



May 4, 2018

Chandler Newhall
Extraction Oil and Gas, Inc.
370 17th Street, Suite 5300
Denver, CO 80202

Re: Broomfield's Comments on Extractions Comprehensive Drilling Plan submitted April 17, 2018

Dear Chandler:

We thank you for your continued participation in the meetings with Broomfield staff, and your review of the comments on Extraction's Comprehensive Drilling Plan (CDP). Below, please find additional comments regarding issues not addressed in the draft of the CDP, submitted to Broomfield on April 17, 2018.

Comments on Extraction's CDP, submitted to Broomfield on April 17, 2018

The following comments need to be addressed by Extraction, and included in the next draft of the CDP:

I. Comments from Engineering that need to be Addressed and included in the CDP by Extraction:

1. (Outstanding) Redlined Plan Sheets - It appears that the Redlines from our previous reviews have not been addressed those comments can be found at the following links [Interchange B & Livingston CD 2 Comments](#), [Oil and Gas CD Comments](#)

All comments from this review and previous submittals should be addressed and resubmitted. When submitting please **include a letter** which includes Broomfield written and redline comments and responses indicating how each comment/redline was addressed, including an explanation of any revisions/additions/deletions which were not part of the redlines.

Below are comments for this submittal:

- (Outstanding) Drainage Report needs to be signed and stamped by licensed Engineer. Should be in accordance with Section 100 and 600 of the Broomfield Standards and Specifications.
 - Per section 610.00 All ponding facilities shall be of the detention type.
 - Provide historic and proposed drainage basin map
 - All ponds should provide water quality
 - All ponds should drain within 72 hours
 - Should be designed for a minor storm of 10yr and a major of 100yr

- (Outstanding) Provide a Drainage letter for the access road plans.
 - Provide historic and proposed drainage basin map
 - Provide location and sizing for crossroad pipes both existing and proposed

Section H - List of Permits Needed and Variances

2. Below is a list of Permits and Variances required.

- Grading Permit for the sites, permits can be found on the Broomfield website at the following link [Broomfield Engineering Permits](#). The following items are needed before approval of Permit.
 - Approved grading plans completed in accordance with Section 160 of the Broomfield Standards and Specifications.
 - Submit the [Wildlife and Environmental Clearance Letter](#) from an environmental consultant for review/approval by the Broomfield Open Space and Trails Division, not more than 20 days prior to the anticipated start date of construction.
 - Stormwater Management Plan (SWMP) in accordance with Broomfield Stormwater Standards
 - If Prairie Dogs are present on site submit a Prairie Dog Mitigation Plan and applicable permits for review/approval by the Broomfield Open Space & Trails Division [Broomfield Prairie Dog Policy](#)
 - Submit fully executed easements (if necessary) as shown on the approved construction plans.
 - Oil and Gas Wells Production Site Abandonment (if necessary) - Certification in accordance with Ordinance 1698
- Public Private Improvement Permit (PPIP), permits can be found on the Broomfield website at the following link [Broomfield Engineering Permits](#). The following items are needed before approval of Permit.
 - Approved construction plans completed in accordance with Section 160 of the Broomfield Standards and Specifications.
 - Submit a Final Pavement Design Report for City and County Engineer approval, following the installation of utilities and prior to the placement of subgrade, roadbase and asphalt (including curb and gutter).
 - Have an approved designated truck route for construction traffic prior to the issuance of a grading or PPIP Permit.
 - Have an approved Traffic Control Plan (TCP) for any work completed on Public ROW.
 - Submit a Building Permit for any retaining wall over 3' in height.

II. Comments From Traffic That Need to be Addressed And included in the CDP by Extraction:

Section G - Traffic Comments

3. As we have discussed in our regular Wednesday meetings, Broomfield is requesting that the haul road between the Northwest B Pad and Huron St, be designed so that it is adjacent to the Northwest Parkway and so the radius so it will accommodate turning into any of the SB turn

lanes. Extraction should state this in the CDP and note that it will design and use such haul road in a manner that maximizes light, noise, and dust mitigation.

4. Extraction should state in the CDP that it will use all Broomfield roads in a manner that comports with the law and include a note in the CDP indicating that security guard will be placed at each entrance and exit to sites at all time and place signs indicating, "Private access road" at all site access locations.

