sitzman 1U Tank Battery**  
NWSW, Section 27, Township 5 North, Range 65 West  
Weld County, Colorado

Proposed Soil Boring and  
Monitoring Well Location  
Map

**FIGURE**  
**1**