East Bay Municipal Utility District Background

- EBMUD operates a WWTP in Oakland
- Digesters produce biogas
- Biogas used to produce 6.5 MW at cogen station
- Advanced co-digestion program
- Net energy producing WWTP
- Interest in pursuing NG pipeline injection – greater value in renewable transportation fuel AND flexibility for other uses anywhere in State with local air quality benefits
EBMUD Proposed Biogas Upgrading Project (RNG)

Municipal Sludge

High-strength Trucked Wastes

Biogas from Municipal Sludge and Trucked Wastes

Renewable Electricity

Turbine (4.5 MW)
Three Engines (6.6 MW)

Gas Flares (~11% of volume)

Biogas Conditioning and Compression System

Proposed Project

Renewable Natural Gas (RNG)

PG&E Pipeline Interconnection
EBMUD Proposed Interconnect with PG&E

Background:
- RNG project would interconnect with the adjacent PG&E gas main
- Initial Feasibility Study with PG&E completed
- Detailed System Study next step

Costs:
- Estimated construction cost for interconnect: $3.5M
- Estimated Interconnection Monetary Incentive: $1.8M
EBMUD Proposed RNG Project  
Impact of Proceeding 13-02-008

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Inlet Gas</th>
<th>Water Wash Outlet</th>
<th>VPSA Polisher Outlet</th>
<th>Pipeline Spec (PG&amp;E)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Flow</td>
<td>500</td>
<td>322</td>
<td>293</td>
<td>NA</td>
<td>Scfm</td>
</tr>
<tr>
<td>Methane</td>
<td>63</td>
<td>96.8</td>
<td>98.8</td>
<td>NA</td>
<td>Percent</td>
</tr>
<tr>
<td>CO₂</td>
<td>30.5</td>
<td>2.0</td>
<td>0.27</td>
<td>&lt;1.0</td>
<td>Percent</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>0.4</td>
<td>0.9</td>
<td>0.85</td>
<td>NA</td>
<td>Percent</td>
</tr>
<tr>
<td>Oxygen</td>
<td>0.1</td>
<td>0.3</td>
<td>0.08</td>
<td>&lt;0.1</td>
<td>Percent</td>
</tr>
<tr>
<td>Heating Value</td>
<td>636</td>
<td>978</td>
<td>998</td>
<td>970</td>
<td>mmBTU/scf</td>
</tr>
</tbody>
</table>

- Water wash meets the HHV spec but not the CO₂ or O₂ spec, requiring polishing at capital cost of $1.0M
- SoCal Gas CO₂ spec is 3%
PG&E Interconnection Status

- Pipeline injection capacity evaluation – completed and green-lighted
- Negotiating agreement for PG&E’s interconnection design and construction
- CEC Grant GFO-18-601
- EBMUD awarded $3M for RNG project in January 2019
- EBMUD declined award on March 18, 2019
Determination Not to Proceed

CalARP/PSM

- OSHA Process Safety Management (PSM) and California Accidental Release Program (CalARP) regulations have significant requirements for facilities with >10,000 lbs flammable gas on-site
- EBMUD WWTP exceeds this threshold
- EBMUD WWTP currently considered exempt as biogas used solely for workplace consumption
- Any project moving the biogas or upgraded product off-site or to a third party will result in loss of exemption
EBMUD believes RNG pipeline injection offers maximum flexibility for the conveyance and sale of RNG.

**HOWEVER**, pipeline interconnection loses PSM and RMP exemption for large WWTPs above threshold.

Estimated cost of compliance with PSM/RMP is $13M, equal to estimated capital cost! Project no longer financially viable.

Proposed RNG project at EBMUD is currently a “NO GO”.

Reaching out to EPA to request a modification of the regulatory exemption to address projects where an interconnection introduces no new or greater risk and the loss of the exemption makes the project non-viable.

Onsite biogas utilization alternatives at EBMUD will continue to be explored but are limited in scope and flexibility.
# Biogas Regulatory Requirements
## RMP (CalARP) and PSM

<table>
<thead>
<tr>
<th>Regulation Protects</th>
<th>Public</th>
<th>Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation</td>
<td>CalARP</td>
<td>US RMP (Title 8 CA)</td>
</tr>
<tr>
<td>Enforced by</td>
<td>CUPA (Alameda County)</td>
<td>US EPA Region IX</td>
</tr>
<tr>
<td>Program Level?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Process Boundary</td>
<td>&lt; 1% w/v of methane</td>
<td>Undefined</td>
</tr>
<tr>
<td><strong>Major Program Requirements</strong></td>
<td>Depends on Program level</td>
<td>Process Safety Information (PSI)</td>
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<tr>
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<td>EBMUD likely Program 1:</td>
<td>Process Hazards Analysis (PHA)</td>
</tr>
<tr>
<td></td>
<td>Worst Case Release Analysis</td>
<td>SOPs</td>
</tr>
<tr>
<td></td>
<td>5-year accident history</td>
<td>Training</td>
</tr>
<tr>
<td></td>
<td>Program 3 requires -&gt;</td>
<td>Contracting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mechanical Integrity (MI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Management of Change (MOC)</td>
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<td>Incident Investigation</td>
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<tr>
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<td></td>
<td>Worst Case Release Analysis</td>
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<td></td>
<td></td>
<td>5-year accident history</td>
</tr>
</tbody>
</table>
MWWTP Currently operates under “onsite use exemption”:

CalARP Exclusion (Section 2770.4.1):
A flammable substance listed in Section 2770.5, Table 2, is nevertheless excluded from all provisions of this chapter when the substance is used as a fuel or held for sale as a fuel at a retail facility.

OSHA PSM Exceptions (Title 8 CCR § 5189(b)(1)):
(2) Hydrocarbon fuels used solely for workplace consumption (e.g. comfort heating propane, gasoline for motor vehicle refueling)…
3) These regulations do not apply to retail facilities,…

EBMUD believes an RNG pipeline injection project would lose this exemption.