PROPOSED RULE 1118.1 -
Control of Emissions from Non-Refinery Flares

Working Group Meeting #5

April 4, 2018

SCAQMD Headquarters – Conference Rm GB
Diamond Bar, California
RULE PROCESS

- 5 Working Group Meeting from August 2017 to April 2018
- 18 Site Visits

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landfills</td>
<td>6</td>
</tr>
<tr>
<td>Wastewater Treatment</td>
<td>6</td>
</tr>
<tr>
<td>Oil and Gas</td>
<td>6</td>
</tr>
</tbody>
</table>

- Released preliminary draft rule language March 4, 2018
- Received 3 formal comment letters
# KEY STAKEHOLDER COMMENTS RECEIVED

<table>
<thead>
<tr>
<th>Comment</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule should distinguish emergency, backup, and routine flaring.</td>
<td>Rule provides allowances for low-use (&lt;200 hours/year) and low-emitting (&lt;1 lb/day) flares.</td>
</tr>
<tr>
<td>Disaggregate three major industries (oil and gas, landfills, waste water).</td>
<td>Each industry shares similar control technologies and opportunities, albeit possibly different interim actions may be required, such as different levels of gas clean up.</td>
</tr>
</tbody>
</table>
Comment
Backup flares are justified for landfill gas and digester gas because of low quality, low BTU content, and higher concentration of impurities.

Response
- Backup *capacity* is needed but not backup flares. Alternative technologies and services exist to handle backup and emergency gas.

  Additionally:
  - The proposal allows for flares that comply with Table 1 emission limits.
  - Biogas clean up for beneficial use is feasible and the EPA Renewable Fuel Standard and the California Air Resources Board Low Carbon Fuel Standard credits will help offset costs.
  - Renewable natural gas has low carbon intensity which increases it’s market value.
KEY STAKEHOLDER COMMENTS RECEIVED (cont.)

<table>
<thead>
<tr>
<th>Comment</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine flaring should be prohibited and backup flaring for oil and gas extraction should be limited.</td>
<td>Most large oil producers do not routinely flare. Rule allows for routine and backup flaring but requires reduce emissions and increase beneficial use.</td>
</tr>
<tr>
<td>20 year phase out is too lax for oil and gas industry, they should be required to use gas beneficially immediately and be required to only use ultra-low NOx flares as backup.</td>
<td>Most large oil producers already use the majority of their gas beneficially. Half of the oil and gas flares will have over 20 years of service within 5 years of rule adoption. Any flares installed after 2016 already meet the proposed emission limit.</td>
</tr>
<tr>
<td>Comment</td>
<td>Response</td>
</tr>
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</tr>
<tr>
<td>Change (e)(2) from 90 days to 60 days (requirement to submit the source test protocol prior to the source test).</td>
<td>The 90 day requirement is necessary to ensure adequate time to conduct a thorough review. Once approved, protocol does not need to be re-submitted unless flare or emission limits have been altered.</td>
</tr>
<tr>
<td>Add language to exempt a facility from Source Test Requirements and Source Test recordkeeping requirements if they use (d)(3) Beneficial Use Averaging Compliance Option.</td>
<td>Paragraph (e)(1) excludes (d)(3) from the Source Test requirements, thus facilities complying with (d)(3) would not be held to source test recordkeeping requirements.</td>
</tr>
<tr>
<td>Comment</td>
<td>Response</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Stronger incentives for beneficial use are needed.</td>
<td>Staff is open to suggestions for stronger incentives.</td>
</tr>
<tr>
<td>For owners or operators of flares complying with the Beneficial Use</td>
<td>Beneficial Use Alternative Compliance Option intended to reduce flaring,</td>
</tr>
<tr>
<td>Alternative Compliance Option, include an exemption for gas flared</td>
<td>exemption for any upset would not achieve this goal.</td>
</tr>
<tr>
<td>during upstream equipment malfunctions, maintenance, process upsets,</td>
<td>Details of Beneficial Use Option will be included in Appendix A.</td>
</tr>
<tr>
<td>emergency situations and/or safety concerns of operating personnel and</td>
<td></td>
</tr>
<tr>
<td>equipment.</td>
<td></td>
</tr>
</tbody>
</table>
Staff is currently working on changes in response to the following comments:

- Decreasing the Beneficial Use percentage
  - Will assist the Outer Continental Shore concerns
- Including an exemption for closed landfills that generate less than 1,000 MMscf/year
- Extending the time to replace a flare (d)(2) beyond 12 months
- Exempting gas used to maintain flare pilot from Beneficial Use provision
- Adding “or equivalent” to the ultrasonic meter requirement
- Reducing recordkeeping retention from (f)(8) to less than 5 years
- Adding “with energy recovery” to the end of flare definition

**Stakeholder Suggested Change:**

<table>
<thead>
<tr>
<th>Compliance Date</th>
<th>Beneficial Use of Total Annual Captured Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/1/2019</td>
<td>85%</td>
</tr>
<tr>
<td>7/1/2022</td>
<td>90%</td>
</tr>
<tr>
<td>7/1/2025</td>
<td>95%</td>
</tr>
<tr>
<td>7/1/2028</td>
<td>98%</td>
</tr>
</tbody>
</table>
KEY STAKEHOLDERS COMMENTS FOR DISCUSSION

- Suggested Flare definition change:
  - First Suggestion
    FLARE means a combustion device, whether at ground level or elevated, that uses a flame to burn combustible gases or vapors with combustion air provided by uncontrolled ambient air around the flame or a controlled combustion air blower without energy recovery.
  
