

Apples, they're not just for eating anymore

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ORRTANA — At the Knouse Foods, Inc. plant in Orrtana, apples aren't just for eating.

They are involved in producing electricity, steam, ash, drying heat, and essence flavoring. What produces all these energy resources? The waste product of apple processing known as "apple pomace".

Knouse Foods operates the only co-generator on Metropolitan Edison's energy network and the only system of its type in the country. The system recycles dried apple pomace as a fuel, yielding the 32-year-old fruit grower's cooperative a sizable savings on their energy bills and, at the same time, eliminating the problem of what to do with all the apple pomace.

The master-mind behind Knouse's innovative apple pomace recycling program is James Oyler, director of operations, and a 36-year veteran of the fruit processing industry. Oyler is quick to recognize, however, that without the support of Knouse's board of directors, Chairman William LaCour, and the Department of Environmental Resources (DER), this project could not have been operational.

With Knouse Foods processing enough fruit from growers to gross 85 million dollars annually, cost of production and residual waste can be two very costly problems. Knouse Foods processes apples, peaches, cherries, and blueberries, with apples constituting the bulk of the processing.

The disposal of apple pomace is a problem that has been with the industry for years. Early on it was dried and used for pectin in jelly production. But, as the demands for jelly declined, another alternative had to be found.

Knouse Foods tried burying the pomace in landfills, but since it is not bio-degradable, it fermented underground. This fermented mass could last as long as 15 to 20 years with the possibility of polluting underground water sources. That's when DER entered the picture and demanded another method of disposal to be employed.

Knouse Foods' next consideration was to use the pomace as an animal feed. There was some concern about residual sprays on the product, but with the advent of newer sprays the concern passed. Knouse Foods worked with Penn State on a pilot program of feeding the pomace to steers.

Apple pomace contains about 65 percent moisture and 35 percent dry matter. It is high in carbohydrates and higher in TDN than some ensilaged feeds. The researchers found farmers willing to feed the pomace in poor corn crop years, but they showed little interest in using it when corn silage was plentiful.

Since they couldn't bury or feed

it, Knouse Foods decided to try spreading it on the land. This, however, had its problems too.

There were seasonal restrictions that prohibited daily spreading. And although it seemed beneficial for the land up to a certain point, they found that spreading too much had a detrimental effect; the level of soil acidity became too high. So about 8 years ago, Oyler concluded that the only thing they could do was to return to drying the pomace.

Along with the concerns of product wastes, the cost of energy for product processing also became a greater concern to the fruit processing plant as the country became more energy conscious.

Since Knouse Foods had periods of high energy demands for electricity, Met-Ed charged them "demand charges" as a penalty for overuse. To cut down on these charges and to prevent "brown outs", they decided to install their own electrical generators. This was an attempt to "peak shave" their demand load from Met-Ed, with a bonus of being able to resell any excess electricity produced back to the power company.

Gas turbines were selected as the most efficient means of running the electrical generator. But what about the wasted heat from the turbines? This is where Oyler, Robert Binkley, George Hickes, and Ken Eshelman, all of Knouse Foods, combined their expertise to develop a heat reclaiming system from the turbines and combine it into a drying process for the apple pomace.

Knouse Foods purchased the initial turbine, generator, and waste heat boiler for the project. Through the efforts of the Adams County Commissioners, Knouse received an additional \$300,000 grant from the DER to complete the project.

The project, housed at the Orrtana plant in a specially designed building, works on the premise of using every BTU of heat efficiently. Heat from the gas turbine used to run the generators is introduced into a steam boiler. This steam is used in the fruit processing phase to cook applesauce, pasteurize fruit juice, etc.

The heat from the steam boiler is blown into a dryer into which apple pomace is introduced from a 90,000 pound hopper above the dryer. This dries the apple pomace and rice hulls contained in the pomace. Rice hulls are put into the apple squeezing process since they provide channels through which the juices can flow more freely from the mass.

At this point, the rice hulls are removed and blown into a large silo for reuse. The remaining pomace is pulverized to the texture of a coarse brown flour. It is this pulverized powder that, when

