

Pioneering food technology at the POS Pilot Plant

Q. What do Protein, Oil and Starch have in common?

A. The POS Pilot Plant in Saskatoon, Saskatchewan.

POS was founded in 1973 as a joint venture between government and industry, in the form of a not-for-profit corporation dedicated to the development of new and improved methods for processing cereals, oilseeds and legumes.

The structure of POS is unusual in that private industry representatives comprise half the board of directors, even though the government guaranteed 90% of the capital costs of the facility and continues to contribute substantially to offset operating deficits. The board, which is responsible for setting operational policies, has 16 members: 8 selected from among industrial members, 6 appointed by non-industrial membership groups (including 2 from the federal government), Executive Director Dennis Jones, and Assistant Director Bob Hickingbottom.

The existence of POS, according to Executive Director Dennis Jones, is a response to the need for new technology in food processing and agriculture that will keep the agricultural and food industries profitable while providing sufficient food to meet the world's demand.

Citing the troubled economies of

developed Western nations, Jones foresees that industry will find it increasingly difficult to survive without significant new products and new markets. These new products, he says, can come only from a greater reliance on technology. Some companies are using obsolete technology that will require updating if they are to remain competitive, Jones observes.

"We inhabit a world whose population is increasing alarmingly, and world food demand will very shortly exceed supply..." Jones says, "unless positive action is taken to remedy this situation."

The "positive action" that Jones is talking about is the development of new and improved technologies to make the most of agricultural raw materials.

While the major part of POS' work is devoted to technology for separating oilseeds, legumes and cereals into proteins, oil and starch, POS was designed to be flexible enough to deal with all major nutrients in food raw materials as well as with many other constituents. POS' capabilities extend to such diverse areas as conversion of damaged vegetables and fruits to stable powders, recovery of protein from animal carcass

residues, and fermentation. POS even can produce some finished products, including pet foods, snack-type items, and milk substitutes.

All this activity takes place under one roof on the campus of the University of Saskatchewan in Saskatoon, and under the auspices of a 26-member staff. The POS Pilot Plant Facility, which Jones estimates is worth between \$7 and \$8 million, comprises primary, secondary, and flammable processing sections, laboratory and library facilities, and an extensive array of processing support equipment.

The primary processing area is equipped to receive raw materials in bags or bulk, and to clean, condition, mill, grind, and dehull. The material can then be flaked, cracked, cooked, or expelled.

The secondary processing area provides a full range of equipment, including tanks, reactors, coolers, centrifuges, dryers, extruders, and an air classifier. A central patch panel allows easy interconnection between processing units.

Connected to the main building by an enclosed corridor, the flammable processing area contains equipment to solvent-extract a variety of oilseeds

and to recover and further process by-products. As in the secondary processing area, all liquids are routed through a central patch panel to provide maximum flexibility of the processing sequence.

POS also offers ancillary support services. There are fully-equipped laboratory facilities staffed by scientists specializing in areas such as lipid and protein chemistry, food processing, microbiology, and cereal grain research. Within the plant is a reference library, which has access to other reference facilities through cooperative inter-library systems, and a machine shop for routine maintenance and modifying equipment for specific processes. Equipment design assistance is available to clients with special requirements.

POS' facilities and services are used by members and clients. Membership is open only to Canadian concerns, though non-member clients may use the facility on a fee-for-service basis. There are two types of membership: voting and associate. The federal government, POS' primary funder, is a voting member, and provincial governments may join by paying an entrance fee of \$100,000 and an annual fee of \$50,000. Voting membership is open to Canadian firms, associations, and universities with an "active and direct interest in process technology" for an annual fee of \$5,000. Members can use POS facilities at a 25% discount and have access to the in-house research program and priority with respect to licensing of POS inventions. Members also may use POS information services and share in the guidance of the corporation.

Associate memberships are designed for organizations with an indirect interest in agriculture or food, which are unlikely to use POS facilities but which wish to lend their support in the form of an annual fee of \$1,000 (or \$10,000 for a 15-year period).

