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Charting the course of fisheries development today.

Alaska Fisheries

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News to Use

Not too often in the production of a quarterly news letter does an issue arise so important as to stop the presses. This time one did: USDA has approved a sketch label for a meat/surimi product.

What will this approval mean for the U.S. surimi industry? An entire new market has opened for surimi producers, one that conceivably could consume all the surimi made in this country today. Or surimi could go virtually unnoticed by meat processors. Read the story at right, along with the *Director's Log* on page 6.

Certainly the use of surimi in processed meats, and in other non-seafood analog uses, brings Alaska one big step closer to fulfilling the potential of our sea resources. Another step will be to obtain the maximum nutritional benefits from all our fish catch. Toward that end, Kodiak Reduction, Inc. is improving its fish meal plant and some Alaskan fish processors are educating themselves about the market potential for their fish processing wastes (page 4). These efforts are evidence of the maturation of Alaska's seafood industry.

In the meantime, Kemp Pacific Seafoods launched its new factory ship, *Bering Trader*, which steamed north to the Bering Sea earlier this spring to process flatfish, pollock and cod.

As this newsletter springs into being, the Moscow summit is coming to a close. One of the most significant — and least talked about — events of the summit was a significant new fisheries agreement, which was signed May 31 (see page 8).

Welcome new AFDF member

Natural Flavors, Inc. of Newark, NJ joined AFDF as an associate member this quarter. And Kodiak Reduction, Inc. of Kodiak, AK joined as a voting member. Welcome to both companies.

USDA says yes to surimi

By Krys Holmes

A pork nugget with surimi called Spicy Bites is the first surimi/meat blend to gain USDA approval, federal officials announced June 2. The approval marks the first time a meat formulation using surimi as a complementary protein has been approved for commercial production by the U.S. Department of Agriculture (USDA).

"USDA approval of this label is symbolic," said Barbara Batson of Manning, Batson & Associates (MBA), a consulting firm that walked AFDF through the approval process. "We hope this will serve as a catalyst for the surimi and other food industries to begin serious exploration of surimi as a raw material for products outside the analog market."

The nod from USDA was a major event even in the eyes of their own personnel. Standards branch chief Judy Quick of the FSIS said when she verbally confirmed the approval that the action was being presented to the top administration of the USDA because the approval was "precedent-setting" in nature. It is expected that the approval will take some of the risk out of surimi product development that is associated with any new protein mate-

rial, and may result in new food and non-food products being developed with surimi.

"Surimi product development doesn't have to stop with surimi/meat blends," Batson said. "There are other product concepts to consider from pharmaceuticals to confectionery applications. The future looks bright for block processors who are committed to the commercialization of surimi as a raw material."

Spicy Bites are breaded nuggets made with regular pork trimmings, water, Alaska pollock surimi, sodium nitrites and spices. Nitrites were added to prevent outgrowth of *Clostridium botulinum type E*.

The meat formula is ground, formed, battered and breaded, then deep fat fried at 362°F for 2 minutes to an internal temperature of 190°F. Then the product is quick frozen.

Spicy Bites were submitted to USDA on behalf of AFDF as part of an ongoing project to maximize the potential of surimi in the food industry and therefore benefit more fully from Alaska's bottomfish resources. At the same time, MBA submitted a sketch label for another product they developed called Southwest-style Golden Morsels, a blend of beef and surimi with cheese, tomato

Continued next page

MEMBERS ONLY

What's going on
with AFDF members

APS Surimi production escalates

KODIAK — Alaska Pacific Seafoods (APS) in Kodiak has increased its fish handling tenfold in the past two years, and has more than doubled its surimi production capacity.

Between Sept. 1, 1987 and the close of pollock season in early April 1988, APS took deliveries of 50 million lbs. of fish, of which 38.6 million lbs. were pollock. More than half of the pollock went to the surimi line, producing 8,000 metric tons of surimi.

APS plant manager John Sevier said his plant processed 2,300 metric tons of round fish in 1985. Total fish processed in 1987 topped 32,000 metric tons.

