

Objective Criteria Review Memo - Great Western Operating Company

Ivey LC 02-033HC -- Form 2 Application for Permit to Drill (APD) Doc# 402125539

Ivey LC Pad -- Form 4 Sundry to update Location BMPs Doc# 402283197

Approved Form 2A Oil & Gas Location Assessment (Doc# 401687493, approved 08/21/2018)

Location ID# 442411

This memo summarizes COGCC's technical review of the subject well within the context of SB 19-181 and the required Objective Criteria.

The Operator provided the following brief narrative as to the history of this location:

The Ivey Pad was originally permitted through the COGCC and Adams County by Ward Petroleum. The 2A for this site was first submitted and approved in 2015. In 2018, Great Western acquired the pad and refiled the Form 2A. The refiled Form 2A reduced the planned oil tank count from 52 to 10. The refiled 2A was approved on 8/21/2018.

Great Western has since submitted this subject refile APD for this approved Oil & Gas Location that was constructed in 2019. This location was previously approved for 26 wells total, but Great Western has abandoned all but 12 wells previously approved for this location. There are currently no wells drilled at this location. This APD is one of the 12 refile APD's currently in process that Great Western refiled to change wellbore orientations. These APDs collectively received a total of 459 Public Comments (with the most being 330 Public Comments on a single APD).

For Oil & Gas Locations approved prior to SB 19-181, the Objective Criteria apply to any wells proposed on those approved or existing Oil & Gas Locations. This APD meets the following Objective Criteria:

1. **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.* Based on Operator's most recent survey, there are 21 Building Units within 1,500' of the location.
2. **Criteria 3** - *Oil and Gas Locations within 1,500' of a municipal boundary, platted subdivision, or county boundary.* The location is 50' from the City of Thornton (N, E, & S of location) and within 1,500' of the partially built, platted subdivision of Fairfield by Richmond American Homes (SE of location).
3. **Criteria 5a** - *Oil and Gas Locations within: a Floodplain or a Floodway.* The northeast corner of the location is within a floodplain.
4. **Criteria 5c** - *Oil and Gas Locations within: a Sensitive Area for water resources.* The depth to groundwater is 12 feet and the nearest downgradient surface water feature is 75 feet away (drainage; Big Dry Creek).
5. **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. The most recently approved Form 2A contained a comment from CPW regarding a “mapped Recovery and Conservation Water along the nearby creek, which contains some species of Eastern Plains native fish”.

6. **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.** The most recently approved Form 2A listed 18 tanks total (10 oil tanks & 8 water tanks).

The following sections provide 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 Operator’s most recent survey, there are 21 Building Units within 1,500’ of the location. The closest BU is 1300’ away from location and 102 BUs total between 0’ to 2000’ of the location (0 BU 0’-500’; 0 BU 501’-1000’; 21 BU 1001’-1500’; 81 BU 1501’-2000’). The approved Form 2A lists the nearest planned well 1,572 feet from a Building Unit and the nearest planned production facility 1529 feet from a Building Unit. The initial Form 2A which was approved in 2015 prior to construction of the closest residential subdivision to the southeast.

Site Specific Measures to Address Criteria 1: As a condition of the Adams County Permit for this location the Operator holds quarterly meetings which the Operator notices and invites all residents within 2640’ of the location.

- The first of these meetings was held in Q2 2019 on 5/29/2019. 245 invitations were sent out and the meeting was attended by 27 people, including Adams County staff. The Operator provided the following synopsis of that meeting: “Great Western gave a presentation to start the meeting which covered our development plans, operations timing, BMPs, etc. Additionally, folks were able to come to five different tables to talk with experts from each discipline (Operations, Geology, EHS, Land and Regulatory). From those discussions, the topics addressed were access to the site, location of site to home and nearby school, facility equipment counts, landscaping requirements, spacing and pooling, protection of aquifers, air quality and emissions, water quality and sampling, dust, noise and light mitigation, the nearby creek and floodplain and emergency response procedures.”
- The second meeting was held during 2019 Q3 on 9/18/2019. 245 invitations were sent out and the meeting was attended by 6 people, including one member of Adams County staff. The Operator provided the following synopsis of that meeting: “There was no presentation this time, but folks were able to come to the five tables set up to chat with representatives of each discipline just like the previous meeting. The questions brought up included timing of operations, layout of location and facilities, planned landscaping, truck routes, mineral lease questions, and air emissions. All attendee questions were answered, and Great Western remains available for any questions or concerns.”