POS currently has 16 industrial members from across Canada, two provincial government members, one university member, and 5 associate members.

The services that POS provides to members and clients range from analytical laboratory work to complex process and product development. "Smaller concerns usually come to us for a complete package of services," says Jones, "including basic research, product development, and pilot-plant scale-up." Larger firms are interested primarily in process development, he says.

POS offers a wide range of equipment and facilities to its members and clients. Below is a partial listing of equipment available for use at the plant. POS plans to add another \$2 million in equipment over the next five years.

PRIMARY PROCESSING

Grain & Seed Cleaner
Cylinder Cleaner
Grain Dryer
Cracking Mill
Flaking Mill
Pin Mill
Disc Mill
Impact Mill
Hammer Mill
Vibrating Sieve
Cooker-Prepress
Zig-Zag Air Classifier
Specific Gravity Separator

SECONDARY PROCESSING

Decanter Centrifuge
Three-Phase Separator
Basket Centrifuge
Spray Dryer
Vacuum Tray Dryer
Vacuum Tumble Dryer

Freeze Dryer
Cooker-Extruder
Air Classifier
Colloid Mill
Solid Liquid Blender
Ribbon Blender
Pressure-Vacuum Reactors
Batch Processor
Process Tanks
Bulk Cooler
Plate & Frame Filter

FLAMMABLE PROCESSING

Solvent Extractor
Meal Desolventizer
Solvent Recovery System
Colloid Mill
Three-Phase Separator
Basket Centrifuge
Plate & Frame Filter
Pressure-Vacuum Reactor
Process Tanks

Jones points out that members and clients have a choice as to how they may use POS services. They may opt to supply their own operational and laboratory staff, paying POS only for the use of equipment and lab space. They can use POS staff to supplement their own staff or perform work on their behalf. A client may also elect to have POS plan and execute a complete experimental program.

Whatever the nature of the work, all research undertaken on behalf of a specific member or client is done on a proprietary basis. All rights to any developments under the project belong entirely to the client.

According to the "POS Abilities" newsletter issued by POS, a new semi-refined canola oil is now being produced by United Oilseeds Products Ltd. using new patent-pending technology developed by the company with experimental assistance from POS. The new oil and its refining process, according to United's manager of planning and development, Stewart Campbell, will open the way for new canola oil markets and manufacturing alternatives around the world.

While POS clearly has aided individual concerns, it has also come up against some problems. Membership has lagged behind initial expectations and the facility has not been used by clients to the extent originally antici-

ated. Jones feels that these problems can be attributed, in part, to a conservatism that inhibits many companies from investing in research and development to meet future requirements and to a lack of awareness of POS' capabilities.

These problems have severely hampered POS' reaching its goal of financial self-sufficiency. Underutilization and low membership have meant POS has been operating at a considerable annual deficit. "Though it was originally assumed that POS could become financially self-supporting within a few years, it is now apparent that this will not be the case," says Jones. "In fact, institutes like POS can only become self-supporting with great difficulty and after a long period of time."

But Jones doesn't measure success by finances alone. "Our appraisal of success must include more than the annual return, and the best yardstick would appear to be an estimate of ultimate benefits resulting from completed projects, as perceived by the clients who commissioned these projects," he says. Jones points to POS' impact on clients and on the Canadian economy. POS projects have added at least \$5 million annually to sales for the companies involved, Jones says. He estimates that farmers also have benefited from a half-million dollar a year increase in cash flow for contracted

POS PILOT PLANT CORPORATION

Members

The Province of Alberta
 Alberta Wheat Pool
 The Cambrian Engineering Group Ltd.
 The Government of Canada
 Canada Packers Inc.
 The Canada Starch Company Ltd.
 The Royal Bank of Canada
 Canbra Foods Ltd.
 Canola Council of Canada
 Christie, Brown and Company Ltd.
 CSP Foods Ltd.
 Federated Co-operatives Ltd.

