

Objective Criteria Review Memo PDC Energy Inc. Grays Federal 5N65W27 1-10 Form 2A, Document #402077978

This summary explains how COGCC staff conducted its technical review of the PDC Energy Inc. (PDC), Grays Federal 5N65W27 1-10, Form 2A, document # 402077978, within the context of SB 19-181 and for the required Objective Criteria. This is a new Location with 10 wells, 12 separators, 11 oil tanks, 12 volatile organic compound (VOC) Combustors, four vapor recovery units (VRUs), two buried produced water vaults, two modular large volume tanks (MLVT), one electric generator, and one lease automatic custody transfer (LACT) Unit. The proposed construction of this Location meets the following Objective Criteria:

OBJECTIVE CRITERIA MET

- (Criteria #1) Location lies within 1,000 feet of three Building Unit (BU);
- (Criteria #5.c) Location lies within a Sensitive Area for water resources; and
- (Criteria #8) Location with storage of hydrocarbon or produced liquid in more than 18 tanks or in excess of 5,200 barrels (bbl) .

COGCC staff met with the Director to discuss whether the Objective Criteria were sufficiently addressed and whether the Form 2A could be approved with the proposed Best Management Practices (BMPs) and applied Conditions of Approval (COAs). The following sections provide details regarding the evaluation of each criterion.

Criteria #1: Oil and Gas Locations within 1,000 feet of a Building Unit

Site Specific Description of Applicability of Criteria 1: The Location is within 1,500 feet of three Building Unit(s) - which triggers the Director's review of the Form 2A permit. The closest building unit is 357 feet northwest of the Location. This property at 25724 County Road 43 is owned by Michael Boulter Farms LLC, the mineral lease holder. The Location will be a Multi-well Location with associated Production Facilities.

Site Specific Measures to Address Criteria 1: Based on the technical review and desktop evaluation, staff identified that since the Location is 357 feet from the nearest BU Objective Criteria #1 is met. Additionally, there are four more BU to the north within 2,000 feet, and another five BU located just outside the 2,000 radius from the Location.

PDC provided Building Unit Owner Acknowledgement of Operations letters to BU owners between 1,000 feet and 1,500 feet of the proposed location. PDC indicated no issues or concerns have been addressed at this time. Copies of two letters signed by the BU owners stating that they are agreeable to the location of the proposed wells and production equipment were provided as attachments.

On November 1, 2019, OGLA staff requested additional information from PDC. 1) PDC provided additional information on permanent and temporary oil and gas facilities and equipment operated in a manner that odors do not constitute a nuisance or hazard to public welfare. PDC

proposes using Group I oil based mud (OBM) for the production string drilling due to high bradenhead pressures and remote locations. PDC provided BMPs to control OBM odor and odor neutralization..

2) PDC provided Notice pursuant to Rule 305.c, regarding meetings on the proposed Location sent along with a BU acknowledgement letter. No concerns were brought to PDC's attention for those BUs that received notices. PDC provided a copy of a Building Unit Owner Acknowledgement of Operation letter signed by Don Lee Schafer of the Don Lee Schafer Living Trust for the BU located at 25835 County Road 43.

3) PDC provided additional information on how they "reached out" to BU owners from 1,000 feet to 1,500 feet from the Location to notify them of the proposed activities. PDC provided copies of a letter to BU owners at 21260 County Road 54, 26970 County Road 43, and 25967 County Road 43. According to PDC no concerns have been brought to their attention pursuant to the outreach letter.

4) PDC plans to construct a multi-well pad and improved lease access road off of CR 43 for all heavy truck traffic and rig moves along with drilling operations and maintenance equipment. PDC have engaged in the Weld Oil and Gas Location Assessment (WOGLA) process and will obtain any necessary Access, Right-of-Way, or Traffic Control Permits. PDC plans to transport oil from this location via pipeline and LACT, as available, to reduce traffic, emissions, and minimize onsite storage.

5) PDC conducted a baseline noise survey for site specific noise modeling to determine if any mitigation measures are warranted. Based on the review and proximity to Building Units, PDC will install light and sound mitigation, such as sound walls, straw bales, or customized semi-trailers, will be installed to the north and south of the Location.

6) PDC will operate in a manner so that dust does not constitute a nuisance or hazard to public welfare. Practices will include use of speed restrictions on lease roads, regular road maintenance, restriction of construction on high-wind days, and silica dust controls when handling sand used in hydraulic fracturing operations. PDC will coordinate dust mitigation with the county on gravel roads, and place road base where allowed by the surface owner around tanks and wellheads to minimize dust.