5. Per Broomfield's meeting with Extraction on February, 16, 2018, the CDP shall state that the Livingston Pad exit does not need to be perpendicular to Lowell Boulevard, as this would cause trucks entering Lowell Boulevard to swing out into the opposing lane. The entrance to the pad site is located on Sheridan Boulevard to be used by westbound Extraction vehicles only (no Extraction vehicles anticipate entering from eastbound Sheridan to cross lanes). A maximum grade of 6% on the site is being proposed within the site (within Broomfield standards)

6. Extraction should state in the CDP that the Livingston site provides good one-way operation with less congestion at the Lowell exit. The CDP should state that vehicles are not allowed to enter the site from Lowell, this could cause potential backups on Lowell Boulevard in both directions.

7. The CDP should state that Extraction trucks will not be operating during the peak am hours of 7 am to 9 am and peak hours of 3 pm to 6 pm. Extraction is to review and improve the radius at the exit location on Lowell Boulevard and to provide warning signage with advance flashing beacons at both entrance and exit.

8. The CDP should state that Extraction is to provide Broomfield an overall map indicating Extraction cumulative traffic volumes. Below are Extraction trips anticipated for the Livingston site:

| Stage | Duration (days) | Average Truck Trips per day | Average employee trips per day | Total average trips per day |
|-----------------------|-----------------|-----------------------------|--------------------------------|-----------------------------|
| Pad Construction | 20 | 11 | 10 | 21 |
| Facility Construction | 60 | 2.8 | 10 | 12.8 |
| Drilling | 169.5 | 11.1 | 36 | 47.1 |
| Completion Operations | 99 | 172 | 12 | 183.8 |
| Completion Flowback | 99 | 5 | 15 | 20.7 |
| Flowback | 60 | 0 | 0 | 0 |
| Interim Reclamation | 20 | 11 | 10 | 21 |

III. Comments from the Public Health and Environment Division that need to be Addressed and included in the CDP by Extraction:

Section I Air Quality

9. Broomfield is requesting more specificity in the CDP concerning Extraction's odor control mitigation plans at the well site, beyond the requirement that Extraction use a filtration system and additives to control odors. The CDP must include how the odor mitigation system works and what additives Extraction will use. Broomfield also requests more specificity regarding the manner and time frame in which Extraction will respond to odor-related citizen complaints.

10. Broomfield commented that Extraction's plans for fugitive dust and odor control were not specific. The recent application provides no more detail for these controls and remains inadequate. Extraction does say that disturbed areas will be revegetated and fresh water will be used for fugitive dust control and that odor will be controlled with emissions controls and additives. Broomfield is requesting further detail be provided by Extraction in this section.

11. In 4.2 of Section I, which discusses odor, there is a statement that references additives possibly being used to mitigate odors. As stated in previous comment submittals, Broomfield needs Extraction to identify what the additives are and how they will be used (e.g., are they maskants or do they actually remove odors?).

Section N Hazardous Materials Management Plan and Waste Management Plan

12. The following items must be included in this section:

- In the charts that provide information on the chemicals, use, HMIS and NFPA physical hazard identification and ranking, etc., the pages that are associated with the **Drilling Phase** do NOT include the intended use like the other pages do. There is a general description but no use information. Broomfield Public Health and Environment is especially interested in this, given the large amounts of hydrochloric acid and other hazardous materials that are included in the chart.
- Most of the anticipated quantities are understandable and within reason. Again for the **Drilling Phase** chemicals/pages, the quantities are significant. For the chemicals included on the **Drilling Phase** pages, Public Health and Environment needs clarification on if these numbers represent quantities for all of the pads collectively and over the life of the drilling phase or if this quantity represents something else. It would be helpful to know (for these very significant quantities), the maximum quantity that would be onsite at any given time. Additionally, for these chemicals, Public Health and Environment needs to know:
 1. A description of the primary containers that will be used for storage;
 2. A description of any containment (other than the site berm(s)) or other methods for preventing leaks and spills;
 3. A description of the frequency and types of inspections performed on storage containers, etc. as well as containment devices;

4. A description of the maintenance and calibration requirements and frequency on spill control or containment devices, if applicable.

As stated previously, the reason for requesting this information is due to the large quantities and potential risks associated with a leak, spill or release.

13. Public Health and Environment is fine with combining CDP Section O, Waste Management information with Section N.

COGCC Applications 2 and 2A

14. Site drawings for the drilling pads were not corrected for the notation that surface water runoff from the pads flows toward the southeast to Big Dry Creek and then southerly to Stanley Lake. The fact that these errors were made in the first place and still exist in the site drawings does not instill confidence in the quality of the engineering. Extraction should provide to Broomfield correct versions of the site drawings.

