



July 6, 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 May 11, 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 May 11, 2018.

1. Extraction needs to provide an updated and accurate drilling schedule for the CDP. The current schedule has inaccuracies, including anticipation of dual drilling rigs. Also, please clarify in writing the amount of power needed by operator to operate a drill rig at these sites and how many drill rigs the operator will be able to operate at the same time. All references to Phase II on the Livingston Pad need to be removed from the CDP. Phase II of Livingston is mentioned in the CDP on pages 1312 and 1313 starting in Section 7.1.
2. (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](#)
3. 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 a Colorado Registered Professional 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 (not retention as proposed).
 - Provide historic and proposed drainage basin map
 - All stormwater ponds should provide water quality
 - All stormwater ponds should drain within 72 hours

- Stormwater ponds should be designed for a minor storm of 10yr and a major of 100yr
- Phasing of the stormwater detention ponds is subject to Broomfield approval.
- (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

4. Extraction's CDP, Section H, includes "Grading Permit" (singular) and states "None at this time." This is incorrect. Multiple grading permits will be needed. Similarly, Extraction includes "Public and Private Improvement Permit if off of a Broomfield Road (PPIP)" and states "No waiver or exception at this time." Both types of permits will be needed.

- 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.

Section G - Traffic Comments

5. Extraction should state in the CDP and note that it will design and use haul roads in a manner that maximizes light, noise, and dust mitigation.
6. 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 all sites up through the completions stage.
7. A maximum grade of 6% on the site should be proposed within the Livingston site (within Broomfield standards). Please assess this requirement.
8. Extraction is to review and improve the radius at the entrance and exit locations on all sites. Confirm that none of the trucks should be using the opposing lanes in order to turn at the access locations.
9. The CDP should state that Extraction is to provide Broomfield an overall map indicating updated Extraction cumulative traffic volumes for the completions stage for each site. In the CDP, provide the following:
 - A clear summary of one-way average truck trips per day for the completions stage (heaviest traffic time) for all of the sites.
 - All of the individual charts and tables (colored in red) need to be verified and updated and should be consistent between all charts and tables in the CDP.
 - The CDP should clearly state the anticipated remaining service life of Sheridan Parkway and 160th Avenue.
 - Below are Extraction trips anticipated for the Livingston site: This information is not consistent with the average one way average trip information in the CDP, please clarify. Broomfield provided information to City Council indicating a total of 124 one way average truck/personal trips per day (completions stage), please verify.

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

Section I Air Quality

10. 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.

11. 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.

12. Operator should state in the CDP that the baseline air quality testing for each well site will be conducted at locations acceptable to Broomfield and the results of such air quality monitoring modeling will be provided to Broomfield and made a part of the CDP for enforcement purposes.

13. A statement should be added to the CDP indicating that Extraction agrees to cooperate with Broomfield, the Colorado Department of Health and Environment, and Broomfield's contractor with regard to all air quality testing around the well sites, including providing access through well pad access roads, a single point of contact for such communications, and giving Broomfield and its air quality testing contractor advance notice of all operations.

Section N Hazardous Materials Management Plan and Waste Management Plan

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

- 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 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.

COGCC Applications 2 and 2A

15. 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. Extraction should provide to Broomfield correct versions of the site drawings. All

references in the CDP and associated site plans to a phase two at the Livingston Pad should be deleted.

16. Include in the TRP evacuation maps with .5 and 1 mile radius for each site.

Appendixes:

- Site specific plan still need further development (all parties are aware of this)
- Evacuation plans once developed need to be included.

Emergency Response Preparedness Plan

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

18. 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.

19. The CDP should state that Extraction shall pay Broomfield's costs to extend the existing water lines and install hydrants so the maximum distance from hydrant to the center of any pad does not exceed 1,000 ft. Hydrants shall be installed on the lease side of roadways so hose lays do not impede the travel of emergency vehicles.