General Foods Ltd.
 The Heritage Group Inc.
 Industrial Grain Products Ltd.
 Kraft Ltd.
 Northern Alberta Rapeseed Processors
 The Bank of Nova Scotia
 James Richardson & Sons Ltd.
 The Griffiths Laboratories Ltd.
 The Province of Saskatchewan
 University of Saskatchewan
 Saskatchewan Wheat Pool
 Standard Brands Food Company

United Oilseed Products Ltd.
 Waterloo Centre for Process
 Development

crops. Through its work for individual clients, POS has indirectly stimulated the Canadian economy by helping create new jobs.

Though Jones feels that POS has been successful in several ways, he still

is aiming for financial stability by reorienting some of POS' policies and priorities. To make membership more attractive, POS recently has changed its policy with respect to non-contracted research. When such research leads to

patentable discoveries or inventions, POS will file the patent and then offer exclusive license for that discovery to members who have six months to submit bids. High bidder gets the license. If no members bid on the license, non-members may bid for a license.

Jones describes the first project performed under this new policy as the development of a novel pet-food formulation with "dog appeal" which could capture a large slice of the North American pet food market for the successful bidder.

Jones says that this new research and licensing policy has already stimulated interest in membership. He expects to add another provincial government member—and maybe two—within 12 months, as well as one university. He plans to expand the staff from the current 26 members to the 29.5 budgeted for 1982 and for purchasing between 12 and 15 pieces of new equipment this year. During the coming five years, he foresees increasing staff size 30% to 50% and adding more than \$2 million in equipment to keep POS at the forefront of process technology research. □

Forecasting service available

A University of Illinois physicist, Paul Handler, has developed a long-range weather and crop forecasting service, Atlas Forecasts, based on work he began several years ago on forecasting weather trends by studying oceanic conditions.

In the December 1981 forecast, Handler says there will be average weather conditions for soybean crops in Brazil and Argentina during the growing season which should mean no major surprises in the size of their soybean crops.

Details are available from Atlas Forecasts, 706 W. Oregon St., Urbana, IL 61801.

New canola crushing plant

With the help of a \$4 million grant from the Ontario government, Canada Packers Inc., the Toronto-based meat packing and food processing concern, is building a \$20 million facility in Hamilton, Ontario, to process canola (rapeseed) into vegetable oil.

The plant, to begin crushing in early 1983, will have an ultimate annual capacity of 160,000 metric tons—the equivalent of 200,000 acres of canola. At present, eastern Canada uses the equivalent of 500,000 acres of canola.

The Ontario Ministry of Agriculture and Food reports that Canada Packers has undertaken to offer to buy all the Ontario-grown canola made available to the plant. The facility will use western canola initially, gradually shifting to Ontario canola as it becomes available.

Ontario Agriculture and Food Minister Lorne G. Hender-

son said that the grant, made through the Board of Industrial Leadership and Development, "will help increase the province's food processing capacity and will open a market for a new high-value crop for Ontario farmers." Government estimates are that the market created by the plant could increase Ontario's net farm income by \$30 million.

Canada Packers also has a soybean facility in Hamilton.

Chemical Abstracts turns 75

Chemical Abstracts, the American Chemical Society abstracting service, marks its 75th anniversary this year.

Chemical Abstracts, located in Columbus, Ohio, abstracts, indexes and cites more than half a million scientific papers and patents annually, and each weekly issue of *CA* contains almost 9,000 abstracts. The first issue of 1982 contained the 9 millionth abstract to be published in *CA*.

Indictments in Louisville explosion

A federal grand jury has indicted the Ralston Purina Co. in connection with Feb. 13, 1981, explosions in Louisville's sewer systems. The city says the explosions occurred because hexane from Ralston's soybean processing plant got into the sewer system. The criminal indictments could lead to fines totaling \$62,500, the Louisville *Courier-Journal* reported. Sewer repair costs have been estimated at \$16 million, water line repairs at about \$700,000 and street repairs at approximately \$1.5 million. In addition, a \$250 million class action suit has been filed against Ralston Purina on behalf of an estimated 500 persons affected by the blasts.