IV. Comments from Planning Division that need to be Addressed and included in the CDP by Extraction:

Extraction needs to address and include the following in the CDP:

15. Original Planning Division Comment: "The lighting shown can be mounted at multiple angles and is indicated at a 45 degree angle. The Lighting best management practices identified in the agreement (See page 16 of agreement, number 28): *All bulbs must be fully shielded to prevent light emissions above a horizontal plane drawn from the bottom of the fixture.* Mounting the intended light at 45 degree angle will allow the light to be seen above the horizontal plane drawn from the bottom of the fixture. A light fixture needs to be shown which will adhere to this requirement in the best management practices. The light needs to be directed fully downward and remain shielded."

16. The response letter indicates Extraction plans to comply. However, the lighting plans included in the CDP still indicate lights will be tilted at 45-60 degrees in conflict with the Lighting best management practices. This remains a concern and should be revised. Changing the angle of the lighting will change the light coverage which may impact light locations/heights.

V. Comments from the Emergency Management Unit that need to be Addressed and included in the CDP by Extraction:

17. The Tactical Response Plan (titled extraction_trp_Broomfield_DRAFT) appears to be a template that provides a framework for a plan, but nothing specific to these sites. Extraction needs to further develop these plans to provide the information necessary to communicate emergency protocols that would be used in the event of an emergency response (including a spill, explosion, etc.) and that can be used to train staff. In addition, Extraction needs to identify local vendors/suppliers that would provide response to or support for spill responses.

18. The Tactical Response Plan (TRP), [Attachment A](#) to this letter, shall be included in the Emergency Management Plan of the CDP.

19. The following identified items should be detailed for Broomfield and included in the Tactical Response Plan (TRP) - Section J:

Pg 5.

- The Flowchart should incorporate the establishment of Unified Command sooner.
- Include coordination with NMFR and Broomfield in manage external notification (this could be the agencies circle)

Site Maps

- Is Muster point for responder also and if so would it be the Command Post site? If not where would CP be established? It should not be the same as the staging area.
- Include in the TRP evacuation maps with .5 and 1 mile radius for each site.

General Comment - Extraction needs to include a statement in the CDP that Extraction will inform NMFRD and Broomfield as operations move from one phase to the next. Broomfield requests a draft schedule of all operations that is updated monthly by Extraction.

2.1 Site preparation

- Hazmat shall be included and transported into the site.

2.2 Drilling

General Comment/ Question: No where in the Tactical Response Strategy is Shelter in Place or Evacuation mentioned. Will that be included in the NMFRD O&G response? Which potential site hazards/incidents would warrant consideration of Shelter or Evacuation?

- Fire - See above.
- Well Control - What does isolate immediate area mean. Is that evac and/or Shelter in place (see above)

2.3 Hydraulic Fracturing

- Toxic vapors - - again what does isolate immediate area mean. Shelter in place/evacuation?

3.2

- Should this list include consideration of shelter in place or evacuation? Is it covered in the establish zones statement.

3.3 See above 3.2

3.4

- Does isolate mean evacuation?

4.3

- Does this imply that the cold zone could include evacuation?

Appendixes:

- Site specific plan still need further development (all parties are aware of this)
- OEM phone number should be 911 and a page requested.
- Evacuation plans once developed need to be included.

Emergency Response Preparedness Plan

20. The CDP should state that Extraction agrees to comply with Hot Work requirements established by OSHA, Fire Code and/or NFPA.

21. Extraction needs to include the following items in the Emergency Response Preparedness Plan (Section J) and/or the Risk Management Plan (Section R) and indicate that Extraction will do the following:

- Creation of a new department specifically for enhanced supervision of flowback operations, including a full-time Extraction flowback supervisor role.
- Updated temporary flow back equipment layout specifications and guidelines.
- Additional training required for flowback crew contractors.
- Gas monitoring and detection equipment with flashing beacon installed on all flowback operations.
- Pad-by-pad sound wall evaluation to increase air circulation.
- Implementation of automated tank gauging on flowback operations, to avoid need for traditional “tank strapping” that requires the opening of the tanks.
- Expanded internal Hot Work permitting requirements and additional gas monitoring during Hot Work.
- Enhanced grounding requirements and inspections to mitigate for static electricity.
- Comprehensive pre-start-up review of flowback design.
- Engineered tank gas pipe header systems for temporary flowback.
- Enhanced operations and maintenance of temporary tank gas lines.
- Enhanced enforcement of 4-gas monitors worn by all personnel at all times.
- Enhanced contractor training led by Extraction senior field leaders, with an emphasis on new or revised protocols.
- In process of implementing remote-powered LED lighting system solutions, rather than diesel engine driven light plants, to eliminate that ignition source.

