

## **Objective Criteria Review Memo - Extraction Oil and Gas Inc.**

**Interchange A S16-20-20N -- Form 2 Application for Permit to Drill (APD) Doc# 401504441**

**Interchange A & B Pad -- Form 4 Sundry Doc# 402131279 to update Location BMPs**

**Approved Form 2A Oil & Gas Location Assessment (Doc# 401477000, approved 8/23/2018)**

**Location ID# 456747**

### **Location Timeline - *Prior to SB19-181*:**

Approval of Form 2A - Aug 2018: The Form 2A (Doc# 401477000) was submitted in January 2018 as part of Extraction's application materials to construct a new Oil & Gas Location with 33 horizontal wells. Only 25 of the 33 APDs were submitted concurrently with the Form 2A, but all 33 wells were represented in the Form 2A's Facilities Count and Multi-well Plan. COGCC's review of the Form 2A incorporated all 33 proposed wells at this Location, to ensure a fully comprehensive technical review of both surface and subsurface considerations.

Key components to COGCC's review of the Form 2A included:

1. Multiple consultations with Broomfield, Adams County, and Extraction regarding the siting of this Location due to the proposed siting of the Location in the City and County of Broomfield, proximity to Adams County, and proximity to residential areas;
2. Assessment of the protective capacity of proposed BMPs.
3. Compliance with all applicable required statutes, Rules and policies.

COGC Staff requested additional information regarding BMPs, Extraction's ongoing outreach and communication with local residents, and Extraction's collaboration with Broomfield and Adams Counties. With Extraction's concurrence, Staff updated the BMPs and added COAs to the Form 2A to ensure this Location and all 33 proposed wells have adequate protective measures to ensure the health and safety of the public and the environment. Additionally, Extraction offered and agreed to enhanced protections that are beyond the requirements of COGCC Rules and are of higher quality than common standard practices for Operators in Colorado. The Form 2A was reviewed to ensure it met all applicable statutory requirements, COGCC Rules and policies in place at the time of approval; the Form 2A was approved by the Director on August 23, 2018.

Approval of APDs - Aug 2018 and Mar 2019: 33 wells were proposed on the approved Form 2A. 25 APDs were approved concurrently with the Form 2A (well slots 1-25). An additional four APDs were approved in March 2019 (well slots 26-29).

Work Done on Location: Construction of the Location commenced in December 2018, prior to SB19-181. Ten wells were spud in March & April 2019 prior to the implementation of SB19-181 on April 16, 2019.

## **Location Timeline - *Post SB19-181:***

Approval of APDs - pending: The remaining four pending APDs on the pad (well slots 30-33) are now being reviewed under the rigors of SB19-181. These are not “new” or “additional” wells on the Location; they were part of the originally submitted application materials (Multi-Well Plan and Facilities Count) which met all COGCC requirements upon initial submission. COGCC review of these APDs was delayed due to wellbore spacing objections received; as of October 18, 2019, all objections have been dismissed through COGCC’s Hearings process.

## **Objective Criteria Review:**

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

This Location has a lengthy and complicated history that need not be reexamined in this Memo. For information regarding public comments received on the Form 2A, please see Doc# 401742191 in the Location’s electronic file via COGCC’s website. For COGCC’s response to these public comments, and a detailed history of this Location, please see Doc# 2316417. For Extraction’s response to public comments, as requested by COGCC staff, please see Doc# 2316397. For Extraction’s response to Broomfield’s request for a description of operational improvements, please see Doc# 2316327. For Extraction’s internal Objective Criteria review and Air Monitoring Summary, please see Doc# 2158197.

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. The subject APD meets the following Criteria:

1. **Criteria #1** - *Oil & Gas Location within 1500’ of a Building Unit (BU).* The proposed well is 1054’ east of the nearest BU.
2. **Criteria #2** - *Oil & Gas Location within a municipality.* The proposed well is within the City and County of Broomfield (Broomfield).
3. **Criteria #3** - *Oil & Gas Location within 1500’ of a county boundary.* The proposed well is approximately 940’ east of the Adams County boundary.
4. **Criteria #5.c** - *Oil & Gas Location within a Sensitive Area for water resources.* The nearest downgradient surface water feature is a ditch located 33’ north of the Location. There is also potential for shallow groundwater as identified during the review of available water well data for water wells located within the vicinity of the Location.
5. **Criteria #10** - *The Relevant Local Government requested additional consultation.* The City and County of Broomfield requested additional consultation for this location.
6. **Criteria #12** - *Oil & Gas Location with an access road within 200’ of a BU on lands not subject to a Surface Use Agreement.* - The Location’s access road meets the public road at a point approximately 200’ from a BU not subject to a Surface Use Agreement.