7) PDC will have contractor lights turned downward away from BU within the 1,500 foot buffer zone. Sound walls will screen lights as well. Use of an oil pipeline and LACT, reduction of the number of tanks, and the installation of VRU and VOC combustors will reduce emissions.

8) PDC will locate MLVT based on Location size, nearby surface waters, site visibility, surrounding land use, property lines, onsite traffic, site security and topography. The MLVT will be constructed in accordance with the manufacturer's Standard Operating Procedure (SOP), COGCC June 13, 2014 policy, and PDC will conduct visual inspections daily. A minimum of two feet of fresh water will be kept in the MLVT as a safe volume to hold the liner down and keep the

MLVT stable. PDC is committed to the safety of its employees, contractors, and the public as a top priority.

Criteria 1 Summary:

PDC provided additional information and clarification regarding PDC's proposal and BMPs for addressing siting conditions imposed by Weld County and updated information pertaining to meetings and communication with BU owners within the Buffer Zone Locations, alternatives for BMPs for avoiding or minimizing impacts from odor complaints from BU owner/occupants arising from the use of OBM.

PDC provided a BMP that they will operate in a manner that odors do not constitute a nuisance or hazard to the public welfare. PDC will store OBM in closed, upright tanks, and an odor neutralizer will be used in the active mud system to manage odors. PDC will haul cuttings continuously to the offsite disposal facility in an effort to reduce the volume of cuttings and keep odor as low as possible.

PDC has proposed BMPs for controlling traffic, light, emissions, and dust through transporting oil via pipeline to reduce truck traffic, install road base on location and access roads, and reduce the number of tanks onsite in addition to installing VRU and VOC combustors to reduce emissions. Light sources will be directed down and away from BU within 1,000 feet and PDC will restrict speed and maintain lease roads to reduce noise, dust, and alleviate traffic complaints.

PDC will install and maintain freshwater MLVT based on site specific criteria that will ensure the safety of employees, contractors, the public and environment by installing and maintaining the MLVT in accordance with the manufacturer's SOP and the COGCC June 13, 2014 policy. PDC will conduct visual inspections of the MLVT daily.

Criteria #5.c: Oil and Gas Locations within a Sensitive Area for water resources.

Site Specific Description of Applicability of Criteria 5.c: The Location is within a Sensitive Area for water resources which triggers the Director's review of the Form 2A permit. The closest down gradient water resources are an unnamed irrigation ditch located 13 feet to the north, Latham Ditch located 1,629 feet north, and the nearest water well (Permit #124018--A) is 585 feet north-northwest of the Location. The technical review found the depth to ground water is 19 feet below ground surface (bgs); and is therefore, a Sensitive Area for water resources.

Site Specific Measures to Address Criteria 5.c: The Operator will prepare a stormwater management plan (SWMP) to contain required elements associated with PDC's construction activities, and to comply with the Colorado Discharge Permit System (CDPS) General Permit (COR-030000) which restricts sediment and other contaminants allowed in discharge to protect water resources.

1) PDC will implement BMP in accordance with good engineering practices, including, but not limited to, construction of a berm or diversion dike, site grading, or other comparable measures, sufficient to protect surface water and shallow ground water in proximity of the Location from releases of produced fluids and chemical products that could occur during drilling, completion, and production operations.

2) PDC proposes using a Group I OBM with a closed-loop system during drilling of the production string. The OBM will be reused and recycled. PDC provided BMP to manage the oil based drill cuttings by continuously removing the cuttings from the Location to prevent impact to shallow ground water. For drilling operations, PDC will use three foot (3 ft) steel containment walls constructed with a 40 mil liner around all the storage tanks on location. Six foot (6 ft) cellar rings will be placed around each of the wellheads. For shallow ground water, a 40 mil liner will be placed under the drill rig. The rig crew will use catch pans when draining hoses or mud lines. A one foot (1 ft) earthen berm will be constructed around the rig to contain unexpected spills. During completion operations, a 45 mil chemically resistant, non-slip, high density polyethylene (HDPE) liner will be placed beneath trucks, the storage area, and up to the wellheads with ten feet (10 ft) of excess on three sides of the working area.

3) PDC will construct berms or diversion dikes, use site grading, or other comparable measures, sufficient to protect surface water (irrigation ditch 13 feet north of the Location) and shallow ground water in proximity of the Location from releases of produced fluids and chemical products that could occur during drilling, completion, and production operations.

4) PDC plans to use partially buried, double-walled, fiberglass produced water vaults will be installed above an impermeable synthetic or geosynthetic liner system tied back into the surface liner to prevent ground water impacts. PDC has attached a Leak Detection Plan per 604c.(2).F to the Form 2A.