  - Second Suggestion (from 40 CFR 98.238 (Subpart W))
    FLARE means a combustion device, whether at ground level or elevated, that uses an open or closed flame to burn combustible gases or vapors with combustion air provided by uncontrolled ambient air around the flame or a controlled combustion air blower without energy recovery.
Suggested change for demonstrating 200 hour/year use limitation:

- Initial Language
  For each flare demonstrating operating hours are less than 200 hours per year pursuant to subparagraph (d)(4)(C), maintain monthly recordkeeping of flare use using an installed calibrated non-resettable totalizing time meter.

- Suggestion
  For each flare demonstrating operating hours are less than 200 hours per year pursuant to subparagraph (d)(4)(C), maintain monthly recordkeeping of flare use using a 200-hour equivalent volume of permitted process gas flow measured by non-resettable fuel meter(s).
AFFECTED UNIVERSE

- Staff further analyzed the data to better assess
  - Number of flares that will potentially need to be replaced based on age, use, emissions, and existing Beneficial Use
  - Potential emission reductions and cost effectiveness
  - Limited data for Beneficial Use estimates, staff continues to compile and analyze available information
## AFFECTED UNIVERSE*

<table>
<thead>
<tr>
<th>Total Flares</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting Proposed Limits</td>
<td>15</td>
</tr>
<tr>
<td>Low-Use</td>
<td>17</td>
</tr>
<tr>
<td>Low-Emitting</td>
<td>93</td>
</tr>
<tr>
<td>At closed landfills generating less than 1,000 MMscf/year</td>
<td>20</td>
</tr>
<tr>
<td>Meeting 85% Beneficial Use in 2019</td>
<td>17</td>
</tr>
</tbody>
</table>

≥20 years of service not meeting proposed allowances:

<table>
<thead>
<tr>
<th>Year</th>
<th>Additional flares per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>23</td>
</tr>
<tr>
<td>2020</td>
<td>3</td>
</tr>
<tr>
<td>2021</td>
<td>4</td>
</tr>
<tr>
<td>2022</td>
<td>1</td>
</tr>
<tr>
<td>2023</td>
<td>2</td>
</tr>
</tbody>
</table>

*Note: Data is draft, staff continues to compile and refine data, especially regarding Beneficial Use estimates.*
AGE OF EXISTING FLARES IN 2019

~ 64 flares with over 20 years of service
2016 EMISSION INVENTORY

- Emissions Inventory: 0.85 tpd
- Potential Emission Reductions by 2023: 0.1 tpd

- Open Landfills: 52%
- Oil and Gas: 17%
- Wastewater: 12%
- Closed Landfills: 8%
- Other: 11%
BENEFICIAL USE ESTIMATES

- Source of data
  - Annual Emission Reporting (AER)
    - Volume of gas flared
    - Volume of gas used for energy production (gas used in turbine, engine, etc.)
    - *Data limited to facilities that emit more than 4 tons per year of a criteria pollutant*
  - Oil and Gas Industry
    - Volume of gas generated estimated from DOGGR website
    - Assume volume of gas not flared or used for energy production was injected in pipeline
    - Challenging to match data from DOGGR to specific SCAQMD facilities
  - Landfills
    - Volume of gas generated from Rule 1150.1 Annual Reports
  - Wastewater Treatment
    - Assumed all gas used at facility accounted for in AER reports
Data for 21 of the 37 Oil and Gas Facilities
SUMMARY OF OIL AND GAS INDUSTRY USE OF GAS PRODUCED

- Estimated Pipeline Injection: 76%
- Energy Production: 8%
- Flared: 16%

Estimated Total Gas Produced: 12,000 MMBtu
SUMMARY OF LANDFILL GAS HANDLING

- 85% Beneficial Use

- 2015 Gas Collected (MMscf)
- Used for Energy
- Gas Shipped offsite
- Gas flared (MMscf)
- % Beneficial Use
BENEFICIAL USE PERCENTAGES AT LANDFILLS