Arctic Alaska Fisheries: Profits up 47%

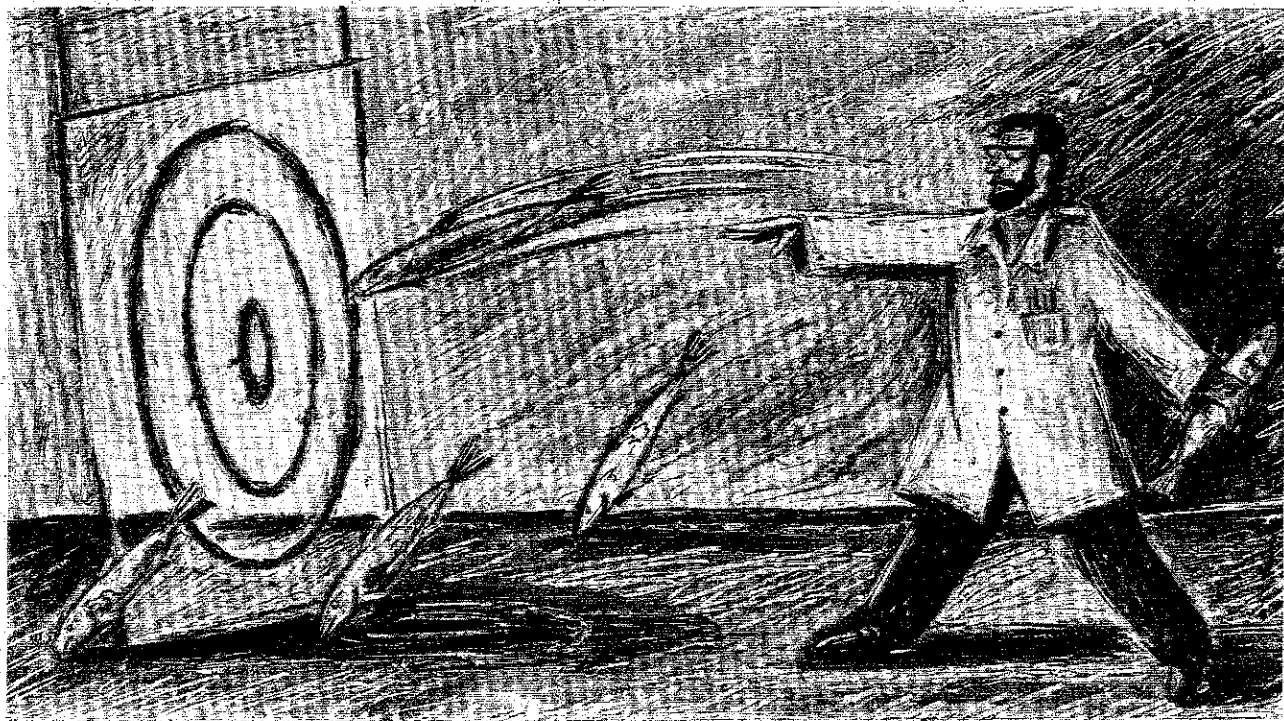
SEATTLE - Arctic Alaska Fisheries Corp., the holding company that owns Arctic Alaska Seafoods, reported profits topping \$71 million in 1987, a 47% increase over the 48.7 million reported in 1986. According to an Associated Press story, the financial results represent the combined figures for several companies that were consolidated last January to form Arctic Alaska Fisheries.

Arctic Alaska Seafoods went public April 29, 1988. Their stock now is traded on the American Stock Exchange, and at press time closed at 13 1/2¢. The company owns 17 vessels that catch and process bottomfish and crab in Alaskan waters, and is the largest U.S. surimi producer.

Towa aids Yukon fish smokers

ANCHORAGE - Towa America, a seafood exporting company active in Western Alaska, is supporting an effort among Yukon River fishermen to commercially produce smoked salmon in their individual fish camps with approval from the state of Alaska Department of Environmental Conservation (DEC). Local fishermen have smoked salmon for years in the Yukon River area, but until now it was not legally sold commercially. The local production will enhance Towa's effort to increase sales of smoked salmon strips to Japan.

This year, fisherman Sid Huntington will produce smoked salmon strips from his Yukon River fish camp in a pilot-scale effort to build a cottage industry from smoked salmon produced at family fish camps in the area. Towa will provide cold storage facilities and will market the product. Towa vice president Terry Reeve said Huntington's effort "is a real breakthrough that demonstrates that you can go out and do something on your own, get all the permits to do it, and make money. You don't have to be a million dollar fish plant to do it."



New surimi test "targets" speed, accuracy

Two surimi technologists are working to develop an instant method of testing surimi gel strength and functionality that will give accurate ranges of surimi quality before the surimi is all the way through the line.

The McRae-Manning Test was developed by University of Arizona graduate student Lorelie McRae and food technologist Patricia Manning, and if further tests are successful, it may be less expensive and faster than either the traditional punch test or the newer torsion test, each of which can take up to two days to complete.

McRae and Manning will see how well their test applies to the commercial surimi industry in a project funded by AFDF that begins this summer.