5) PDC provided a description of secondary containment berms constructed per Rule 604c.(2).G that will have steel rings with geosynthetic liners, designed and installed to prevent leaks from oil tanks, water tanks, and separators, will have a minimum capacity capable of containing the largest estimated release, such as from the largest single tank, plus designed with adequate freeboard to contain precipitation for a major storm event. At a minimum inspections will be conducted in accordance with PDC's spill prevention, control, and countermeasures (SPCC) plan.

Criteria 5.c Summary:

PDC has prepared a SWMP with BMPs to be implemented prior to conducting soil disturbing activities that will protect surface water and shallow ground water in proximity of the Location. PDC will use a combination of geosynthetic liners, earthen berms, drip pans, and portable containment structures to protect shallow ground water at the Location during drilling, completion, and flowback operations. OBM drill cuttings will be removed continuously from the site for offsite disposal at a commercial facility to alleviate odors and to reduce the potential for impact to shallow ground water.

PDC will use a combination of control measures; including a leak detection system, use of geosynthetic liners and steel rings for temporary and permanent production tanks and equipment. PDC plans to use partially buried, double-walled, fiberglass produced water vaults will be installed above an impermeable synthetic or geosynthetic liner system tied back into the surface liner to prevent shallow ground water impacts. Inspections will be conducted in accordance with PDC's SPCC plan.

Criteria #8: Oil and Gas Locations with storage of hydrocarbons or produced liquid in more than 18 tanks or in excess of 5,200 barrels (bbls).

Site Specific Description of Applicability of Criteria 8: The Location has eleven (11) oil tanks with a storage capacity of 538 bbls and two produced water vaults with a storage capacity of 210 bbls. Therefore, the total storage capacity is 5,800 bbls.

Site Specific Measures to Address Criteria 8:

1) PDC plans to provide containment berms for permanent and temporary tanks constructed of steel rings with geosynthetic liners, designed and installed to prevent leakage and resist degradation from erosion or routine operation. Berms and secondary containment will be designed to contain a minimum of 150% of the largest single tank and will be sufficiently impervious to contain any spilled or released material.

2) PDC personnel will typically observe secondary containment at the production Location on a daily basis. Any deficiencies are to be relayed to appropriate PDC staff so that a work order can be generated to schedule necessary repairs. PDC performs inspections of the secondary containment on an annual basis.

3) PDC provided a Leak Detection Plan per 604c.(2).F. 4) Buried produced water vaults will be installed above an impermeable synthetic or geosynthetic liner system which shall be tied back into the surface liner. PDC opted to use partially buried fiberglass water vaults due to the need for the inlet to the vault being below the frost line and to keep water from freezing during cold weather months and prevent environmental releases. The fiberglass vaults will be double-walled and will be inspected as part of PDC's integrity testing program. The load line will be installed 12 to 18 inches from the bottom of the vault to keep water in the vault at all times and prevent the vault from floating.

Criteria #8

Summary:

PDC will install containment berms for permanent and temporary tanks. The containment berms will consist of steel rings with geosynthetic liners, designed and installed to prevent leakage, resist degradation from erosion and routine operations, and will be sufficiently impervious to contain any spilled or released material. The containment will be of sufficient size to contain 150% of the largest tank within the containment to contain the largest estimated release, account for adequate stormwater freeboard, and displacement from other tanks and equipment within the containment. PDC provided a Leak Detection Plan. PDC personnel visually inspect the containment on a daily basis, and conduct annual inspections of the containment.

Double-walled fiberglass vaults for Produced Water storage are partially buried to prevent produced water from freezing during cold weather months. A synthetic or geosynthetic liner is placed beneath the vaults and tied back to the The vaults are included in PDC's integrity testing program. Load lines are installed 12 to 18 inches above the bottom of the vault to keep water in the vault at all times to keep the vault from floating.

Director Determination: Based on the Objective Criteria review. The Director has determined that this permit application meets the standard for protection of public health, safety, welfare, the environment and wildlife resources set by SB 19-181. Since PDC proposes to use Group I oil-based drilling fluids, the following COA was added:

In the event odors are detected offsite by COGCC Staff during routine inspection, or confirmed offsite by COGCC Staff investigating a complaint, the Director may require the Operator to cease the use of Group I oil based drilling fluid and on the subsequent well the Operator shall switch to Group II oil based drilling fluid combined with the use of an odor neutralizer or switch to Group III oil based drilling fluids (such as NeoFlo or equivalent) prior to initiating future drilling on the well pad.

PDC will install containment berms for permanent and temporary tanks, sized secondary containment with a capacity of 150% of the largest oil tank, PDC has provided a leak detection plan, will have partially buried double-walled fiberglass produced water tanks installed to prevent freezing and designed to contain water to prevent floating.