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MEMO

WX-2011-10-A

TO: Agency Directors, Fiscal Officers and Weatherization Coordinators
FROM: Tim Zimmer, Weatherization Program Coordinator
RE: REM Truing Protocol
DATE: October 4, 2011

Greetings,

From interacting with agency staff, there seems to be some confusion regarding the protocol that OHCS requires when truing REM/Design models to actual usage. This Memo is intended to clarify OHCS expectations. However, it is not intended to be all inclusive and will not address every possible situation.

Truing of REM/Design to actual usage is **required** to the greatest extent possible for all homes and all fuel types. The procedures for both metered and un-metered fuel types will be addressed.

The following protocol and guidance suggestions assume the building has been properly modeled, all heat sources have been included, and a fuel summary report can be produced without any errors.

Electric Only Homes:

1. Obtain one year's usage from utility. If one year's usage is not available, refer to the protocol for modeling conservatively listed below.
2. Input the year's usage in the utility consumption analysis (UCA) spreadsheet. Note the baseload usage total from the spreadsheet.
3. Model the building in REM/Design with the thermostat set point at 60 heating & 85 cooling. Run the fuel summary report (FSR). Compare the baseload usage in the FSR annual end use consumption section to the baseload calculated in the UCA.
4. Add or subtract from the baseload listed in REM on the lights & appliances section to true the baseload consumption in REM to the calculated baseload amount on the UCA.

5. Re-run the FSR and compare heating usage in the annual end use consumption section of the report.
6. If REM/Design is predicting heating & cooling usage higher than is indicated on the UCA, keep the set point at 60 & 85. Ensure the inputted R-values in the model are accurate, furnace efficiencies are accurate, blower door & duct blaster values are accurate and that all performance adjustments are set at 100%. If all of these settings are correct, note in the file that the REM model has been trued as close as possible. The REM model is complete and no further action is required.
7. If REM/Design is predicting usage lower than actual, it is allowable to raise the thermostat set point (it can be raised in increments as low as 1/10 degree) until the heating usage matches the heating & cooling usage on the UCA.

Gas Heated Homes:

1. Obtain one year's usage from both the electric and gas utilities. If one year's usage is not available, refer to the protocol for modeling conservatively listed below.
2. Input both the year's gas and electric usage in the utility consumption analysis (UCA) spreadsheet. Note the baseload usage total from the spreadsheet for both gas and electric if applicable.
3. Model the building in REM/Design with the thermostat set point at 60 heating & 85 cooling. Run the fuel summary report (FSR). Compare the electric and gas (if applicable) baseload usage in the FSR annual end use consumption section to the baseload calculated in the UCA.
4. Add or subtract from the baseload listed in REM on the lights & appliances section to true the baseload consumption in REM to the calculated baseload amount on the UCA for both gas and electric baseload.
5. Re-run the FSR and compare heating usage in the annual end use consumption section of the report.
6. If REM/Design is predicting heating & cooling usage higher than actual. Keep the set point at 60 & 85. Ensure the inputted R-values in the model are accurate, furnace efficiencies are accurate, blower door & duct blaster values are accurate and that all performance adjustments are set at 100%. If all of these settings are correct, note in the file that the REM model has been trued as close as possible. The REM model is complete and no further action is required.
7. If REM/Design is predicting usage lower than actual, it is allowable to raise the thermostat set point (it can be raised in increments as low as 1/10

degree) until the heating usage matches the heating & cooling usage on the UCA.

Un-metered Fuel Type Homes (Oil, Propane, Wood Pellets etc.)

1. Obtain one year's usage from the electric utility. If one year's electric usage is not available, refer to the protocol for modeling conservatively listed below.
2. If possible, obtain proof of the previous year's usage of the un-metered fuel type. (Receipts)
3. Input the year's electric usage in the utility consumption analysis (UCA) spreadsheet. Note the baseload usage total from the spreadsheet.
4. Model the building in REM/Design with the thermostat set point at 60 heating & 85 cooling. Run the fuel summary report (FSR). Compare the baseload usage in the FSR annual end use consumption section to the baseload calculated in the UCA.
5. Add or subtract from the baseload listed in REM on the lights & appliances section to true the baseload consumption in REM to the calculated baseload amount on the UCA.
6. If you were unable to acquire usage information for the un-metered fuel, leave the set point at 60 and 85. Ensure the inputted R-values in the model are accurate, furnace efficiencies are accurate, blower door & duct blaster values are accurate and that all performance adjustments are set at 100%. If all of these settings are correct, note in the file that the REM model was trued to baseload and the un-metered usage documentation could not be acquired. The REM model is complete and no further action is required.
7. If you were able to acquire usage for the un-metered fuel type, re-run the FSR and compare heating usage in the annual end use consumption section of the report.
8. If REM/Design is predicting heating & cooling usage higher than actual. Leave the set point at 60 & 85. Ensure the inputted R-values in the model are accurate, furnace efficiencies are accurate, blower door & duct blaster values are accurate and that all performance adjustments are set at 100%. If all of these settings are correct, note in the file that the REM model was trued as close as possible. The REM model is complete and no further action is required.
9. If REM/Design is predicting usage lower than actual, it is allowable to raise the thermostat set point (it can be raised in increments as low as 1/10 degree) until the heating usage matches the heating & cooling usage on the UCA.

Homes with a Metered Heat Source and an Additional Un-Metered Heat Source

1. Follow the appropriate protocol listed above depending on the metered fuel source (s). Follow the protocol through step 5.
2. If REM is predicting a higher heating & cooling usage for the metered fuel than the UCA indicates, on the "mechanical equipment properties" screen, un-check the box labeled "Capacity weight % of load served" and **increase** the percentage of use for the metered fuel until it matches the heating load on the UCA.
3. If REM is predicting lower heating & cooling usage for the metered fuel than the UCA indicates, on the "mechanical equipment properties" screen, un-check the box labeled "Capacity weight % of load served" and **decrease** the percentage of use for the metered fuel until it matches the heating load on the UCA.
4. Once the metered fuel source is trued to actual, the balance of heating & cooling usage can be attributed to the additional un-metered fuel source. Unless you have documentation of the additional un-metered fuel source consumption (receipts) you must leave the set point at 60 & 85. Ensure the inputted R-values in the model are accurate, furnace efficiencies are accurate, blower door & duct blaster values are accurate and that all performance adjustments are set at 100%. If all of these settings are correct, note in the file that the REM model was trued as close as possible. The REM model is complete and no further action is required.

Modeling a home conservatively

If usage history cannot be acquired for a home or there is an inadequate history to predict the usage accurately, the home will be modeled conservatively.

1. Model all R-values as you assessed them during your audit.
2. On the general building information screen, under number of bedrooms, input the number of occupants. This will help ensure baseload water usage is accurate.
3. Model the set point at 60 heating & 85 cooling.
4. Ensure the inputted R-values in the model are accurate, blower door & duct blaster values are accurate and that all performance adjustments are set at 100%.

5. Model the furnace efficiencies as the furnace was designed. Do **not** reduce the performance adjustment below 100%.
6. Input the actual test results for Duct blaster & blower door tests.
7. Make a note in the notepad that the home was modeled conservatively due to the lack of usage documentation.

As noted above, this guidance is not intended to be all inclusive. But it should cover most of the situations you might encounter.

Please share this with all staff members who utilize REM /Design for your agency.

If you have any questions, please contact Steve Divan at (503) 986-0979.

Best Regards,

Tim Zimmer
OHCS Weatherization Coordinator