22. The CDP should state that Extraction will develop enhanced hot work planning and setback procedures and include those and the following in the next draft of the CDP:

- The expanded hot work programs must include employee training, oversight and enforcement of Hot Work permit implementation and management, re-issued STEPS alert to employees and vendors for hazard recognition and proper PPE.
- Adding additional field management levels for specific flowback activities.
- Evaluating and retrofitting sound wall placements or technologies to enhance air flow for improved site ventilation.
- Developing and implementing automated tank gauging on flowback operations.

- Inspecting berms and other containment devices to verify integrity and functionality, at least monthly.

23. Extraction should include a statement in the Emergency Response Plan that it agrees to pay for the equipment and training as set forth in [Attachment B](#) to this letter.

24. The CDP should state that Extraction shall extend existing water lines and install hydrants so the maximum distance from hydrant to the center of any pad does not exceed 1000 ft. Hydrants shall be installed on the lease side of roadways so hose lays do not impede the travel of emergency vehicles

VI. Comments from Open Space & Trails Division that need to be addressed and included in the next draft of the CDP by Extraction:

The secondary numbering in this section reference Broomfield's comments in its January 20, 2018 letter of comments (First Letter on the CDP):

25. First Letter Section 1. Access Road for Northwest Pads.

It is appreciated that the road alignment for the United Pad on the Nordstrom OS has been moved farther north away from residents. The CDP should state that that Extraction will construct the bale wall, as it is critical to minimizing impacts on the residents that live closest to Huron. It is important to see the hay bale wall plan now for this area with the new alignment.

26. The CDP should state that Extraction will provide the public outreach to the residents concerning the new road alignment.

27. Regardless of whether the original or revised road alignment is used for the Nordstrom pads, there will be prairie dog impacts. At this time, there is an active colony around the Nordstrom existing well site. The CDP should state that Extraction will follow Broomfield's Prairie Dog Policy.

28. Also, on April 20, OS staff and the Extraction Environmental staff person observed a burrowing owl on the Nordstrom Open Space--just northwest of the well site on one of the burrows. The CDP should state that if the owl(s) remain on the site, work may only be conducted on this site after the owl's departure in late fall has been confirmed.

Follow-up on comments in Sections 27, 29, 44-48, 52-54 from Broomfield's First Letter:

29. The CDP should state that the interim reclamation should be started once the construction stops, not when the construction stops and the well is producing. There could be unforeseen issues with getting the wells into production that would delay the interim reclamation unnecessarily that has no bearing on commencing reclamation.

30. The proposal is only to provide water if needed. The CDP should state that watering is required to get the seed started, unless there is adequate snow or rain. (Versus the current proposal, which only calls for watering if there are drought or dry conditions.) The CDP should state that Broomfield determines if watering is needed under these conditions. The preferred

solution is to provide watering and if it is not needed, then it can be stopped temporarily. The CDP should state that Extraction agrees that Broomfield maintenance staff can require that Extraction start watering if they deem this is necessary.

31. In the APEX Report on the Livingston Plan in Section 4.1 (page 69 of the CDP), the testing of soils for the remediation and test results should be shared with Broomfield. The Form 19 (Spill release Report) should also be shared with Broomfield. The CDP should state that Extraction shall share with Broomfield, immediately upon receipt, the testing of soils for the remediation and test results and all Form 19 (Spill release Reports).

32. The trees on the Davis Open Space may not be living but they are still considered viable from an OS viewpoint as they provide habitat, particularly for raptors. Extraction noted that these trees are not "viable", but Broomfield does value these trees given their habitat and aesthetic values. The CDP should state that Extraction shall protect these trees and ensure that the numerous large vehicles that will be accessing this site do not impact the trees. A plastic mesh construction fence is not strong enough to protect the trees. Please provide a plan to show how the trees will be protected and allow for a 30-foot radius around the trees. Perhaps Extraction could use hay bales.

33. The CDP should state that Extraction shall is providing a culvert in the ditch and not just filling it in on the Northwest A pad on the Davis Property.

34. Sections 172 and 173 of the First Letter. Please show the grading around Interchange B to document that the work will not be adding fill to the floodplain. See graphic on Page 967 of the CDP in the Apex Wetlands report. Show the grading and road around the Northwest A pad to document where the fencing around the cottonwoods needs to be placed, see graphic on Page 971.