- The third meeting was held during 2019 Q4 on 12/11/2019. The meeting was attended by approximately 20-30 people, including a member of COGCC Staff as an observer, two members of Adams County Staff, and a Member of Adams 12 Five Star Schools (the School District the location is within). The meeting had five booths set up for different specialties to answer question regarding: Regulatory, Land/Minerals, Geology, Operations (drilling, completions, production, facilities), and Environmental/Health & Safety (which included a consultant toxicologist on hand to answer any questions regarding oil & gas health studies).

In order to mitigate against possible impacts to the neighborhood to the southeast of the location, the Operator provided the following BMPs:

- Sound & Light: 32' sound walls (PVC coated outer shell with multiple layers of acoustical fabric/cladding in between) will be constructed around all sides of the location for drilling and completions activities. Light sources will be directed downwards, and away from occupied structures. There will be no permanently installed lighting on site.
- Odors: Operator is planning on using Group III drilling fluid for this location. Drilling rig and completion equipment engine exhaust will be directed upward, away from the closest occupied buildings to mitigate noise and emissions.
- Fencing: Great Western will install a solid screen wood fence with a locked gate.
- Dust Controls: speed restrictions, regular road maintenance, restrictions of construction activities during high wind days, and silica dust controls when handling sand used in hydraulic fracturing operations. Additionally, a street sweeper and/or water tank will be on call to limit dust when necessary.
- Great Western will provide air emissions monitoring to detect fugitive emissions at the production facility. A two-week baseline test will be conducted prior to the start of drilling. The monitors will be placed in proximity to the production facility and will remain in place from the beginning of drilling through the first six months of production. One month following the initial thirty-day period after drilling commenced, a data summary report will be provided to the COGCC which will include the first 30 days from the start of drilling, as well as the two-weeks of baseline data. Thereafter, monthly reports will be provided and submitted to the COGCC on a subsequent monthly basis. The air emissions monitoring will be performed by a third party.

In addition to the above BMPs, the Operator stated they will be using a quiet frac fleet during completion operations at this location.

There is also a school 3100' east of the location (which is beyond the COGCC school/child care center set back distance of 1000' and beyond the notice distance for a school/child care center of 1320'). To mitigate against potential traffic concerns, the Operator has worked out a traffic plan with the local government that would limit or stop any traffic to/from the location during specific pick-up and drop-off times at the school.

Summary: Great Western provided BMPs that address possible impacts to the nearby community. The BMPs include sound walls surrounding the location, reduced odor drilling fluid (tier/group III), permanent fencing, dust controls, and emissions monitoring. Great Western is

also implementing a traffic control plan to not adversely affect school traffic and will be using a quiet frac fleet during completions activities. Great Western also is committed to continuing to hold quarterly neighborhood meetings, which they invite everyone within half a mile from the location to these meetings.

Criteria 3: Oil and Gas Locations within 1,500' of a municipal boundary, platted subdivision, or county boundary.

Site Specific Description of Applicability of Criteria 3: The location is 50' from the City of Thornton (N, E, & S of location) and within 1,500' of the partially built, platted subdivision of Fairfield by Richmond American Homes (SE of location).

Site Specific Measures to Address Criteria 3: In addition to the mitigation measures for noise, odors, and sound impacts to the Fairfield Community mentioned in the discussion of Criteria #1 above, the Operator obtained deceleration and turn lane permits from the City of Thornton to construct a turn lane and access road for the location. The City of Thornton was included as a referral agency during the USR process with Adams county and the turn lane and access road for the location are now built.

Summary: Great Western provided BMPs that address possible impacts to the City of Thornton and the Fairfield Community. The BMPs include the previously mentioned sound walls surrounding the location, reduced odor drilling fluid (tier/group III), permanent fencing, dust controls, and emissions monitoring. Great Western has also coordinated with the City of Thornton regarding construction of new turn lanes to further reduce traffic impacts to the community.

