Topics

Reverse Setbacks

- Definition of terms and measurements between features
- Current setbacks in Aurora
  - Primary (State: COGCC; City: Oil & Gas Manual)
  - Reverse (City Code)
- Reverse setbacks in other jurisdictions
- Discussion of existing 150’ reverse setback

Easement around Plugged Wells

- Why and how wells are re-plugged
- Easements in other jurisdictions
- What is right for Aurora

Applies to Producing Wells

Applies to Plugged Wells
Reverse Setbacks

Jeffrey S. Moore, P.G.
Manager • Oil & Gas Division

We steward access to the natural resources under our authority with integrity and respect for our citizens, businesses, and the environment.


Definitions – Oil & Gas

“Oil and Gas Location”  
Used by COGCC and City

- Refers to the physical area of ground disturbed in preparation for drilling activities
- “Well Site” in the Operator Agreements
- Industry calls in a “well pad”
- May contain multiple wells and equipment

“Working Pad Surface”  
Reduced area of the Oil and Gas Location after drilling/completion activities

COGCC only

“Oil and Gas Facility”  
Used by COGCC and City

- Refers only to the equipment installed on the Oil and Gas Location
- Examples are well, wellhead, flowlines, tanks, surface equipment
Oil and Gas Location

- Grande South
- Near Powhaton Road and Jewell Avenue in Ward II
- Constructed in 2017

Oil and Gas Location
- 4.4 acres
- 310’ x 620’
Working Pad Surface

- Grande South

**Oil and Gas Location:**
- 4.4 acres
- 310’ x 620’

**Working Pad Surface:**
- 2.7 acres
- 275’ x 420’
Oil and Gas Facilities

- Grande South

**Oil and Gas Location:**
- 4.4 acres
- 310’ x 620’

**Working Pad Surface:**
- 2.7 acres
- 275’ x 420’

- Oil and Gas Facilities:
  - 0.5 acres total

![Diagram of Grande South Oil and Gas Location and Working Pad Surface]
Definitions – Buildings

“Residential Building Unit (RBU)” (COGCC and City)
- Building or structure designed for use as a place of residency
- Includes manufactured, mobile, and modular homes unless used for business purposes
- Each individual residence within a building will be counted as one Residential Building Unit.

“Building Unit” (COGCC)
- A Residential Building Unit
- Every 5,000 square feet of building floor area in commercial facilities
- Every 15,000 square feet of building floor area in warehouses that are operating and normally occupied during working hours.

“High Occupancy Building Unit” (COGCC)
- Any School, or hospital
- Any nursing facility, life care institution, or correctional facility provided the facility or institution regularly serves 50 or more persons;
- An operating Child Care Center
- A multifamily dwelling with four or more units.
COGCC

• 200’ - From buildings, public roads, above ground utility lines, or railroads  [Rule 604.a.(1)]
• 2,000’ from existing Residential Building Units (house structure), and High Occupancy Building Units  [Rule 604.b]
  • 4 exemptions allow drilling between 500’ and 2,000’
• 2,000’ from School Facility or Child Care Center  [Rule 604.a.(3)]

Aurora (OGM)

• 350’ from:
  ▪ Existing and proposed parks and open space areas
  ▪ City Critical Infrastructure (buried)
  ▪ Domestic water wells
• 500’ from 100-year floodplains
• 1 mile from existing or planned reservoir sites
Primary Setbacks (applies to O&G Operator)

- Residential Lot Line
- Oil and Gas Location
- Working Pad Surface

2,000’*

* Four exemptions available as close as 500’
Reverse Setbacks (applies to Surface Developer)

- None at the state level
- 150’ in Aurora City Code (re-instated April 25, 2022)
  - Measured from the Oil and Gas Facility (i.e. equipment) to the edge of the residential lot line
Current Reverse Setback – From Facilities

- Grande South

150’ reverse setback from oil and gas facilities

<table>
<thead>
<tr>
<th>Acres</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.7</td>
<td>WPS</td>
</tr>
<tr>
<td>~3.5</td>
<td>150’ setback</td>
</tr>
<tr>
<td>6.2</td>
<td>TOTAL</td>
</tr>
</tbody>
</table>

Current City Code
Why are primary setbacks larger?