The following sections provide details regarding the evaluation of each criterion. Some Criteria have been described together for clarity due to similarities and consistencies in their technical review.

**Criteria 1:** Oil and Gas Locations within 1500' 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:** The subject well is located 1054' from the nearest BU. Rural residential areas are located approximately 650' west of the Interchange A pad and approximately 650' south of the Interchange B pad. COGCC staff estimated 30 BUs lie within 1500' of the Location and 41 BUs lie within 2000' of the Location's disturbed area. There are no BUs within 1000' of a well or production facility, therefore this Location is not a Designated Setback Location.

**Site Specific Measures to Address Criteria 1:** The health, safety and welfare of local residents is paramount for this Location. The Location has been built using extensive BMPs that minimize emissions and nuisance issues such as noise, dust, odors, lights, and traffic. Extraction designed this Location as a "tankless" Location with no onsite storage of fluids. All oil, gas, and produced water will be conducted from the wellheads directly into pressurized (i.e. not atmospheric) vessels for phase separation, then delivered directly into pipelines. This design and construction greatly reduces the potential for emissions (see Doc# 2158196 "Closed Fluid Flow Diagram" in Location file). Emergency protocols are addressed in cooperation with Broomfield and local emergency responders. Complete BMPs are found on the approved Form 2A and in the Location file. A brief summary of key BMPs is provided here:

1. EMISSIONS CONTROL - NO TANKS: The Location was designed with no permanent tanks on site. All flowback and produced gas, oil, and water are immediately directed from production facilities into pipelines that flow offsite to a centralized processing facility in Weld County. Temporary tanks are on location during flowback to receive produced water as a backup destination only if the capacity of the produced water pipeline is not sufficient to handle peak water volumes. Leak Detection and Repair Plan (LDAR) is in place to monitor for fugitive emissions. 4-gas monitors with alarms placed around the Location during flowback phase to detect VOCs.
2. EMISSIONS CONTROL - EMERGENCIES: Emission control devices and maintenance vessels are in place if needed during upset or emergency conditions. Saleable gas will not be flared; wells will be shut in if needed during upset or emergency conditions. Wells and production facilities fully automated with remote shut-in/shut-down capability.
3. EMISSIONS CONTROL - DRILLING FLUID: Closed-loop pitless system used for drilling fluids. Base drilling fluid planned is a non-diesel medium aromatic IOGP-defined Group II fluid; a COA on the Form 2A expressly states that if odors are confirmed off-site, Extraction will switch to an IOGP Group III drilling fluid. Drilling fluid is recycled and reused until degraded to the point disposal is required.
4. EMISSIONS CONTROL - ELECTRICAL POWER: Drilling rig, completions fleet, and permanent production equipment will all be run on electrical power rather than diesel. Diesel generators will be on site only for emergency backup in the event highline power fails.

COGCC Staff has added the following COA to Sundry Doc# 402131279 as an additional requirement should drilling fluid odors become an issue adjacent to the Location:

“In the event odors are detected offsite by COGCC Staff during routine inspection or confirmed offsite by COGCC Staff investigating a complaint, Operator shall cease the use of Group II drilling fluid and switch to Group III drilling fluid (such as NeoFlo or equivalent) prior to drilling the next well on the pad.”

In addition, Extraction’s Operator Agreement with Broomfield required Extraction to conduct two ambient air quality tests prior to construction of the Location within 500’ of the proposed well sites (Fall of 2017 and Fall of 2018). This type of data acquisition is above and beyond the scope of COGCC’s Rule requirements. Results indicate that the level of VOCs in pre-construction ambient air is consistent with expected concentrations. Extraction has also allowed Broomfield to conduct ongoing third-party air quality monitoring at this Location; Q1 samples were collected from October 4, 2018, to March 31, 2019. Results indicate 1) VOCs detected are within ambient air concentration level expectations, and 2) all VOC concentrations were well below health guideline values, indicating no observable health risks (per Broomfield Air Quality Monitoring Program website, accessed 10/22/2019).

