



Ray Davy
Agriwaste Energy, Inc.
2054 Loren Road
St. Paul, MN

February 13, 2009

RE: Letter of Support

Dear Mr. Davy,

This letter serves as support to Agriwaste Energy in their pursuit of additional funding for the expansion of their biomethane production and cleanup projects. The Gas Technology Institute (GTI), in collaboration with Cornell University, Universities across the US, and dairy farms in the Northeast, Midwest and West coast, initiated an expansive study aimed at trying to understand biomethane quality and its potential introduction to natural gas networks throughout North America. Funded by over 22 natural gas utilities in both North America and Europe, GTI is finalizing the results of this study, titled: *Pipeline Quality Biomethane: North American Guidance Document for Introduction of Dairy Waste Derived Biomethane*. The intent of this work is to define the parameters of importance for a "pipeline quality" biomethane product, suitable for interchange with traditional natural gas supplies.

Agriwaste Energy was an active and supportive participant in this study. Of important note, only 2 biomethane suppliers in the United States participated in this significant study. Agriwaste Energy provided numerous samples of biomethane to the GTI project, embracing the efforts towards establishing a common framework for biomethane quality. This participation was extremely helpful to industry efforts to verify that a high quality biomethane product may be produced routinely. Gas utilities have committed to increasing their "green portfolio" of energy products and biomethane may augment renewable incentives. However, there is often confusion as the quality of the final biomethane product. Agriwaste Energy graciously provided high quality samples from their production and cleanup process so that industry may verify that analytical parameters similar to those found in natural gas may be consistently achieved. These data will help to usher in the increased production and use of biomethane as a high quality, renewable energy product. Please refer to Table 1, as a sample of data quality (Agriwaste biomethane versus typical natural gas parameters).

GTI is thankful for the participation of Agriwaste in our study. It appears that the Agriwaste production and cleanup plant sampled can be readily expanded to other farms and modified to meet the needs of the gas specification. GTI did not consider this system as experimental; rather, the success of this facility offers hope for the consistent production of a high quality new fuel, suitable for inclusion in pipeline networks. Please consider this letter in support of their approach. The *Guidance Document* from the GTI work should be publically available soon. If there are any additional questions, please feel free to call me at (847) 768-0538.

Sincerely,

Diane L. Saber, Ph.D.
Director



GTI collected 4 biomethane samples from Emerald Dairy from January 22, 2008 through April 8, 2008. The samples were subjected to a variety of analytical tests, including those that are commonly performed on natural gas. Table 1 compares the composition of natural gas to that of biomethane from Emerald Dairy. The parameters listed in Table 1 are those that are commonly found in natural gas pipeline tariffs.

Table 1. Composition of Natural Gas vs. Biomethane from Emerald Dairy

| Gas Property | Natural Gas ¹ | | Biomethane from Emerald Dairy | |
|---|---|---------------------------------|--|--------------------|
| | Contract Limits | Typical Values | Average | Standard Deviation |
| Heat Content (dry) | 967 - 1120 Btu/scf | 1010 - 1060 Btu/scf | 975.8 | 2.58 |
| Sulfur Compounds - Hydrogen Sulfide (H ₂ S) | ¼ - 0.3 grains per 100 scf, Maximum (5) | 0 - 1/8 grains per 100 scf | Below detection limit (<0.003 grains per 100 scf) | NA |
| Mercaptans (RSH) | No Specification | Highly Variable 0 - 40ppm(1) | Below detection limit (<0.003 grains per 100 scf) | NA |
| Total Sulfur Compounds, as sulfur | 5 - 20 grains per 100 scf - Maximum | 0 - 1 grains per 100 scf | 0.003 grains per 100 scf | 0.0003 |
| Diluent Gases Total | 4 - 5% Maximum | 0.5 - 3% | 3.79% | 0.25% |
| Oxygen (O ₂) | 0.2% Maximum | 0 - 0.001% | 0.46% | 0.05% |
| Helium (He) | 0.2% Maximum | 0 - 0.1% | Below detection limit (<0.1%) | NA |
| Nitrogen (N ₂) | 3% Maximum (4) | 0 - 2% | 2.43% | 0.36% |
| Carbon Dioxide (CO ₂) | 2 - 3% Maximum(4) | 0 - 2% | 0.91% | 0.08% |
| Mercury (Hg) | No Specification | 0 - 1ppb(3) | Below detection limit (<0.02 ug/cubic meter) | NA |

¹ American Gas Association. Transmission Measurement Committee. AGA Report No. 4A, Natural Gas Contract Measurement and Quality Clauses. Washington, DC: American Gas Association, 2001