The McRae-Manning test is similar to some used in other food processing industries. It begins with 15 grams of partially thawed surimi, to which 85 ml of distilled water has been added. The mixture is blended briefly (extended blending decreases gel strength) and put into 20 cc syringes from which the needle end has been removed. The syringes are heated in 90°C water for 20 minutes, then cooled.

The cooled surimi is placed onto the center of a transparent plastic sheet marked with concentric circles that increase in radius in 1 cm increments up to 1.1 cm. One end of the plastic sheet is elevated to 2 cm for four minutes. If the surimi doesn't drip off the sheet, the one end is

elevated to 6.5 cm. for two minutes. If it remains on the sheet within the concentric circles, it is considered high quality, depending on the cooling time. Results are also based on the thickness of the supernatant, which increases with cooling time.

The test is similar to those used by egg white producers and other food manufacturing industries to measure product quality. Manning said the test works as well for measuring mince before the washing stage as it does on finished surimi.

"This test achieves two things," Manning said. "First, it is simple, which means it doesn't require expensive equipment or extra training, fewer mistakes are likely to be made. And second, it can be used as an in-line system. We can pull mince from the middle of the surimi line and run a quick test that will give an assessment of what kind of final product that batch will produce."

Manning and McRae will try out their new test in Kodiak in upcoming months. "In the future, I would like to be able to run a simple test in mid-process that will tell me how many washings I need to run, or what I need to do to produce a batch of surimi that meets particular specifications," Manning said. "My feeling is, even if it is a quick and dirty test, if it provides you with hands-on information that is workable and useful, then it's a boon to processors."

USDA approves surimi in processed meats

Continued from page 1

paste, onions and spices. Golden Morsels are also battered and breaded and deep-fat fried. The product is low in fat, adequate for either commercial market or restricted diet programs, and is less expensive to manufacture than similar all-meat products, Batson said.

Any subsequent surimi/meat products would have to be submitted to USDA for approval; USDA is the regulatory agency governing approval for all products made with meat that are sold in interstate commerce in the U.S. However, the data AFDF and MBA (with significant help from the Fishery Industrial Technology Center, Alaska Pacific Seafoods and the National Marine Fisheries Service, among others) compiled over the last two years — including intensive microbiological studies, shelf life tests, Type E botulinum studies and investigations into the interaction of meat and fish proteins — will help pave the way for new product ideas.

"This approval is a model only for surimi/meat formulations which include curing salts," Batson said. "But it is significant because it sets a precedent for other surimi/meat formulations to follow, once NMFS completes its type E botulinum studies to answer the agency's concerns regarding the organism."

The question that comes on the heels of the USDA approval is, how will the meat processors respond? Will producers of nuggets, sausages and value-added meat blend items rush to the phone to make orders? Will surimi producers find a ready market outside the crab analog field

for their increasing production?

AFDF executive director Mel Monsen believes surimi will find its potential in processed meats and other food products only if the surimi industry takes an aggressive stance toward educating its potential market.

"Regulatory approval has been a real stumbling block for surimi in the past," Monsen said. "It has taken almost two years to answer the regulatory questions. Now the industry must start to educate meat and other food producers about the functionality and economics of using surimi in new products."

Batson said she believes some of the U.S. surimi producers will initiate market education. "The surimi producers have been pretty happy with the analog market. But with competition growing and the only domestic market being analogs, the time seems right to forge new ground. We have seen some interest in expansion among surimi producers. I think that success from here will depend on how aggressively the industry explores and promotes new uses for its product, and equally as important, how it addresses the issue of relevant terminology for new applications and new buyers," she said.

For more information about the functionality of surimi in various products, contact AFDF at (907) 276-7315 or Manning, Batson & Associates in Seattle, Washington at (206) 442-9467.

What makes Alaska flatfish the way it is?

Refrigerated sea water systems and pumping are the enemies of high quality flatfish, writes Diana Greene from the NMFS Utilization and Research Lab in Kodiak.

Greene is studying the quality characteristics of Alaskan flatfish species, and is correlating visual quality indicators with objective biochemical analyses. Her studies began with Gulf of Alaska flatfish, and later will include flatfish harvested in the Bering Sea.

Her test results confirmed what buyers of high-quality flatfish have historically affirmed: that flatfish are not only physically different from other groundfish and salmon, but there are distinct metabolic differences that make good handling, with regard to both speed and temperature, even more critical to the delivery of top quality product.

Greene observed methods of visual evaluation of flatfish used by Japanese buyers at Eagle Fisheries. The graders prefer fish that come in with a thick slime layer, are in mid-rigor, and have intact scales at the time of delivery. These three indicators of good handling history guarantee a high quality finished product, whether H&G or fillet, and the holding method that achieves all three is layer ice.