20. Extraction should define recordable events in a manner acceptable to Broomfield, state that it will contact emergency responders for each recordable event, and list all relevant subcontractors name and contact information in the TRP.

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

21. It is appreciated that the road alignment for the United Pad on the Nordstrom OS has been moved farther north away from residents. The new road alignment must be shown in the CDP. The CDP should state that Extraction will construct the hay 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. Any plans, including the visual mitigation drawings should be updated accordingly to show this new alignment.

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

23. 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 comply with Broomfield's Policies for Prairie Dog Conservation and Management.

24. 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.

25. The CDP should state that Extraction will comply with Broomfield Parks Maintenance staff requests as set forth in approved permits to complete weed management if deemed necessary to ensure the seeding is successful.
26. 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.
27. The CDP should state that Extraction shall provide a culvert in the ditch and will not just fill the ditch on the Northwest A pad on the Davis Property to ensure that stormwater flows will still pass through the ditch and reach any vegetation along the ditch.
28. Extraction has explained that the pig launcher area is approximately 150' by 150'. This area is approximately one-half acre in size. The Visual Impact Chapter V. needs to show this area on a site plan and identify how the pig launcher area will be screened to minimize visual impacts.
29. Reclamation Plan: The Interim reclamation plan should be started once the construction of the well pad is completed instead of when production begins. There could be a lag between completion of the well pad and production so this clarification is needed on the timing.
30. Reclamation Plan: Extraction shall submit a soil stockpiling plan for the Northwest A and B and United well pads to Broomfield Open Space and Parks Maintenance staff to review and will require their approval to ensure that the stockpiling is compatible with farming as much of these sites as possible.
31. Extraction shall provide Environmental Assessments for any future well pads, pipelines and oil and gas access roads that may arise. 20-Day Environmental Clearance letters shall be submitted by Extraction for any pipeline, access roads and well pad sites before any construction occurs for each of these types of requests.
32. Extraction shall mow the disturbed areas on the Huron Open Space Property to ensure that the reseeding of this property is successful as requested by Broomfield staff.
33. A meeting was held with Mike Baker, the farmer that Broomfield works with for the Harmer Open Space, Extraction staff, and Broomfield Open Space staff to address the farmer's concerns about not being able to use irrigation water on two of his fields because the Extraction pipeline construction was blocking the water flows from reaching these fields. Extraction agreed to pay Mike Baker approximately \$1,200 per acre for his lost crops. Broomfield Open Space staff asked for this arrangement to be put in writing. Extraction still needs to provide the written agreement and pay the farmer.

34. In Section T, the Parks Maintenance staff has these comments about the reclamation:

They have a slope gradient of 3:1 where our specifications are 4:1. Please meet Broomfield's specifications.

Extraction also does not have soil amendments listed for the areas being reclaimed which should be 1 yard per 3,000 square feet of native seeded area.

Open Space staff also supports these comments.

35. Extraction still needs to provide a signed Mylar of the Nordstrom minor subdivision plat for the Huron Open Space property so that the plat can be recorded.

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:

36. Air Quality Mitigation Plan (I): As stated in Section III above, 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.

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

37. 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:

38. Noise Impact (E), (M): Noise modeling results for several sites were provided by Extraction. Broomfield renews its request for the 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.

39. Operator should state in the CDP that the baseline noise testing for each well site will be conducted at a location acceptable to Broomfield and the results of such baseline testing will be provided to Broomfield and made a part of the CDP for enforcement purposes.

40. The manufacturer's warranty information for the noise testing equipment indicates that the equipment should not be tripod mounted. Please confirm in writing in the CDP that all noise testing/monitoring equipment will be used in accordance with the warranty requirements.

Broomfield requests that Extraction conduct baseline noise and air modeling at locations to be approved by Broomfield for each of the well sites.

Add a statement to the CDP that the 32 foot sound walls will be removed as soon as each well site goes into production phase.

