

Nixon, Elizabeth

From: jmda09@gmail.com on behalf of Matt Davis <mdavis@groundenergysupport.com>
Sent: Thursday, January 31, 2013 9:12 AM
To: Nixon, Elizabeth
Cc: Chris Williams
Subject: Thermal Monitoring/Verification

Liz,

Thanks again for organizing the Stakeholder's meeting last Friday, it was very helpful to hear everyone's comments and get a better understanding of the challenge you are facing.

The wide range of sources combined with the wide range of capacities (small residential geothermal to large district heating biomass) presents significant challenges in itself. Combining the wide variation in production with the lack of industry standards and the legal requirement to verify production makes the rulemaking even more onerous, as you are well aware!!

I have come up with a potential framework that may help to simplify matters. It places an ongoing burden on the producers (and their monitors) to document methods and accuracies using recognized industry standards and provides them with choices, but choices that potentially stand up to the legal requirement of verification. I have run this by the NEGPA board and others involved in the documents we have been providing to you, and would like to put this on the table for your consideration.

To date, heat metering standards have focused on protecting both the producer and consumer equally and the metrics are based on % error. The presumption is that an unbiased measure with equal error on both sides, exposes the consumer and producer to equal risk. However, this is particularly detrimental to low production rates (~10MBtuH) for two reasons.

- First, as the delta Ts are small, achieving the kinds of percent accuracies noted in OIML becomes very expensive and impractical. Defaulting to a straight percent errors that are attainable results in potentially large errors for large producers (higher delta T means higher error)
- Second, because the production rate is low, the benefit to the producer is small and not sufficient to warrant the cost. At the same, time allowing large producers to avoid accuracies that are achievable and affordable, exposes the consumer.

While specifying a fixed percentage error is seemingly equitable to both large and small producers, it is actually skewed towards large producers.

We recommend that we recast the problem of heat metering to include a data worth component. The objectives are to:

1. provide the same level protection to the consumer (utilities, rate payers) and
2. allow producers to assume the risk (cost) necessary to document production.

Under such an approach, each metering technology would need to have documented BTU accuracies based on components (delta T, flow rate, fluid properties, and calculation). The "Reported" thermal energy produced would be the conservative value (measured minus error) that has a very high certainty of being produced (and thus meets the verifiable requirement). For a geothermal system that generates and measures 20MWh thermal

(\$500 max REC value) may be willing to accept a 10% error and Report only 18 MWh (\$450 max value) instead of spending thousands of more dollars to attain a 2% accuracy. For large producers (such as Concord Steam) who expect to generate 20,000 MWh (\$500,000 of RECs), it is more beneficial to invest in higher accuracy metering as a 10% error would potentially leave \$50,000 on the table.

So, in the end, producers report a verifiable amount of thermal energy produced using the technology that provides them with the greatest benefit. The consumers are protected in that only the verifiable energy is being reported.

Under this approach the PUC rules might specify the components of the uncertainty and require that the composite uncertainty be documented by the meter manufacturer and/or monitor. Methods would follow the "American National Standard for Expressing Uncertainty--U.S. Guide to the Expression of Uncertainty in Measurement, ANSI/NCSL Z540-2-1997".

Because the error consists of distinct components (deltaT, flow, fluid properties, and calculation) that comprise the heat transfer equation, it should be possible to provide clarity in the rules as to how the error should be documented, reviewed, and accepted.

Let me know if this is something that you think might be helpful and we could continue to work on fleshing out the details.

Best regards,

Matt

Matt Davis
Ground Energy Support LLC
2 Washington St Suite 217
Dover NH 03820
603.867.9762

CONFIDENTIALITY NOTICE: This e-mail message, including any attachments, is for the sole use of the intended recipient's and may contain confidential and privileged information. Any unauthorized review, use, disclosure or distribution is prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy all copies of the original message.