VERMONT STATE CONSERVATION INNOVATION GRANTS

Quarterly Progress Report

Project Title: Fuel from the Field to the Flue: Grass pellet heating equipment combustion optimization project.
Grantee Name: Meach Cove Real Estate Trust
Project Director: Christopher W. Davis
Progress report author (if different than Director):
Period Covered by Report: 1/1/2012 to 3/31/2012
Project End Date: 1/1/2013

A) Work performed during this period:

1.0 During this period the Project Director traveled to Enviro Energy in Wells Bridge, N.Y. to pick up approximately 10 tons of grass pellets that Enviro Energy had produced from hay in their area and hay that was grown on the Meach Cove Trust property.

2.0 The project director extracted one gallon dry measure samples were from a random selection of ten bags of each of the grass species we now have on site and they were sent to the Twin Ports Testing laboratory in Superior, WI. The sample testing data is posted on the project website we created:

3.0 We created a website www.meachcovefarms.org.using a web hosting company and their template software. The cost of this is part of Meach Cove's contribution to the project but the website is a valuable tool for making the project accessible to more people.

4.0 We shipped 1400 pounds of grass pellets (400 pounds each of switch grass, reed canary grass and Enviro Energy grass) to Northwest Manufacturing, the WoodMaster boiler maker in Red Lake Falls, MN so that they could try them in several of their boilers to determine if one of their models would be suitable for use in our project.

I have attached invoices for a total of $2,406.15 for the Federal share of our project under the CIG Agreement.

1. Ryder truck Rental, diesel fuel: $549.38
2. Shipping to Twin Ports Test Lab: $34.74
3. Twin Ports testing costs: $379.00 & $1,137.00
4. Land Air Express trucking pallet of grass pellets to WoodMaster in MN: $309.03

B) Significant Results and lessons learned

1. The pellet sample test data is posted on our website and will be a useful baseline data when we begin combustion testing. This data also provides a qualitative comparison of the composition of the grass species we intend to test.

2. We heard from the marketing director, Todd Strem, at WoodMaster regarding the combustion of the grasses in a WoodMaster boiler and furnace. They tested the grasses in the Flex Fuel Boiler and the Force hot air pellet furnace. Because neither of these boilers have moving ash grates the grass formed a liquid mass prior to drying into a large clinker. For this reason Wood Master is not going to do any further testing on their units at this time. They had hoped that these two units would be able to handle the grass pellets based on their design features. Todd Strem feels that it is not worth doing any combustion testing on the AFS-900 or AFS 1100 model outdoor boilers that Cornell University Extension had previously tested with grass pellets because they believe the new EPA emission standards under review will be adopted by late 2012 and these boilers will no longer be able to be sold in States adhering to the EPA standards.

3. The Project Director has communicated with several other companies and individuals who claim to have boilers that can handle grass pellets. A summary of this information is as follows:

    a.) Pro-Fab Industries, Arborg, MB Canada, Pelco 1020 boiler: This boiler is able to combust agricultural waste and they claim will handle grass pellets. They have a boiler available the price would be $28,200 before delivery. I have spoken with several people familiar with the Pelco boiler firebox design and they feel that it is not very efficient in combusting the grass and the units that they were familiar with had high ash particulate stack emissions with wood pellets. This boiler is an option for the CIG project as it is a production boiler but I would want to test grass pellets in a unit prior to purchasing one. If no other more efficient and proven boiler is identified then I would propose to ship the remaining pellets from WoodMaster in northern Minnesota to a farm facility in southern Minnesota that has several Pelco boilers provided they were willing to run a test burn with the grass pellets.

    b.) Brandelle Biomass Systems, Milton, ON: This company claims to have developed a biomass pellet capable boiler (BX-200). I was able to speak with an engineer at their facility and at first they seemed interested in working with our project. In January they would not return my calls or e-mails. I learned from another Ontario based biomass equipments processing dealer that Brandelle has developed prototypes for these biomass boilers but that they are not interested at this time on moving to actual production of these biomass boilers.

    c.) Heatilator Corporation, Mt. Pleasant, IA: The Heatilator Corporation has developed a prototype grass pellet hot air furnace (Bio-500F). The unit appears to be well designed but it is only in the prototype right now. They may be interested in working

with the project but the prototype status of their unit may not meet the CIG qualifications.

d.) Biomass Energy Works, Ashburnham, MA, Mark Carlisle: Mark Carlisle has been working on a design for a 200-350K BTU boiler that is specifically designed to burn grass pellets. His third generation design is burning Enviro Energy grass pellets with success in his shop. He claims that he has developed a unique burner and water filter to make his flue emissions clean and particulate free. He is interested in collaborating on testing his design but since his design is still in development I do not believe it would meet the CIG qualifications.

e.) Pellergy, Barre, VT, Andy Boutin, Pellergy has developed a Vermont assembled wood pellet boiler and hot air furnace. They have experimented with grass pellets in their "gun" style burner. They continue to have trouble with clinker formation in the barrel of the combustion chamber which blocks the airflow. They are using an air compressor on a times blow cycle to clear ash and unburned pellets from this chamber. Unfortunately the grass clinkers does not clear from the chamber as easily as the wood pellet ash. They are willing to work with this CIG project but it is clear that modifications to their combustion barrel would have to be made to continuously and effectively burn grass pellets. An automatic ash removal auger would also have to be fitted to their boiler and furnace due to the volume of ash produced with grass pellet combustion. This work would be possible but may be beyond the scope allowed under the CIG program.

C) Work that we anticipate completing in the next three-month period

1. Now that the Project Director has learned that the various Canadian and US made boilers or furnaces that claim to be able to handle grass pellet combustion is very limited at this time, I intend to review this information with the Grant Administrator to see what the options are for proceeding.

D) EQIP and CIG provisions:

1. The primary EQIP-eligible producer for this project is:
   Meach Cove Real Estate Trust
   P.O. Box 309
   Shelburne, VT 05482

2. There are no ($00.00) direct or indirect payments for structural, vegetative or management practices under this project.

3. The Project Director, Christopher W. Davis, certifies that there will not be any direct or indirect payments made to an individual or entity for any structural, vegetative or management practices through this grant. The AIG and HEL/WC provisions do not apply to this project.

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