**Summary:** The extensive BMPs and COAs in place at this Location to avoid, minimize or mitigate emissions, nuisance issues, and emergency situations are well-designed, well-implemented, thorough, and effective. On-site air quality monitoring data indicate VOC levels are within acceptable limits.

**Criteria 2:** Oil and Gas Locations within a municipality; and,

**Criteria 10:** The Relevant Local Government requested additional consultation on this Location.

**Site Specific Description of Applicability of Criteria 2:** The proposed well lies within the City and County of Broomfield.

**Site Specific Description of Applicability of Criteria 10:** The Relevant Local Government (Broomfield) requested additional consultation on this Location. The Broomfield Local Government Designee (LGD) requested the public comment period for the subject APD be extended to allow for additional input from local residents and stakeholders.

**Site Specific Measures to Address Criteria 2 and Criteria 10:** Broomfield is the Surface Owner at the Location. Extraction has an Amended and Restated Operator Agreement (“Agreement”) approved and signed by the City and County of Broomfield on October 24, 2017. This Agreement includes a Surface Use Agreement, also signed by Broomfield in October of 2017. A Comprehensive Drilling Plan (“CDP”) was approved by the City on September 18, 2018. *This CDP is not to be confused with a Comprehensive Drilling Plan (CDP) allowed by COGCC Rules; no such CDP has been submitted to COGCC.* Extraction is in daily, weekly, and monthly contact with the local government to discuss operational conditions, logistical project updates, and schedule updates.

The Broomfield LGD requested that COGCC extend the public comment period on the subject APD. The request was granted, resulting in the public comment period remaining open for 30 days. The COGCC was in regular communication with Broomfield during the 2018 review of the Form 2A and during the review of the subject APD.

**Summary:** Extensive and ongoing communication and coordination between Extraction, Broomfield, and COGCC occurred prior to the approval of the Form 2A. Communication between Extraction and Broomfield is ongoing on a regular schedule and for operational updates.

**Criteria 3:** Oil and Gas Locations within 1500' of a county boundary.

**Site Specific Description of Applicability of Criteria 3:** The proposed well is approximately 940' east of the Adams County boundary. The edge of the Location's disturbed area is approximately 600' east of the Adams County boundary at the Interchange A pad, and approximately 635' north of the Adams County boundary at the Interchange B pad. The BUs listed in Criteria 1 are predominantly in Adams County; there are 30 Adams County BUs within 2000' of the Location.

**Site Specific Measures to Address Criteria 3:** During the Location's planning phase, Adams County Commissioners expressed concern that the majority of homeowners potentially impacted by this Location were Adams County residents, and that Adams County Commissioners had no authority in the approval of this site. Extraction engaged in ongoing collaborative discussion with Adams County, resulting in moving the Location farther north in order to ensure a 1000' distance between proposed wells and Adams County residents, eliminating truck traffic routes from Adams County roads. Extraction also engaged with adjacent Adams County residents, including hosting a public meeting specifically for Adams County residents, participating in a COGCC hearing specifically based on their request, regularly meeting with them inside their homes, and hosting field tours.

No comments were received on the subject APD from Adams County LGD during the public comment period. COGCC staff reached out to Adams County for comments during this objective criteria review; no comments or concerns were received.

**Summary:** Extraction included Adams County in the Location's design process, and ultimately made multiple revisions and concessions in response to Adams County Commissioners' and local resident's concerns. The subject well is farther than 1000' from any Adams County BU.

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

**Site Specific Description of Applicability of Criteria 5.c:** The Form 2A indicates the Location is in a sensitive area for water resources as the nearest surface water feature is a ditch located approximately 33' to the northeast as measured to the Location's disturbed area (Hydrology

Map Doc# 401484081). A second ditch is indicated on the Location Drawing (Doc# 2316368) existing 356' to the southwest of the Location. Depth to groundwater is estimated at 36' based on water well permit #93695 approximately 1500' SW of the location.

**Site Specific Measures to Address Criteria 5.c:** During the 2018 Form 2A technical review, staff worked with the operator to place BMPs on the Form 2A that address protection of surface and ground water resources. Complete BMPs are found on the approved Form 2A and in the Location file. A brief summary of key BMPs is provided here:

1. Tertiary Containment using diversion ditch and berm with sediment traps and wattles installed around the perimeter of the Location
2. Separators will have steel-rim secondary containment with compacted roadbase (very low impervious factor) and are inspected quarterly
1. Temporary tanks and equipment will have "duck pond" liners or built-in secondary containment.

