VALUE ADDED AGRICULTURE: A LOOK AT AN OPERATING FACILITY

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Background of the Company

Permolex Ltd. is a unique value-added grain fractionation facility located in Red Deer, Alberta. It is the first of its kind in North America, using wheat in its initial stages of production. The plant's design incorporates leading edge technologies and processes to capitalize on the benefits of integration. The merger of three traditionally independent manufacturing processes, flour mill, gluten plant and ethanol plant, allows the by-products of one process to be utilized as feedstock for another process. In addition, the facility has incorporated a co-generation plant to produce the electricity and steam required in the processes.

The facility produces bakery flour, vital wheat gluten, fuel grade ethanol and livestock feed. The remaining by-products can be upgraded to revenue producing products.

Permolex is owned by Brent Enterprises and Doug MacKenzie.

The Plant

The Red Deer facility, situated on 24.4 acres of fully serviced land, conveniently borders the Canadian Pacific Railway on one side with direct exposure to Highway No.2 on the other side. Highway No.2, the main highway joining Calgary and Edmonton, connects with Interstate 15 at the Montana-southern Alberta border thus providing direct transportation links into the US. The facility itself is 107,000 square feet and is comprised of 88,000 square feet of manufacturing area and 7,000 square feet of service and mechanical areas. Of the 88,000 square feet of manufacturing area, 40,000 square feet of this space is available for future expansion. The availability of expansion space is a key strength of the facility and provides the flexibility to grow with market and new agri-business opportunities.

The Process

The merger of traditionally independent manufacturing processes at a single facility allows the by-products of one process to be utilized as raw material for another process. The facility, based on this integrated platform, enjoys cost advantages over traditional production plants. More specifically, PERMOLEX generates lower volumes of liquid or solid waste effluent as the by-products from each manufacturing step are converted to valuable sales product in subsequent steps.

Our Products

Bakery flour and vital wheat gluten are the first food products produced at the Permolex facility. These products are sold individually, however, it is possible to create blends specifically tailored to meet customers' needs. Thus, Permolex's food products are not only integrated in their manufacture but have the potential to be complimentary in their end use.

The fuel grade ethanol and livestock feed products are the final component to the integration of the plant. Fuel grade ethanol is sold without any further processing, however, it is possible to upgrade the process to produce industrial grade ethanol. The concentrated thin stillage is presently utilized as a liquid feed, however feasibility studies are underway to add value to this by-product of the ethanol process by dehydrating it and combining it with the millfeed by-product from the flour mill, hence also adding value to the latter.

Flour

Numerous types and grades of flour are produced for various segments of the baking and confectionery

markets. The largest and most widely recognized type is standard patent flour, used primarily for white bread baking because of its purity and brightness. Permolex's Satake flourmill has also entered this market by producing standard patent flour, using CPS wheat, which accounts for 20% of the mill capacity. Baking tests conducted at the Canadian International Grains Institute and at Sons Bakery in Calgary showed that when compared to competitor flours, Permolex has produced consistently an equal or superior loaf of bread. All of the flour produced by competitors is made by using Hard Red Spring wheat versus CPS wheat. This is an economic advantage to Permolex as CPS wheat is classified as feed wheat and is therefore purchased at a substantially lower price. The remaining 80% of flour produced is used as feedstock to the gluten plant.

Vital Wheat Gluten

Vital wheat gluten is a unique water-insoluble vegetable protein and carbohydrate complex that is extracted from wheat by wet processing. When dried, it is a cream to tan colored, free flowing powder containing a minimum of 75% protein on a dry matter basis.

The unique structural and functional properties of vital wheat gluten set it apart from all other commercially available vegetable proteins.

Gluten's unique bulking and elastic properties are widely used to provide body and texture to food products. The adhesive, cohesive and film-forming properties of hydrated gluten form the basis for various types of applications in food products. Although the primary market for gluten is in the baking industry it can be beneficially used as an emulsifier, a binder in meat products, a formulation aid, a processing aid, a stabilizer, a thickener and a surface-finishing agent. When used in baking, texture and bread volume benefit greatly from the ability of vital wheat gluten to entrap the carbon dioxide produced during fermentation (dough rise) to provide the necessary cell structure and loaf volume desired by consumers.

Fuel Grade Ethanol

Ethanol is an alcohol commercially produced by the fermentation of simple sugars. The feedstock may already contain the simple sugars or it may contain sugar polymers such as starch, which can be depolymerized into simple sugars such as glucose with the use of enzymes. Permolex produces fuel grade ethanol from starch and starch by-products generated during the manufacture of gluten. This fuel grade ethanol is dehydrated to 0.7 percent water content. Market demand for both the E10 (10% ethanol) and E85 (85% ethanol) blended fuel is growing as air quality regulations become increasingly stringent and consumers become more environmentally conscious. Further, American automobile manufacturers like Ford are increasing their production of vehicles that can run on the E85 fuel, thus creating market opportunity in the future. The US government is in the process for implementing a Renewable Fuels Standard (RFS) which will require a doubling of the ethanol production over the next 6 years. PERMOLEX product enters the USA duty free under NAFTA.

Livestock Feed

Mill run and thin stillage from the various units of the processing facility are all passed through as a feedstock material. The products contain both high fiber and high protein, which are desirable ingredients in cattle and swine rations for maintenance and growth. Permolex will be doing a feasibility study to determine the possibility of further processing the two animal feed by-products by blending them into one value-added livestock feed to be sold directly to the local market.

Our Grain

We use primarily CPS wheat as our feedstock to the operation because of its functionality for our process and the cost. We purchase approximately 90,000 metric tonnes annually of which 30% is purchased through the

Canadian Wheat Board (for flour and gluten production) and 70% is purchased "off Board" (for ethanol and wet animal feed).

We are the largest CPS processor in western Canada. One of the primary characteristics we are looking for in our wheat is protein. The level of protein in the wheat determines the level of gluten production we can reach. However, we are also looking for starch to feed our ethanol plant. The net result is we look for large kernels with high protein.

We can and do process other varieties of wheat to meet certain requirements in our process, predominantly protein. However, other grains high in starch can be used for ethanol (e.g. corn).

As our customers look for consistency in our product, we look for consistency in our wheat. To do this we look at ways to work directly with producers from not only from a quality standpoint but also a marketing standpoint to ensure both the producer and our company's needs are met. As we all know, the grain market can be pretty fickle at times.