Data for 20 of the 51 Landfills

- ≥98%: 20%
- 95 - 98%: 2%
- 90 - 95%: 0%
- 85 - 90%: 2%
- <85%: 76%
SUMMARY OF WASTEWATER TREATMENT PLANT GAS HANDLING

85% Beneficial Use
Data for 21 of the 29 Wastewater Treatment Plants
## Facilities Currently Meeting Proposed Beneficial Use Requirements by Industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total Facilities</th>
<th>Facilities Meeting Proposed Beneficially Use Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>85 – 90%</td>
</tr>
<tr>
<td>Oil and Gas</td>
<td>37</td>
<td>0</td>
</tr>
<tr>
<td>Landfills</td>
<td>51</td>
<td>1</td>
</tr>
<tr>
<td>Wastewater Treatment</td>
<td>29</td>
<td>1</td>
</tr>
</tbody>
</table>
COST EFFECTIVE ESTIMATES

- **2016 Air Quality Management Plan - Programmatic Evaluation**
  - Estimated cost effectiveness at less than $20,000/ton
  - Assuming all flares would be replaced ~250 flares
  - Higher emission inventory ~2.4 tons/day
  - Higher emission reductions ~ 1.3 tons/day

- **Current Evaluation – Actual Facility Data**
  - Replacement of flares with 20 years service life if do not meet:
    - Low-use
    - Low-emitting
    - Beneficial Use Targets
COST EFFECTIVE ESTIMATES

Assumptions

- Capital Costs
  - 40 MMBtu - $360,000
  - 17 MMBtu - $225,000
  - 1.7 MMBtu - $180,000

- Installation cost
  - 5 - 15% of the capital cost

- Service Life
  - 25 years

- Annual Maintenance Cost
  - $30,000 at 80% - full capacity
  - $15,000 - 19,000 at 50% - 60% capacity
  - $10,000 at 20% capacity

- Cost information obtained from flare manufacturer and end user feedback
Overall Cost Effectiveness:

$45,000/ton

* Assumes all flares replaced with 40 MMBtu flare, 15% installation, full capacity annual maintenance costs

COST EFFECTIVE ESTIMATES

- **Oil and Gas**
  - 1 flare replacement/Beneficial Use by 2023
  - Low-emitting flare ~500 lbs NOx/year
  - Emission reduction ~0.0003 tons/day
  - >$100,000/ton assuming flare replaced with 1.7 MMBtu flare
  - Future increase in price of oil could drive up emissions

- **Landfills**
  - 13 flare replacements/Beneficial Use by 2023
  - Emission Reduction ~ 0.029 tons/day
  - ~$40,000/ton*

- **Wastewater Treatment**
  - 13 flare replacements/Beneficial Use by 2023
  - Emission Reduction ~ 0.034 tons/day
  - ~$40,000/ton*

- **Other Flaring**
  - 6 flare replacements
  - Emission Reductions ~ 0.008 tons/day
  - ~$30,000/ton assuming flare replaced with 1.7 MMBtu flare

Overall Cost Effectiveness*:

$45,000/ton

* Assumes all flares replaced with 40 MMBtu flare, 15% installation, full capacity annual maintenance costs
COMPLIANCE PATHWAYS
Table 1 Emission Limits

<table>
<thead>
<tr>
<th>Flare Categories</th>
<th>lb/MMBtu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NOx</td>
</tr>
<tr>
<td>Biogas</td>
<td>0.025</td>
</tr>
<tr>
<td>Process Gas</td>
<td>0.018</td>
</tr>
<tr>
<td>Other Flare Gas*</td>
<td>0.025</td>
</tr>
</tbody>
</table>
Scenario Two

Existing Flare → Under 20 year service life → No Action Required Until Flare over 20 years
Scenario Three

Existing Flare

19 Year Service Life

Comply with Table 1 Emission Limits

Effective following September

Beneficial Use Alternative Compliance Option Plan

Plan Submittal following July
Existing Flare
Over 20 year service life
Low Use/ Low Emitting
Monitoring/ Record Keeping

Scenario Four
Scenario Five

Existing Flare → Over 20 year service life

Comply with Table 1 Emission Limits

Beneficial Use Alternative Compliance Option

Plan Submittal July 2019

Effective September 2019

No Action Required for Remaining 15% of Gas

At Least 85% Used Beneficially
Scenario Six

Existing Flare

≥85% Beneficial Use

Under 20 year service life

No Action Required

Beneficial Use Alternative Compliance Option

Over 20 year service life

Plan Submittal July 2019

85% Beneficial Use

Under 20 year service life

No Action Required
Scenario Seven

- **Existing Flare**
  - <85% Beneficial Use
  - **Over 20 year service life**
    - No Action Required
  - **Under 20 year service life**
    - Beneficial Use Alternative Compliance Option
      - Comply with Table 1 Emission Limits
        - Plan Submittal: July 2019
        - Effective: September 2019
SOURCE TEST REQUIREMENTS

Existing Flares

Low Use

Beneficial Use

Low Emitting

New Flare

Source Test Once Every Three Years

No New Source Test Requirements in PR1118.1

Low Use

Beneficial Use

Low Emitting

No New Source Test Requirements in PR1118.1
NEXT STEPS

- Public Hearing delayed until July
- Preliminary draft staff report will be released mid-April
- Staff welcomes further comments, meetings, and site visits
CONTACT INFORMATION

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