35. New Comment: 1a. page 1071 of the CDP: Under 2.6, Visual Mitigation Chapter V., the intro refers to the Northwest A pad and it should be the Interchange B pad.

36. New Comment : 2a: The new access road alignment east of the Northwest B pad out to Huron needs to be shown in the Visual Mitigation Chapter V page 6. The hay bale wall should be adjusted accordingly.

37. New comment: 4a: Please note exterior dimensions of the pig launcher diagram on page 1073, 3.2 of the Visual Impact Chapter V. so it is possible to understand how large this area is and then locate this site on a site plan.

VII. Comments on Section (I) Air Quality Impact Mitigation Plan that need to be Addressed and included in the next draft of the CDP by Extraction:

38. See the Public Health and Environment Division's Comments above and Air Quality Mitigation Plan (I): As stated in Section III above, Broomfield commented that their plans for fugitive dust and odor control were not specific. The recent application provides no more detail for these controls and remains inadequate. Extraction does say that disturbed areas will be

revegetated and fresh water will be used for fugitive dust control and that odor will be controlled with emissions controls and additives. Broomfield is requesting further detail be provided by Extraction.

VIII. Comments on Application Section (U) Electrification Plan that need to be addressed and included in the next draft of the CDP by Extraction:

39. Electrification Plan (U): As stated in Section III above, further details are presented of how the electric power will be provided by United Power to the drilling pads. The electrification plan remains a work in progress, but for now adequately addresses the previous concerns. The CDP should state that Extraction shall provide additional details on the Electrification Plan as requested by Broomfield, which shall be incorporated into the CDP.

IX. Comments on Application Section (E) Noise Impact Mitigation Plan & Section (M) Noise Modeling that need to be Addressed and included in the next draft of the CDP by Extraction:

40. Noise Impact (E), (M): As stated in Section III above, the prior application presented noise modeling results for several sites. However only the final results figure was presented for each site with no supporting description of how the modeling was performed or the assumptions that were used. The recent application provides no further detail so it remains inadequate. The background noise monitoring at each site was adequately done and is acceptable. Only the future condition modeling remains inadequate.

X. Comments on Application Section (r) Risk Analysis that need to be Addressed and included in the next draft of the CDP by Extraction:

41. Extraction should provide Broomfield with certification of all insurance and bonding requirements and keep those certifications updated annually as a part of the CDP.

42. Page 959 of the CDP includes a risk matrix with a column labeled as “Formal Written Risk Mgt Plan.” Extraction needs to provide information on what is meant when a check mark is placed in the box indicating “Formal Written Risk Mgt Plan.” This information needs to identify where this plan is located and how will it be communicated for review and comment to the City and County of Broomfield.

43. The Risk Register is [Attachment C](#) to this letter and should be included in the CDP. Broomfield has the following comments on the Risk Register:

Broomfield requests more detail be added to the Risk Register on risks, mitigation, and training. The register, as originally prepared by Charles Taylor Co. for the Comprehensive Plan Committee, was a template. We would like to see more thought by Extraction on the range of risks associated with drilling in close proximity to high density residential areas. The following response from Extraction to one of Broomfield’s requests seems to be indicative of a less than thorough analysis of risks:

“Evidence that all employees and contractors are properly trained on operating procedures in order to minimize risks of accidents, releases, and near-misses.

RESPONSE: Extraction will not provide this information. These practices are addressed in the Charles Taylor Table on Section (R) Risk Management.”

The original “Table” has hardly been altered, and nevertheless this document cannot be construed nor was it ever intended as evidence that of proper training. This Risk Register is intended to give confidence or comfort that attention has been paid to local risks and that the issues raised by Broomfield and its residents have been addressed.

The plans in the CDP remain documents that may need further revisions, even after the CDP is approved by Broomfield. We would ask the Extraction to make a statement in the CDP that it agrees to reasonably consider and adopt any mutually agreed upon changes to the Plans as requested by Broomfield after the CDP is approved.

[Attachment D](#) is citizen comments on the CDP that Broomfield requests that Extraction respond to in the next draft of the CDP submitted to Broomfield. Extraction did not respond directly to many of the citizen comments included with the Broomfield’s January 22, 2018, comments on the CDP. We would ask that you do so now. These may be supplemented if we receive additional comments on the Draft CDP.

Thank you for your consistent participation and response in the CDP drafting process. We look forward to receiving the next draft of the CDP.

Sincerely,



Tami Yellico
Director of Strategic Initiatives