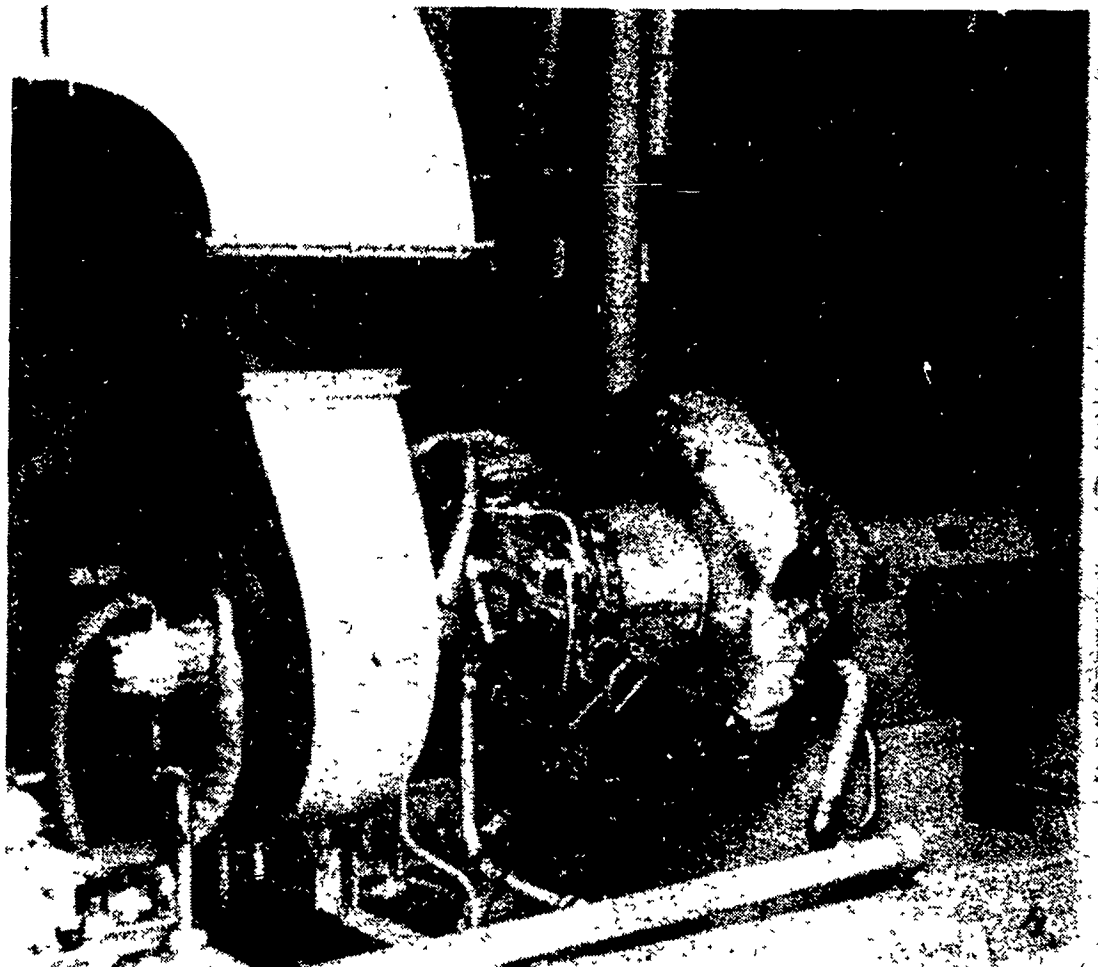
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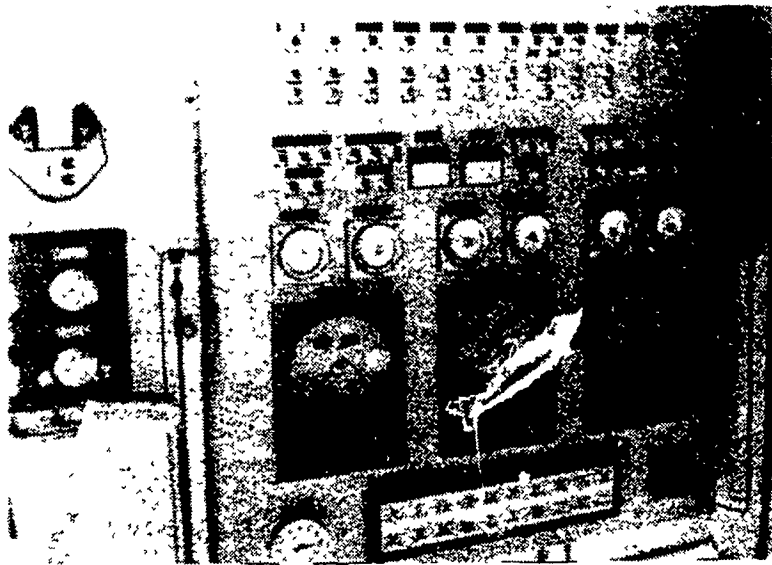
Lucky Leaf is the name-brand for fruit products, marketed Knouse Foods. The Adams County processor grosses \$85 million annually for the juices and pie filling that it makes in its Pa. and N.Y. plants. Here Ken Eshelman checks out the new computer which monitors the 'apple pomace' project. The computer will help eliminate errors in data collection.



The turbine jets and electrical generator that Knouse Foods purchased to generate their own power are cared for with TLC. The walls of the room housing these engines are coated with a special sound absorption material.



The dryer drum for the apple pomace is fed from the hopper bin above the drum which holds 90,000 pounds of pomace.



The main control is the 'core' of the program. An additional panel contains numerous safety checks which protects both Knouse's and Met-Ed's electrical systems.