



Memo

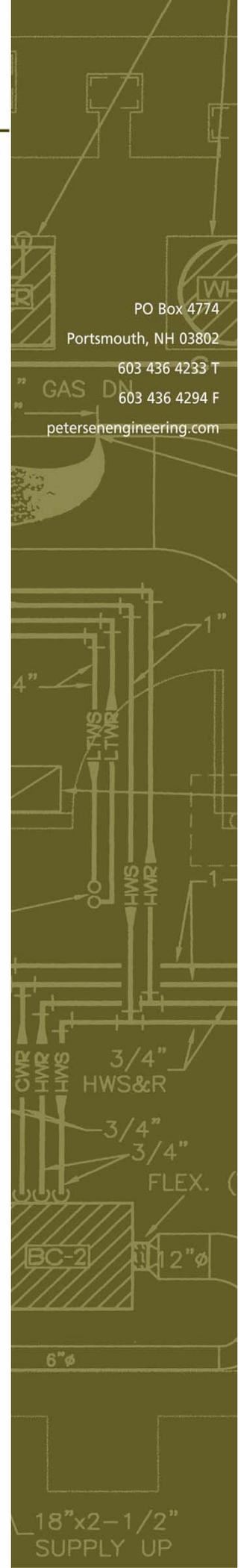
Job Name: Green Woodlands
Job #: 0551
Date: 09/28/06
To: Stu White
From: Andy Arsenault
Subject: Response to Design Day Mechanical's 8/18/06 Letter to Bob Green

The numbering of our response matches the numbering in the letter.

1. We recognize that the Tarm boiler is not ASME rated, however the State of NH has allowed the use of this boiler in residential construction in the past.
2. The specifications now state that an oxygen barrier is required.
3. The minimum tank temperature will only be reached if no renewables (hydro, PV, wood fired boiler) are available. At a tank temperature of 110°F, the boiler will fire in LP mode until the tank temperature rises to 112°F as a last resort to maintain space heating conditions. If the house is occupied, the boiler can be fired with wood to raise the tank temperature to a more conventional 120-140°F for "hotter" domestic hot water.
4. The maximum tank temperature has been changed to 180°F and a secondary sensor will be used which will dump heat and alarm the DDC system if the temperature rises to 180°F.
5. The control sequences now call for pump P-1 to shut off based on the boiler low limit control.
6. Pump P-1 operates when the boiler operates until the low limit control is reached. This will keep the pump running whenever the boiler is firing.
7. This first level of "emergency high limit safety control" is addressed when the tank temperature reaches 180°F by dumping heat to the house heating system.
8. This second level of "emergency high limit safety control" is handled by the expansion tank (ET-1) for pressure increase. For temperature increase, manual intervention is needed – wood should be removed from the fire if the temperature rises too high.
9. This is an operational comment which the Greens should note.
10. This has been corrected in Addendum #1.

Additional comments:

The Excel 2000 has a 4.0 cubic foot firebox, operates at 80% efficiency when burning wood, and outputs 102,500 Btu/hr. With a full firebox (3 cubic feet of oak, air dried), the total heat delivered to the heating water is approximately 726,500 Btu and the fire will burn for approximately 7 hours.



This amount of heat will raise the temperature of the 822 gallon tank by 106°F if no heat is being pulled from the tank during the time the boiler is firing. Therefore, the firebox should not be filled to capacity unless heat is being removed from the tank while the boiler is firing. The tank temperature should be always be monitored while the boiler is being fired with wood.