

Objective Criteria Review Memo - SandRidge Exploration & Production LLC (SandRidge), Big Horn 0780 17 Centralized Tank Battery Location; Amended Form 2A #401990954; Big Horn 0780 1-17 Injection Well Re-complete Form 2 #402063676.

This summary explains how COGCC and CPW staff conducted its technical review of the existing SandRidge Big Horn 0780 17 Centralized Tank Battery (CTB) Facility (Location ID #446174); Amended Form 2A #401990954 and SandRidge Big Horn 0780 1-17 Salt Water Disposal Well; Re-complete Form 2 #402063676, within the context of SB 19-181 and for the required Objective Criteria. SandRidge is planning to re-complete this existing well from a single zone injection well to a multiple zone injection well and install additional equipment as needed. This Form 2A was requested by COGCC to revise the disturbance size acreage (from 17.00 to 13.84 acres) and provide updated attachments for this location to exclude the natural gas liquids processing plant located adjacent and to the south of the CTB facility. The gas processing plant was built, owned, and was operated until August 10, 2019 by North Park Advantage Walden LLC (Advantage). These Form 2A and Form 2 permit applications met the following Objective Criteria -

1. *(Criteria #1) The existing location lies within 1,500 feet of a single building unit located approximately 1200 feet southwest of the existing oil and gas location's edge of disturbance.*
2. *(Criteria 5.c) The existing location is in a sensitive area for water resources due to its proximity to a mapped wetlands to the west and southwest, Grizzly Extension Ditch located east of the tank battery site, and potential for shallow groundwater.*
3. *(Criteria 6) The existing oil and gas location falls within a CPW mapped 'sensitive wildlife habitat' (SWH) area for greater sage grouse production.*
4. *(Criteria 8) The existing oil and gas location has storage of hydrocarbon or produced water liquids in more than 18 tanks and in excess of 5,200 barrels (24 oil tanks and 7 water tanks).*
5. *(Criteria 12) The existing access road (the road constructed from Colorado State Highway 14 to the existing Big Horn 0780 17 Pad) falls within CPW mapped 'sensitive wildlife habitat' (SWH) area for greater sage grouse production.*

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

Criteria 1: Oil and Gas Locations within 1,500' of a Building Unit or High Occupancy Building, which include Urban Mitigation Area ("UMA") and Large UMA Facility ("LUMAF") locations.

Site Specific Description of Applicability of Criteria 1: Based on the technical review and desktop evaluation, staff identified one building unit located approximately 1200 feet to the southwest of the existing oil and gas location (edge of disturbance), 2475 feet southwest of the nearest well, and 1260 feet southwest of the nearest production equipment. This building unit is not within 1,000 feet of the wells or production equipment, so this location is not in a COGCC defined Designated Setback Location. There are no other building units or high occupancy building units within 2,000 feet of the proposed location.

Site Specific Measures to Address Criteria 1: The SandRidge Big Horn 0780 17 centralized tank battery (CTB) facility was built in June 2016 under Form 2A

#401033255 to store fluid production for two related remote well pads. An amended Form 2A #401080879 and a Form 2 #401070741 for a stratigraphic test borehole (strat well) were submitted in July 2016. This well was drilled in July 2017. An amended Form 2A #401424938 was submitted in November 2017 to expand the location to the south to include a gas processing plant, add tanks, and to include three additional related remote well pads. A Form 2 #401480283 was submitted in December 2017 to re-complete the vertical strat well as a single zone (Entrada Formation) injection well. This well was completed as an injection well in September 2018.

The current amended Form 2A #401990954 was submitted in April 2019 to separate the gas processing plant from this location as it is owned and operated (currently not operating) by North Park Advantage Walden LLC (who had submitted a separate Form 2A #402013439 to permit this location and obtain a Location ID number). The current Form 2 #402063676 was submitted in July 2019 to re-complete the single zone (Entrada Formation) injection well to a multiple zone (adding the Dakota and Lakota Formations) injection well.

There is one building unit and two out buildings located within 2,000 feet of the location. Sandridge has provided BMPs to address potential nuisance issues, such as noise, emissions, odor, dust, and lights. The nearest building unit owner is the surface owner on which the oil and gas location has been constructed and has signed a surface use agreement with the operator. The surface/building unit owner has been made aware of the potential impacts resulting from the proximity to the operations. To mitigate potential visual and noise impacts, SandRidge will construct either a 6-foot earthen berm or an insulated fence along the southern and western edges of the truck loadout portion of the CTB facility. Since the residence is slightly uphill and generally upwind of the existing location, along with the proposed visual/sound mitigation measures, noise issues are not anticipated at this time.