- Production phase has lower risk of incidents than drilling/completion phases
- Protection of people in a residence from risks that were unknown at time of residence construction
- Preservation of property values
## Reverse Setback - Impact

<table>
<thead>
<tr>
<th>Feature</th>
<th>Number</th>
<th>Reverse Setback Distance</th>
<th>Acres</th>
<th>Square Miles</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current WPS</td>
<td>32</td>
<td>NA</td>
<td>149</td>
<td>0.23</td>
<td>Actual values</td>
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<tr>
<td>Future Locations</td>
<td>26</td>
<td>NA</td>
<td>243</td>
<td>0.38</td>
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<tr>
<td><strong>TOTAL AURORA</strong></td>
<td><strong>58</strong></td>
<td><strong>NA</strong></td>
<td><strong>392</strong></td>
<td><strong>0.61</strong></td>
<td></td>
</tr>
<tr>
<td>Current Setback from Facilities</td>
<td>58</td>
<td>150'</td>
<td>203</td>
<td>0.32</td>
<td>Current City Code</td>
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</table>

### Additional Reverse Setback Distances

<table>
<thead>
<tr>
<th>WPS</th>
<th>Number</th>
<th>Reverse Setback Distance</th>
<th>Acres</th>
<th>Square Miles</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPS</td>
<td>58</td>
<td>150'</td>
<td>522</td>
<td>0.82</td>
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</tr>
<tr>
<td>WPS</td>
<td>58</td>
<td>500'</td>
<td>2,245</td>
<td>3.51</td>
<td>some setbacks overlap</td>
</tr>
<tr>
<td>WPS</td>
<td>58</td>
<td>1000'</td>
<td>5,800</td>
<td>9.06</td>
<td>some setbacks overlap</td>
</tr>
<tr>
<td>WPS</td>
<td>58</td>
<td>2000'</td>
<td>15,000</td>
<td>23.44</td>
<td>some setbacks overlap</td>
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</table>

WPS = Working Pad Surface (size of location after interim reclamation)
Aurora Residential Developments currently proposed or developing

Other Master Plans

City Limits

2000’ around WPS

Results in ~15,000 acres (23 square miles) of setbacks
Reverse Setback – From Oil and Gas Location

Aurora
Residential
Developments
currently
proposed or
developing

City Limits

2000’ around
WPS

Results in ~15,000
acres (23 square
miles) of setbacks
<table>
<thead>
<tr>
<th>Entity</th>
<th>Feature</th>
<th>Reverse Setback Distance</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arapahoe County</td>
<td>Occupied Structure</td>
<td>250'</td>
<td></td>
</tr>
<tr>
<td>Broomfield</td>
<td>Residential Lot Line</td>
<td>200' from facility</td>
<td>Applies to O&amp;G facilities inside or outside county</td>
</tr>
<tr>
<td>Broomfield</td>
<td>School</td>
<td>500' from location</td>
<td></td>
</tr>
<tr>
<td>Broomfield</td>
<td>Residential lot or school (During permitting, construction, drilling and completion)</td>
<td>2000'</td>
<td></td>
</tr>
<tr>
<td>Fort Collins</td>
<td>Residential Building Unit</td>
<td>500'</td>
<td></td>
</tr>
<tr>
<td>Fort Collins</td>
<td>High Occupancy Building Unit</td>
<td>1000'</td>
<td></td>
</tr>
<tr>
<td>HUD/FHA</td>
<td>Dwelling</td>
<td>75'</td>
<td>Operating or proposed well (measured from the dwelling to the well site boundary)</td>
</tr>
<tr>
<td>Town of Erie</td>
<td>New residential lot, occupied structure, park, sports field, or playground; before production stage</td>
<td>2000'</td>
<td>measured from Working Pad Surface</td>
</tr>
<tr>
<td>Town of Erie</td>
<td>New residential lot, occupied structure, park, sports field, or playground; during production phase</td>
<td>500'</td>
<td>measured from Working Pad Surface</td>
</tr>
<tr>
<td>Town of Erie</td>
<td>Non-occupied structure</td>
<td>25'</td>
<td>measured from Working Pad Surface</td>
</tr>
<tr>
<td>Weld County</td>
<td>Building or Occupied Structure</td>
<td>200'</td>
<td>From a Tank Battery</td>
</tr>
<tr>
<td>Weld County</td>
<td>Building or Occupied Structure</td>
<td>150'</td>
<td>From a Well</td>
</tr>
<tr>
<td>Aurora</td>
<td>Residential Lot Line</td>
<td>150'</td>
<td>From Oil and Gas Facilities</td>
</tr>
</tbody>
</table>
Primary Setbacks are addressed by both the state and Aurora.
Reverse setbacks are addressed only by Aurora.
- Currently 150’ measured between the Oil and Gas Facility (equipment) and the residential lot line.
Council Members previously proposed:
- Expanding the 150’ to a greater distance.
- Changing the measurement point from the facility (equipment) to the edge of the Working Pad Surface or Oil and Gas Location.
Does Council wish to implement any of these proposals or apply the setback to other features such as schools, etc.?
Easement Around Plugged Wells

