

Basic American Foods - Moses Lake, Washington Public Report

Introduction:

This Basic American Foods facility produces potato granules in Moses Lake, Washington. The plant operates two natural gas fired boilers or one electrode boiler. The plant uses 100 psig saturated steam to peel, blanch, and cook the potato products. Product dryers are direct fired with natural gas.

The total energy consumption of the Moses Lake facility did not meet the 1 trillion btu/year threshold for an ESA. The energy consumption of the Moses Lake facility was combined with the energy consumption of the Blackfoot, Idaho facility to qualify for the ESA.

Objective of ESA:

The purpose of the Steam energy saving assessment was to train this facility's and neighboring facilities engineering and maintenance supervisors to use the Department of Energy steam tools, to create a model of the plant steam system, and to identify projects that will save energy.

Focus of Assessment:

Plant generates steam to be used in the production of potato granules. Basic American Foods operates a plant in Moses Lake, Washington, three plants in Idaho, and one plant in Wisconsin. Representatives from Idaho and the Moses Lake plant participated in the ESA to gain knowledge regarding the use of the Department of Energy steam tools. If we can find ways to improve the plant steam system operation we can reduce the cost of energy at the facilities, (primarily reduce the amount of natural gas consumed).

Approach for ESA:

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The Moses Lake facility is unique in that the local PUD electric rates are low enough that the fuel of choice for the production of steam is electricity. We completed the steam system scoping tool for the Moses Lake facility, and we were able to develop SSAT models of the Moses Lake facility and the Basic American facility in Rexberg, Idaho. We used the 3E Plus software to build a chart in each of the SSAT models for the header heat loss due to poor or missing insulation, and we reviewed or discussed the impact of all eighteen projects in the SSAT program.

The natural gas boilers were not in operation as electricity was the current fuel of choice. We used technician tuning reports to determine the natural gas boiler efficiencies.

General Observations of Potential Opportunities:

The plant operated the electric boiler instead of the natural gas boilers but they do use natural gas in direct fired applications. Fuel at this facility is natural gas and the current cost is typical for the northwest United States. There are two electric rates at this facility. One for general plant use and the other rate specifically for the electric boiler.

To enhance the accuracy of the SSAT model the facility needs to record the steam generated from each boiler each day, and the makeup water used in the deaerator each day.

The following opportunities were evaluated. We did run projects to determine the marginal cost of steam for the plant and the value of return condensate.

Change boiler efficiency, reduce excess combustion air. The natural gas boilers have been in service for many years they have older burners and jack shat controls with no flue gas oxygen trim. If we install new parallel combustion controls on the existing boilers it would be possible to reduce the flue gas oxygen from 4.7% to 2.5% and thereby improve the boiler efficiency from 82.3% to 83%. The old burners and controls as evidenced by the boiler tuning reports are running very well and the payback for this investment would be in excess of five years. This improvement would have no impact on the operation of the electric boiler.

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Modify Low Pressure Condensate Flash System. The existing steam system uses flash recovery. The steam that flashes in the condensate receivers is directed to a heat exchanger that preheats dryer make up air.

Change Boiler Efficiency and the Process Steam Requirements. Evaluate the installation of a full condensing stack economizer. A full condensing economizer will reduce boiler stack temperature thereby increasing boiler efficiency to 87%, and it will generate a significant volume of hot water that can be used in the plant for blanchers, or hot wash water. The hot water reduces the amount of steam that must be used to heat water in the plant. The savings depends on the amount of hot water that can be used in the plant and additional engineering and metering will be required to verify this opportunity. The model indicates a potential savings of \$256,000. We must collect accurate data on the volume of water that is currently being heated with steam in the plant to be certain that we can reclaim all of the potential heat in the boiler stack. This improvement can not be used while operating the electric boiler.

Reduce Boiler Blowdown- Evaluate installing a reverse osmosis makeup water pre-treatment system. The amount of blowdown and the amount of chemical treatment used in a boiler is proportional to the quantity and the quality of the boiler makeup water used in the deaerator. If we improve the quality of the boiler makeup water with a reverse osmosis system we will reduce fuel requirements and chemical treatment requirements. Most importantly is the insurance that the risk of ever scaling a boiler will be nearly nill. The SSAT model indicates that the savings will be \$25,000 per year while operating the natural gas boilers and \$34,000 per year when operating the electric boiler, (the electric boiler requires more blowdown than the natural gas boilers). Both of these savings numbers are understated because the chemical treatment savings will be greater than indicated by the model. It is anticipated that the actual savings will be \$56,000 per year.

The facility has a very low electric rate for the operation of the electric boiler and currently they generate steam using electricity. This switch in fuel reduces the annual energy costs by \$242,000. This is a good natural gas savings improvement and it should be noted that with the improvements identified above we could reduce the plant energy costs even operating the natural gas boilers with a fuel cost of \$7.50/MMBtu. The total energy savings available with the above improvements for the natural gas fired boilers and steam system is \$375,000. The improvement will raise the break even price of Natural Gas.

Potential fuel savings from above improvements:

Near-Term

0 MMBtu

0.0% savings

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Medium-Term	6,801 MMBtu	2.9% savings
Long-Term	35,277 MMBtu	15.1% savings
Total	42,078 MMBtu	18%

Near term opportunities would include actions that could be taken as improvements in operating practices, maintenance of equipment or relatively low cost actions or equipment purchases.

Medium term opportunities would require purchase of additional equipment and/or changes in the system such as addition of recuperative air preheaters and use of energy to substitute current practices of steam use etc. It would be necessary to carryout further engineering and return on investment analysis.

Long term opportunities would require testing of new technology and confirmation of performance of these technologies under the plant operating conditions with economic justification to meet the corporate investment criteria.

Management Support and Comments:

The morning of the third day we had a preliminary report review with the plant manager and all of the ESA team. We discussed in detail each of the opportunities identified in this report and we reviewed the usefulness of all of the Department of Energy software steam tools.

DOE Contact at Plant/Company:

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