Summary: During the technical review process, COGCC staff requested additional information and clarification regarding the applicant's proposal and BMPs to address potential nuisance issues, such as noise, emissions, odor, dust, and lights. The information received has been added to the application materials. Since the residence is slightly uphill and upwind of the location (which has been operating for three years), combined with the operator's notification to the surface/building unit owner of proposed operations, modifications, and mitigations; the operator-provided enhancements and clarifications to the proposed BMPs; and inclusion of nuisance BMPs; the potential for impacts to the nearby residents is very low.

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

Site Specific Description of Applicability of Criteria 5.c: Based on the technical review and desktop evaluation, staff determined that this existing oil and gas location is in a sensitive area for water resources due to its proximity to mapped wetlands located adjacent and to the west and southwest and Grizzly Extension Ditch located approximately 400 feet east of the CTB facility's edge of disturbance. The depth to groundwater was estimated at 20 feet bgs as reported in the nearby water well information.

Site Specific Measures to Address Criteria 5.c: COGCC staff's review of this existing oil and gas location indicates that this 14-acre CTB facility has one (1) vertical injection well, 24 oil storage tanks, 7 produced water storage tanks, 4 heater treater units, 2 separators, 2 injection pumps, 2 VOC combustors, 1 gas custody transfer meter, and numerous other production and injection related equipment and pipelines on location. COGCC staff reviewed the existing conditions on October 25, 2019, reviewed the three (3) previously approved Form 2As, the current amended Form 2A, and the submitted Form 2 re-complete. COGCC had placed several COAs on the original Form 2A permits, including fluid containment and spill/release control, sediment and dust control for the access road and CTB pad, tank berming, flaring control, and pipeline testing.

To protect shallow groundwater resources, all existing production equipment that hold fluids were constructed with lined secondary containment; there is built-in containment for the heater treater units, pollution control containers (spill boxes) on truck loading lines, and cathodic protection on buried steel lines to mitigate corrosion. The operator will use a portable rig substructure liner during injection well re-completion activities.

Engineering and administrative control stormwater BMPs have also been implemented to protect the nearby surface water; including automatic shutdown pressure devices installed on tanks and process vessels with remote monitoring capabilities; remote shut-in capabilities for the injection well and all storage tanks located on this pad; and continuous perimeter berms with exterior silt fencing, diversion ditches, and sediment catchment basins.

Summary: During the technical review process for the Form 2A, COGCC staff received additional information and clarification regarding the operator's fluid containment, storm water and erosion control measures, and details concerning the construction, maintenance, and inspection of onsite and offsite pipelines. The operator has implemented the previously imposed permit conditions, provided additional technical information, and BMPs that address the protection of groundwater and surface water resources.

Criteria 6: Oil and Gas Locations within a Colorado Parks and Wildlife ("CPW") mapped Restricted Surface Occupancy Area ("RSO") or Sensitive Wildlife Habitat ("SWH"), or locations receiving site- or species-specific CPW comments.

Criteria 12: Oil and Gas Locations with an access road (the road constructed from the public road to the Oil and Gas Location) within a RSO, SWH, 317B buffer zone, or within 200' feet of a Building Unit on lands not subject to a Surface Use Agreement.

Site Specific Description of Applicability of Criteria 6 and 12: Based on the technical review, desktop evaluation, and onsite review; staff determined that this existing oil and gas location and access road falls within a CPW mapped 'sensitive wildlife habitat' (SWH) area for greater sage grouse production. The closest CPW-mapped leks are approximately 2.0 miles to the southwest, 2.6 miles to the east-northeast, 3.7 miles to the southeast, and 4.2 miles to the northwest.

Site Specific Measures to Address Criteria 6 and 12: CPW and COGCC staff attended an onsite of this location with the operator on June 8, 2016 as part of the initial Form 2A wildlife consultation process. This is a central tank battery facility that holds production equipment and storage tanks to serve 48 wells at five (5) nearby related

remote well pads (Grizzly Hebron 12 0881, 8 wells [#448834]; Gregory 0780 S9, 16 wells [#439603]; Hebron / Marr 7, 9 wells [#413754]; Mutual 0780 S17, 11 wells [#324757]; and Hebron 0780 S18, 4 wells [#414127]). Given the close proximity to existing development and Colorado State Highway 14, CPW did not recommend any additional wildlife BMPs for this location at that time. CPW indicated the use of centralized tank battery facilities reduces truck traffic and consolidates disturbance within already disturbed areas. CPW's recent Form 2A consultation (April 17, 2019) for this location reiterated that there are no additional comments or recommendations at this time.

CPW and SandRidge have signed a Wildlife Mitigation Plan (WMP) that has an analysis component that is used in determining the need for (and the amount of) compensatory mitigation to offset residual impacts within the currently defined development area (Federal Units). The mitigation calculations in the WMP are based on the habitat quantification tool from the Colorado Habitat Exchange and is scientifically defensible. SandRidge is providing general mitigation measures in the area, and CPW indicated that additional mitigation is not recommended for this location.