X. Comments on Application Section (R) Risk Management Plan 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 keep those certifications updated annually as a part of the CDP.

42. We have reviewed the Risk Management Plan that is Section R of the draft CDP, beginning on page 1157. Based upon our consultation with Chris Moss, who developed the Risk Registry that is included in this section of the CDP, Broomfield requests that you address the following additional comments:

- A. All of the columns of this risk registry should be completed by Extraction.
- B. A definition of each risk should be included in the Risk Registry. Broomfield requests that:
 - risks be cross-referenced to those that Extraction has already identified to the Securities and Exchange Commission in the Form S-1, even if only a subset are applicable or addressed in the Risk Management Plan;
 - risks be identified per well for a specified setback distance, both of which vary significantly from pad to pad; and
 - risks to welfare (property values and the tax base) be included.
- C. If Extraction disagrees with the % likelihood of any given risk in the matrix that information should be corrected in some manner.
- D. Broomfield requests more detail be added to the Risk Register on risks, mitigation, and training. 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. 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.
- E. Broomfield requests that Extraction identify all material risks and mitigations in the Risk Registry. For example, additional risks and mitigations are identified in Extraction's responses in section 3(c) of the CDP and those should be included in the Risk Registry. If possible, Broomfield requests that Extraction utilize this as a tool to identify meaningful mitigations, whether they will be undertaken or not.

An example of a risk issue that should be included in the Risk Registry is a risk associated with flowback, as learned from the Stromberger Well incident in Windsor, and the following items should be added to the Risk Registry in the Risk Management Plan (Section R), where appropriate to indicate that Extraction will provide the following mitigation measures relevant to flowback:

- 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.

Another example of mitigation measures that should be added to the Risk Registry under the appropriate risk(s) and include those 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.

43. Broomfield requests that Extraction provide an index of all mitigation measures in the CDP, cross referenced by page number.

44. An introductory statement should be added to the CDP indicating that Extraction and Broomfield understand and agree that the CDP is an integral part of the Operator Agreement between Broomfield and Extraction, dated October 24, 2017 (Operator Agreement), and as such all the requirements of the CDP will be enforced by Broomfield as if a condition of the Operator Agreement.

45. The plans in the CDP remain documents that may need further revisions, even after the CDP is approved by Broomfield. We would ask that Extraction 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.

46. Additionally, we would request a statement in the CDP that if the Colorado Oil and Gas Conservation Commission or the Colorado Department of Health and Environment recommend or make changes to the well site locations or the CDP, if Broomfield agrees in writing, that the CDP will be amended at that time.

If there are any other issues in the CDP that Extraction would like to correct or revise based, please do so and highlight those for Broomfield's consideration.

In addition to the comments on the CDP listed above, we would request that Extraction address the following additional questions from City Council:

1. Are the processes and equipment at the Coyote Pad the same as the Livingston Pad i.e. is Extraction using the quiet fleet and closed loop drilling?
2. Will Extraction use Nitrogen in any drilling process, including hydraulic fracturing? If so, how will the recent Windsor accident be prevented?
3. Is a French drain being contemplated as a protection measure for groundwater contamination? What are the protections in place in the well pad designs to prevent groundwater contamination?

If Extraction adequately addresses the issues above in the CDP, staff may recommend to the City & County Manager that the CDP be approved.

Thank you for your consistent participation and response in the CDP drafting process. We look forward to receiving the next draft of the CDP. We have included comments and questions from some members of City Council, and if we receive any more of those suggestions those will be forwarded to you next week. If all the issues in this letter are adequately addressed, then the staff may be able to recommend to the City and County Manager that the CDP be approved.

Sincerely,



Tami Yellico
Director of Strategic Initiatives

Cc: Broomfield Mayor and Councilmembers
Charles Ozaki, City and County Manager
Kevin Standbridge, Deputy City and County Manager
Shaun Sullivan, City and County Attorney
Pat Gilbert, Deputy City and County Attorney