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Manager • Oil & Gas Division

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Plugged Wells

- After production ends, a well is plugged
  - Cement placed inside pipe
  - Pipe cutoff 5’ below surface
  - Surface is reclaimed
- “D&A” if no production **30 wells**
- “P&A” after production **24 --> 400**
Plugged Wells

- 54 in Aurora

City Limits

Plugged Wells
Recently replugged well

- 54 in Aurora

City Limits

Plugged Wells
• Future Replugging
  – All wells expected to be replugged in the future
  – One study suggests 50 years is the life of steel and cement in a wellbore
  – Wells in Aurora drilled beginning in 1917
  – Half drilled mid-1950’s through mid-80’s

• Risks from old wells
  – Slow leakage of hydrocarbons to the surface
  – Some jurisdictions have seen this in less than 50 years
  – Oil & Gas Division initiating proactive annual soil testing
  – Deterioration of cement in the well can cause communication between hydrocarbon zones and fresh water aquifers
Permanent Easement around plugged wells

- Mud Pumps: 36’x32’
- Rig (setup): 42’x16’
- Freshwater tank: 42’x8’
- Engines/pumps: 30’x8’
- Job trailers: 32’x8’
- Pump truck: 32’x8’
- Pipe Racks: 36’x39’

Approximate dimensions:
- Width: 170’
- Length: 220’
- Depth: ~90’

Area: 0.85 acres
What does this mean for Aurora?

- 54 plugged wells currently
- Up to 400+ in the future
- All wells are expected to eventually need re-plugging
- We must have physical space around plugged wells to site necessary equipment to re-plug fully and safely
- The Oil & Gas Division proposes a 200’ x 200’ (<1 acre) permanent well workover easement
  - No permanent physical structures (residential, commercial, etc.)
  - Access to a public road
  - No below-ground utilities within 10 feet of the well
  - Option for variance request for shape as long as area is ~40,000 ft²
How can easement space be used?

- Agricultural / livestock
- Park
- Open Space
- Parking lot

- Planning Dept confirms ability to count this area in a developer’s neighborhood requirements
## Easement – Other Jurisdictions

<table>
<thead>
<tr>
<th>Entity</th>
<th>Feature</th>
<th>Reverse Setback Distance</th>
<th>Setback Acres</th>
<th>Applies to</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams County</td>
<td>P&amp;A wells</td>
<td>50'x100'</td>
<td>0.11</td>
<td>All structures</td>
<td>buffer easement</td>
</tr>
<tr>
<td>Arapahoe County</td>
<td>P&amp;A wells</td>
<td>250'</td>
<td>4.51</td>
<td>Occupied Structures</td>
<td></td>
</tr>
<tr>
<td>(plugged &lt;2014)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arapahoe County</td>
<td>P&amp;A wells</td>
<td>150'</td>
<td>1.62</td>
<td>Occupied Structures</td>
<td></td>
</tr>
<tr>
<td>(plugged &gt;2014)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broomfield</td>
<td>P&amp;A wells</td>
<td>50'x100'</td>
<td>0.11</td>
<td>Permanent Structures</td>
<td>well maintenance and workover easement</td>
</tr>
<tr>
<td>Town of Erie</td>
<td>P&amp;A wells</td>
<td>150'</td>
<td>1.62</td>
<td>All Structures</td>
<td>exceptions down to 50'x100'</td>
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<tr>
<td>Weld County</td>
<td>P&amp;A wells</td>
<td>25'</td>
<td>0.05</td>
<td>All Structures</td>
<td></td>
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<tr>
<td>Aurora-current</td>
<td>P&amp;A wells</td>
<td>none</td>
<td>-</td>
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<tr>
<td>Aurora-Proposed</td>
<td>P&amp;A wells</td>
<td>200'x200'</td>
<td>0.92</td>
<td>Permanent Structures</td>
<td></td>
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</tbody>
</table>
All wells are expected to be re-plugged in the future
Aurora may have 400+ wells
Physical space is needed to site equipment for the re-plugging
A permanent well workover easement (200’ x 200’) around all plugged wells is needed to prevent future construction of permanent structures over or near plugged wells

Does Council support this concept, and may we craft an ordinance for a future Study Session to discuss?
Thank you!

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