The Location was designed as a tankless system; no permanent hydrocarbon storage will be housed at the Location. Many of the BMPs listed in the Criteria #1 section above also provide protections for water resources. In addition, Extraction uses an impervious material for containment of possible spills at the wellheads from construction until the installation of flowlines. Once flowlines are installed, the stabilization material is removed and compacted roadbase is installed. Field Inspection Reports have identified that stormwater mitigation BMPs are in place and effective.

A COA was added to the Form 2A to further provide protections to local residents, groundwater and surface water features. This COA requires additional water well sampling within ½ mile of the Location with results submitted to COGCC, and, in the event BTEX compounds or TPH are detected, Extraction will notify the Director immediately.

**Summary:** Extraction has implemented BMPs that provide protection of ground and surface water resources through minimization of fluid transport or seepage on or off the Location. A COA on the Form 2A requires increased water well sampling and reporting.

**Criteria 12:** Oil and Gas Location with an access road within 200' of a BU not subject to an SUA.

**Site Specific Description of Applicability of Criteria 12:** The Location's existing access road intersects a public road (Huron Street) at a point approximately 200' northeast of a BU that is on a parcel not subject to an SUA. The BU is located in Adams County.

**Site Specific Measures to Address Criteria 12:** The access road was originally constructed as early as 1993 for access to the CAHB 2-10 well (014-08877, plugged and abandoned in 2001) based on aerial images reviewed on Google Earth. The road was later rebuilt and maintained for access to the Beyer MA 10-5 well (014-09171) circa 2005, and has been in continual use since then. The road is now being used to access the Interchange A & B Location. Extraction has

been in close communication with nearby residents; per residents' requests, the operator has deployed hay bales along the road and upgraded the sound wall to further reduce light and noise impacting local residents.

COAs were added to the Form 2A to provide protections to local residents near the access road; key points are summarized here:

1. Access road built with Class 6 road base and covered with recycled asphalt to minimize "washboard" and dust
2. Access road built with hard surface apron and vehicle tracking pad to minimize mud or debris onto City streets; operator shall provide street sweeping services if needed
3. Access road use restricted to outside of peak a.m. and p.m. traffic to minimize disruptions to local residents
4. Access road shall have speed limits and warning signs posted.

In addition to the COA, the 2A includes BMPs to minimize and control fugitive dust via water trucks, ensure traffic control is coordinated with the City and County of Broomfield, and ensure 24/7 security is in place to restrict unauthorized access.

**Summary:** As this road has been in use for many years, it is preferable to continue using it to access the newly expanded Location rather than building a new access road. COAs and BMPs on the Form 2A have been verified in place by COGCC Field Inspection staff.

#### **Additional Information:**

- Extraction has agreed to participate in a to-be-determined joint CDPHE/COGCC air quality monitoring program, and agrees to make this Location available for such purposes. This agreement is reflected in a COA on the subject Sundry.
- The subject APD (and the three other APDs also currently in process) includes a request for the horizontal boundary well to be completed in a wellbore spacing unit (WSU) as designated per Rule 318A.a.(4).D. Per Rule 318A.e.(5), the operator notified all mineral owners within the proposed WSU at least 30 days prior to submitting the Form 2 APD. No valid objections were received, or, any objections received have been resolved or dismissed and are no longer ongoing. The Form 2 APD does not require a hearing for the approval of the spacing unit; a WSU is approved administratively with the approval of the Form 2 APD.

#### **Director Determination:**

The Director finds that based upon the analysis contained herein that the additional wells and associated wellbore spacing units (APDs) which were contemplated in the original 2A approval are sufficiently protective of public health, safety, welfare, and the environment. In addition, the Director notes that Extraction's past operations performance at this location and nearby locations provides the Director with assurances that this location can be drilled in a protective manner and that if issues arise, Extraction will work with the COGCC to timely address any issues in a protective manner. Finally, it is

important to achieve Operator agreement to commit to the to be determined joint CDPHE/COGCC air monitoring program, and Extraction's agreement to allow this location and other nearby oil and gas locations to be part of the air monitoring program is vitally important to obtain current data to better inform urban drilling permitting decisions and the upcoming COGCC Rulemakings.