Criteria 5a: Oil and Gas Locations within: a Floodplain or a Floodway.

Site Specific Description of Applicability of Criteria 5a: The northeast corner of the location is within a floodplain.

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

Site Specific Description of Applicability of Criteria 5c: The depth to groundwater is 12 feet and the nearest downgradient surface water feature is 75 feet away (drainage; Big Dry Creek).

Site Specific Measures to Address Criteria 5a & 5c: The Operator has several BMP's in place on the most recent Form 2A that mitigate against possible spills and leaks, specifically:

- The use of drip pans during routine fueling and maintenance.
- Daily inspections of tanks, pipeline, and valves. Annual inspections by third-party consultants.
- Remote monitoring and shut-in capabilities via a SCADA system.

- Stormwater controls are constructed in a manner consistent with good engineering practices that will prevent offsite migration of sediment/contaminant, into the nearby surface water feature(s) (covered more in the Criteria #6 discussion).

Summary: Great Western provided BMPs that address possible impacts to having a location near a floodplain and sensitive area for water resources. The BMPs include leak detection, use of drip pans for maintenance, remote monitoring/shut-in capabilities, and stormwater controls constructed in a manner consistent with good engineering practices.

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.

Site Specific Description of Applicability of Criteria 6: The most recently approved Form 2A contained a comment from CPW regarding a “mapped Recovery and Conservation Water along the nearby creek, which contains some species of Eastern Plains native fish”.

Site Specific Measures to Address Criteria 6: The original CPW comment recommended that the location be greater than 100 meters from the bank of the Big Dry Creek. While the final location of the site was not constructed over 100 meters away, the Operator stated: “Great Western worked with the COGCC to develop mitigation for the floodplain and Recovery and Conservation Water along the nearby creek, Big Dry Creek. Language was included on the permit, as a COA, to include tertiary containment for the site.”

At the time of original approval COGCC placed the following COA on the Form 2A: “The proposed location may lie within a sensitive area within proximity to two drainages and the Big Dry Creek. Operator shall use tertiary containment around the down- and cross-gradient perimeters of the Location.” COGCC OGLA Staff and a COGCC Field Inspector conducted a site visit on 10/09/2019 to, among other things, observe how the Operator was complying with this COA. The site visit found that the Operator was complying with the COA and has installed significant stormwater and erosion controls around the entire site including: wattles, rip-rap, culverts, ditch, berm, check dams, erosion control blankets, silt fence, crimped straw mulch, seeded and sediment trap. The entirety of the inspection report can be found at doc# 697500699 and inspection photos at doc# 697500700. Based on these observations the Operator is complying with the COA that was placed on the original Form 2A.

Summary: Great Western provided BMPs that address possible impacts to native fish in the nearby Big Dry Creek. The BMPs include robust stormwater and erosion controls around the entire site including: wattles, rip-rap, culverts, ditch, berm, check dams, erosion control blankets, silt fence, crimped straw mulch, seeded soil and sediment traps.

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 Description of Applicability of Criteria 8: The most recently approved Form 2A listed 18 tanks total (10 oil tanks & 8 water tanks).

Site Specific Measures to Address Criteria 8: In addition to the previously mentioned remote monitoring/shut-in capabilities and leak detection inspections on this location, the Operator will be installing the following lined containment:

- A minimum containment capacity of 150% of the single largest storage vessel inside the containment will be constructed. For this location, steel containment with sealed liners will be utilized at all storage facilities on this location. The liner is made out of a geotextile material coated with modified polyurea. Additionally, steel containment will be utilized around the separator area and the units will be set on 12x12 concrete blocks and then use compacted road base to fill in the rest of the area.

Additionally, the Operator has pipeline takeaway already constructed onsite for this location which reduces the total number of tanks needed onsite.

Summary: Great Western provided BMPs that address possible impacts to having a large number of tanks onsite. The BMPs include remote monitoring/shut-in capabilities, leak detection inspections, and lined containment around the tank area. Additionally, the Operator has already installed pipeline takeaway to reduce the needed tank count and truck traffic.