Summary: During the technical review process for this Form 2A, COGCC staff requested additional information and clarification regarding the applicant's wildlife BMPs and Wildlife Mitigation Plan. Given that this location is in close proximity to existing development and Highway 14, not in direct view of nearby active leks, the non-issuance of any timing limitations by CPW, and the current mitigations identified in the Wildlife Mitigation Plan (WMP); the potential for impacts to wildlife and wildlife habitat resources is very low and no additional mitigation is recommended by CPW.

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

Site Specific Measures to Address Criteria 8: COGCC staff's review of this existing oil and gas location indicates that this 14-acre CTB facility has twenty-four (24) 1,100-barrel oil storage tanks (26,400 barrels) and seven (7) 1,100-barrel produced water storage tanks (7,700 barrels), for a total combined storage capacity of 34,100 barrels. COGCC staff reviewed the existing site conditions on October 25, 2019 and the Material Handling and Spill Prevention BMPs on the current Form 2A.

A summary of the operator provided BMPs that directly apply to Criteria 8 include:

- Site inspections, that include valves and fittings, are conducted every 24 to 48 hours. Lease operators inspect all equipment on their locations at a minimum of once every 48 hours, but most sites are inspected every 24 hours. Valves and fittings inspections are part of the daily job duties of the lease operators. Any valve or fitting that is found to be leaking is either repaired immediately by the lease operator or shut-in procedures are implemented.
- The use of a supervisory control and data acquisition (SCADA) system that can automatically shut-in the injection well during an upset condition. The SCADA system has both automatic pressure and remote shut-in capabilities to prevent spills related to storage tank overflows.
- SandRidge has a Facilities Response Plan (FRP) registered with the EPA. Jackson County does not require a plan. SandRidge coordinates with the

local emergency responders in case of a fire or explosion or release at the location. SandRidge conducts yearly combined training with employees and local first responders.

As discussed previously for Criteria 5.c, both engineering and administrative controls for water resource protection are in place to prevent or minimize impacts to groundwater and surface water. This 14-acre location was constructed in a manner to control run-on and run-off, prevent offsite transport of sediments or contaminants, and minimize site degradation. Storm water measures include perimeter berms, diversion ditches, sediment catchment basins, and exterior silt fencing. Site degradation control measures included grading, slope stabilization (seeding, mulching, surface roughening), and the use of gravel and roadbase materials for access road and pad surfacing. Through the installation of steel and engineered lined secondary containment structures and/or built-in containment for all production and injection equipment that hold fluids, the potential for impacts to groundwater is low.

Based on COGCC and operator records, there has not been an offsite release from this location. Two spills, both closed by COGCC, have occurred at this location. The first reportable spill occurred in December 2017, where less than one barrel of produced water spilled from a tanker truck during flowline testing; all produced water was contained and recovered; no soil was impacted or removed. The second reportable spill occurred in February 2019, where two barrels of oil overflowed from a tanker truck during filling; all oil was contained and recovered; no soil was impacted or removed.

Summary: During the technical review process for the Form 2A, COGCC staff reviewed the operator provided Material Handling and Spill Prevention BMPs. The EPA-required Facilities Response Plan, coordination with local emergency responders and remoteness of the location address the protection of public health and safety. The SCADA system, automatic shutdown capabilities for tanks and vessels, and lined steel secondary containment for all equipment that hold fluids, address any potential risks from the storage tanks and reduces any potential impacts from spills to the environment.

Director Determination: Staff met with the Director to discuss Objective Criteria that are met by this Oil and Gas Location.

- the Director determined Criteria 1 was sufficiently analyzed since COGCC's review of the additional information and BMPs to address potential nuisance issues, such as noise, emissions, odor, dust, and lights, and the location of the residence (uphill and generally upwind of the existing location) meet the standard for protection of the public health, safety, and welfare;
- the Director determined Criteria 5.c was sufficiently analyzed since COGCC's review of information regarding the operator's planned activities, stormwater and erosion control measures, the Form 2A drawings, and the site-specific BMPs that address the protection of groundwater and surface water resources meet the standard for protection of the sensitive environment and water resources;
- the Director determined Criteria 6 and 12 were sufficiently analyzed since this is an existing location within a developed and disturbed area; and according to CPW, the re-completion activities would have minimal adverse impacts to wildlife or habitats within this area; and

- the Director determined Criteria 8 was sufficiently analyzed since the operator's EPA-required Facilities Response Plan, coordination with local emergency responders, and remoteness of the location address the protection of public health and safety; additionally, the SCADA system, automatic shutdown capabilities for tanks and vessels, and lined steel secondary containment for all equipment that hold fluids, reduces any potential impacts from spills to the environment.

Based on the additional analysis from the Objective Criteria, the Director has determined that these permit applications meet the standard for protection of public health, safety, welfare, the environment and wildlife resources set by SB 19-181.