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WES
Energy · Environment · Enterprise

M E M O R A N D U M

Date: June 30, 2016

To: Samantha Meserve, MA Department of Energy Resources

From: Peter Oven, WES

CC: Dan Wilson, WES

Re: MA APS thermal comments

The following are comments regarding the draft Massachusetts APS rules for biomass thermal energy.

Guideline on Metering and Calculating the Useful Thermal Output of Eligible Renewable Thermal Generation Units

1. On pages 8 and 9 there is discussion of items that could pertain to district energy systems, and clarification is requested. Regarding number 10) General Guidance for Locating BTU Meters, 10) (C) states that when the RTGU is located more than 500 ft from the point of connection with a thermal load, the Btu meter(s) must be located within 30 ft from the point of connection to the thermal load. Could it be clarified as to exactly what scenario this is covering, and that the connection point for a district heating system is in the central plant? It is important to note that either a fossil fuel system or RTGU system would see the same losses in the district heating lines, and that the connection point for the RTGU is in the central plant. Regarding the discussion of the same item in 6) Parasitic Energy and the note under number 10), these items identify that pumping energy to transfer heat between the central RTGU and each remote building should be counted as parasitic energy or grid energy. Could it be clarified as to what scenario this would be applied? Please remember that a fossil system serving this same district energy system has the same pumping requirements, and that the RTGU is simply supplying heat to this same system.
2. On page 12, it states that Section 3 of the Guideline on Biomass identifies a method and protocol for fuel metering. However, no method or protocol for fuel metering exists here, unless it is implied that the method is to sum the bills of lading for fuel deliveries for any time period. If this is not what was intended by DOER, please clarify the methods for fuel metering, specifically for pellets and chips. The answer to this question is specifically needed for implementation of the metering of “intermediate” systems.
3. On page 12, the DAS is required to collect data at “less than or equal to five-minute interval[s].” This requirement does not explain whether the data collected must be averaged over 5 minutes, or if the data is an instantaneous reading at the time of collection. Please clarify what this is requiring. Also, please clarify what data is to be collected. It is recommended that data be

stored for each temperature sensor, flow sensor, pressure sensor, etc. at the time of collection, rather than simply the Btu rate or Btu total. Because the required Btu meter in most cases is specified to have an "automated real-time computation and totalizer," some facilities may believe that all they have to do is collect the Btu total value every 5 minutes. However, it is in the best interests of the Meter Reader and DOER to require the collection of all individual raw data from the RTGU, because this will provide supporting evidence that the meter and the RTGU are operating properly, and identification of any operating issues.

4. On page 12, the DAS is required to provide "remote electronic access" to the metered data, however, this requirement is unclear as to the definition of "remote." WES believes the spirit of this requirement is that the data be easily exportable to a PC or other data analysis device, as opposed to a meter which simply reports totals on a small LCD screen, requiring that the Meter Reader copy down the numbers using pencil and paper. WES strongly agrees that the metered data should be easy to export to a CSV or similar file on a PC using an electronic communication link, however, WES cautions that this should not be construed as a requirement to have the metering system be connected to the Internet or "the Cloud." Many facilities have stringent IT policies which would make it difficult to have an Internet-connected meter. Furthermore, an Internet connection is unnecessary for AEC purposes because the metered data will not be used in real time for building monitoring, but rather, will be used by the Meter Reader to periodically verify net useful heat.
5. In Table 3, it should not be necessary to specify or exclude specific flow metering technologies, provided that the overall "Btu Meter Field Accuracy" is maintained as specified. There are other flow metering technologies that provide similar accuracies to the technologies specified, and which are significantly less expensive. Also, there are certain situations where a mag meter has issues due to water quality, and there are sometimes issues with proper installation of acoustic meters. The accuracy of Btu metering is certainly impacted by the accuracy of the flow meter, but this is not the most beneficial place to spend additional dollars on Btu metering. The accuracy of the temperature sensors, recording equipment, and delta Ts of the system are much larger drivers of system accuracy.
6. Regarding the requirements for electric (kWh) meters on page 15, WES believes that the requirement to be certified to ANSI C12.20 is unnecessarily stringent and will result in RTGU installations incurring significant cost for metering relatively little energy compared to the net thermal output of the RTGU. ANSI C12.1 is the standard for revenue grade electric meters with accuracy of 2%, and this should be sufficient based on comparison to the other meter accuracies specified by DOER in the metering guidelines. WES requests consideration of replacing 3.G)(1) with the text: "*Meet the accuracy requirements of American National Standards Institute (ANSI) Standard C12.1*".
    a. Additionally, the requirement that the electric meter "Have a kW and kWh remote output signal with an output signal interval of not more than once per minute" seems to imply that the electric meter must have a pulse output. However, because the kW and kWh values will be logged by the DAS, a pulse output is not necessarily the most convenient way to transmit this information. WES recommends that the apparent requirement to have a pulse output be optional, and that DOER also allow for electric