Flatfish are best when delivered to the plant within 48 hours after harvest, Greene's study revealed. Alternating the layers of fish and ice also seems to slow down the aging of the fish from a chemical perspective and maintains the best possible physical condition. The compounds in fish muscle that are responsible for fresh fish flavor, such as inosine monophosphate (IMP) and inosine, are retained longer when the fish are iced; the formation of compounds responsible for off-flavors, like hypoxanthine, is slowed down. Flatfish differ markedly from cod, pollock and salmon in their formation of this sequence of flavor compounds in that cod, pollock and salmon are very slow to form hypoxanthine. In contrast, flatfish form hypoxanthine very rapidly.

Rock sole: Best at two days

To date, Dr. Greene has analyzed rock sole, flathead sole and yellowfin sole; her studies will include all Alaskan flatfish species. Rock sole were analyzed each day for eight days after harvest by both sensory and biochemical means. Greene discovered that Rock sole layered in ice remained relatively fresh for eight days, while fish held in RSW developed objectionable odors by day four. Fish flavor and overall desirability for rock sole held in either RSW or ice was rated best at two days.

The metabolite IMP is what gives fish its meaty flavor, and enhances other flavors as well. Levels of IMP can be measured and correlated to sensory perceptions about fish, and Greene discovered IMP levels peaked at two days in the rock sole. This which was consistent with the sensory evaluations.

After two days, the balance of flavor components in RSW-held rock sole began to shift, while layer-iced fish retained its IMP levels through the fourth day. Greene's results confirmed that speed and low temperature during processing are even more critical for producing high-quality flatfish than for other species.

Parasite studies

Some inconclusive data came out of Dr. Greene's parasite detection and flesh quality tests on the different flatfish species. Greene determined the incidence and extent of infection by Myxosporeans of the *Kudoa* species, which have been reported to be responsible for muscle softening in species like Pacific whiting.

"We discovered that the presence of these microscopic parasites is not necessarily predictive of muscle softening," Greene said. "The effect of parasites on the flesh appears to be species specific. For example, yellowfin sole can have very high levels, up to 500 spores per square centimeter (as counted on a microscope slide), and still be perfectly normal fish. Flathead can have up to 50 and be normal. Arrowtooth can have just two or even one, and have extreme muscle softening."

Greene said there is no instant correlation between parasites and flesh quality. "The surprising thing is that, of all the flatfish examined, density of parasites was lowest in arrowtooth, yet the muscle softening was the worst in that species."

IMP and hypoxanthine tests on flathead sole revealed puzzling results: Hypoxanthine levels already were high at the second day after harvest, while IMP was barely detectable in either the RSW or the iced fish. It was impossible to develop a quality curve relative to holding conditions, because the sequence of metabolic transitions that occurs over time with rock and yellowfin soles had already come to completion in the flathead. Samples of a species related to flathead were obtained from Maine, and it revealed a similar rapid loss of IMP.

"There could have been a number of explanations for this," Greene said. "But on a preliminary basis, it appears that flathead sole differ from other flatfish in that they break down more

rapidly; they pass their peak quicker than rock sole. At least, that's what the data suggest. More studies are needed before this can be said absolutely."

Gulf Yellowfin: Handling is crucial

Gulf of Alaska yellowfin sole that was pumped from the hold were compared with some that were unloaded by hand. The pumped fish suffered physical damage, significantly lowering their value as an H&G product. When filleted, the pumped fish were also noticeably softer than the hand-unloaded fish.

A test batch of fish held in RSW storage went completely out of rigor by the third day after harvest. Layer-iced fish remained stiff until day four. Both batches showed loss of color in body and fins after five days. At four days, Greene detected jellying and clear zone formation in the fish. This is where spherical areas in the flesh turn jellyed or glassy. These areas turn to mush when cooked and are unpalatable as food. The number and extent of clear zones increased with storage time at 0°C.

Greene also discovered that RSW-held fish absorbed a noticeable quantity of salt by day two, which affected the flavor of the flesh and became objectionable by day five. However, these salty fish produced firmer fillets with a brined or glazed look.

Defect studies on yellowfin sole revealed that at high numbers of spores, parasite density did correlate with the degree of proteolysis observed with the cooked flesh, but in yellowfin a different defect appeared. The jellyed condition or clear circles and streaks occurred at storage temperature 0°C, and seemed to develop more as a function of length of storage rather than method. Whether this type of defect, which is also caused by a proteolytic enzyme, is related to the softening

observed during cooking will require further study to conclude.