meters which transmit data via network protocols, e.g. Modbus or BACnet. WES requests consideration of replacing 3.G)(2) with the text: "*Have a network interface allowing access to kW and kWh registers, or have a kW and kWh remote output signal with an output signal interval of not more than once per minute*".

Guideline on Biomass, Biogas, and Biofuels for APS Renewable Thermal Generation Units

1. On Page 8, there are standards for eligible fuels. A general comment is that it is most appropriate for DOER to focus on ensuring that emissions from biomass equipment are low, and that efficient conversion technologies are used. With the emissions requirements of <0.08 lb/mmBtu(input) for pellets and <0.10 lb/mmBtu(input) for chips, DOER achieves their goal of encouraging clean and efficient thermal biomass technologies. WES respectfully requests that DOER require fuel to meet manufacturer requirements for their specific biomass units, which are then tested to show compliance with emission requirements. Should DOER insist that there be requirements for moisture content, ash, calorific value, and conversion efficiency, then the following changes are recommended.
    a. The pellet standard for moisture is listed as 6%, and the guideline states that compliance with the DOER pellet standard "can be demonstrated through certification against standards such as PFI Premium." However, PFI Premium requires pellet moisture to be ≤8%. Therefore, even PFI Premium certification would not be enough to meet the DOER standard.
    b. The requirement for wood chips is that they be less than 30% moisture (wb). It is not understood why this value is identified. If the biomass system meets the emission requirements, then why is the moisture content important. The fact is that emissions from green chips 40-50% moisture are often lower than emissions from lower moisture content systems, and green chip systems do not have an issue meeting the emissions requirements. Additionally, active offsite drying of fuel, which is typically needed to reach the 30% moisture value, actually results in greater total emissions and energy use. If a value is to be identified, it is recommended that "less than or equal to 50% moisture content (wb)" be used, along with a minimum efficiency value of 65% HHV. This lower efficiency minimum will allow for wood systems to offset fossil fuel used at higher pressure steam applications which have necessarily higher flue gas temperatures (for fossil fuel or biomass systems), and thus lower HHV efficiencies (true for both fossil fue or biomass systems). Please note that, as is shown by well documented testing, LHV efficiencies of green chip systems are identical to those of systems using lower moisture content fuel.
        i. This specific moisture content restriction on wood chip fuels used is not based on any known complete data set for commercial biomass systems, and specifically excludes the most efficient form of the biomass resource, green chips, which have the lowest carbon footprint, lowest total emissions, and highest overall system efficiency of any bulk biomass fuel. Further, due to the economic advantages of green chips, these projects are likely to show greater benefit in many cases than projects with dry chips, and removing this fuel from

the incentive programs removes impetus for biomass system owners to install costly backend control equipment on wood chip systems. Importantly, removing this residual from consideration penalizes the existing forest products industry in MA, particularly smaller producers, at a time when economic times are difficult.

2. On page 7, item 6B, the requirement for EPA method testing leads to tests that require significantly larger stack diameters than are used for boilers in the 1-3 mmBtu/hr input range. Is there DOER guidance on appropriate methods to compensate for this?
3. On page 6, table 2, there are requirements for biomass systems. One requirement is that start up is by an automatic (i.e. electric ignition) system. This requirement is applicable to smaller units, however, this does not make sense for larger units used in large district energy systems or for serving large process loads as industrial facilities. For large systems, the fireboxes are large, and the systems are designed to run constantly at high percentages of their rated capacity. These systems are designed to specifically keep owners from turning them on and off, and cycling these systems in this way would actually increase emissions. It is recommended that this requirement either have a size cutoff or that owners be directed to follow manufacturer operational instructions that were used when the system was tested to show compliance with emission requirements. This requirement, as written now, also seems to be in conflict with the modulation/shut off item, which requires that the system "modulate to lower output **and/or** turn itself off…..".