Yellowfin sole deteriorated faster than rock sole in these tests. Where IMP remained high until day four in rock sole, it began decreasing quickly at day two in yellowfin, suggesting that yellowfin sole must be processed as quickly as possible after harvest—and preferably should be frozen within 48 hours to preserve highest quality. Because of this and the jellying defect, yellowfin sole may not be suitable for the fresh fillet market and may even be of limited interest to processors.

Conclusion: Ice is best

Fish held in RSW deteriorated more quickly than iced fish, and absorbed saltiness that reached objectionable levels with longer holding time in RSW. Another consideration of RSW holding is that it requires pumping the fish out, which preliminary data indicates may deteriorate flatfish and soften muscle tissue.

For the frozen flatfish fillet market, fish should be processed two to four days after harvest. Some Alaskan flatfish species like yellowfin sole may be unsuitable for the fresh fillet market; others like rock sole and flathead can be of excellent quality if handled properly and shipped quickly after harvest. To compete favorably on the domestic market, flatfish should be sorted and iced to maintain firmness, freshness and flavor.

Greene's study reveals that fishermen and processors must find economical ways to treat flatfish differently than any other fish during harvesting, handling and processing.

For a copy of Diana Greene's first report, contact AFDF and ask for "Flatfish Utilization Research." It is available at no charge.

Flatfish really flies at Eagle

Fishermen harvesting flatfish for Eagle Fisheries delivered 80,000 pounds of raw fish per trip in early June. Eagle's production has increased to about 160,000 lbs. per week (compared with 220,000 lbs. for the whole month of April) as fishermen switched over from cod to target flatfish.

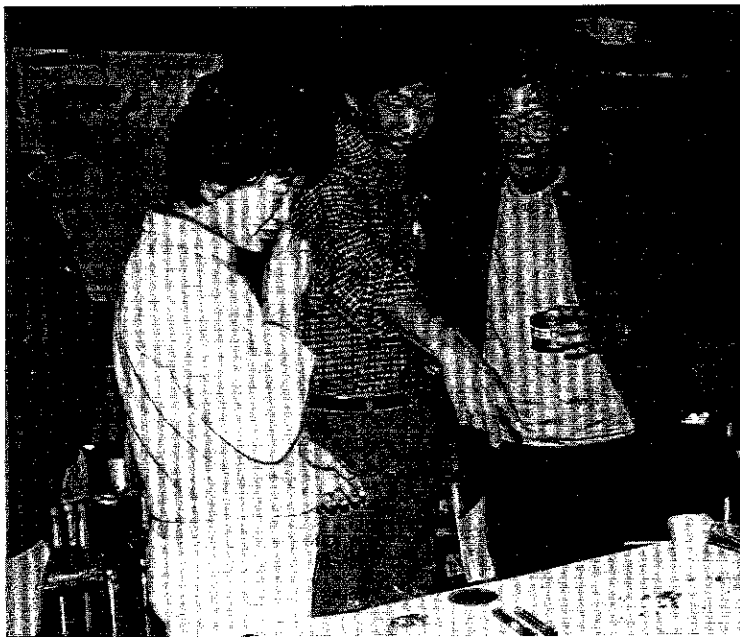
"Considering the dismal cod market, fishermen delivering to Eagle are making increased effort to target flatfish and carefully handle and ice the fish," said AFDF project manager Peter Moore. "They are finding that

flatfish can pay handsomely — in some cases better than codfish."

A TRIO skinning machine now is installed at Eagle Fisheries alongside the Baader skinners. The Baader 175 flatfish filleter also has seen several adjustments in the past few weeks, and is handling the incoming fish much better as most of the species approach the end of spawn season.

For more information about the flatfish production demonstration project, subscribe to AFDF's free newsletter, **Sole Source**. It can be had by sending a post card to AFDF.

FOUNDATION projects



Participants at the Kodiak Waste Utilization Workshop look over some samples of fish feed pellets made by Duncan Law.

Waste Watching: Conference was a primer on turning dross into dollars

Every day, Alaskan fish processors generate 684 metric tons of fish waste (on the average). And every day, on the average, 35,000 people around the world die of starvation. And every day, Alaskan processors, though most are not worried about starvation, are worried about how to raise profit margins, increase productivity, and improve efficiency in their plants.

A waste utilization workshop for fish processors in Kodiak in May gave participants some idea of the issues involved in successful waste processing and aquaculture feed production. The AFDF-sponsored workshop was hosted by Dr. Jong Lee of the Fishery Industrial Technology Center and by Dr. Jerry Babbitt of National Marine Fisheries Service.

First of the three speakers was Dan James, manager of Kodiak Reduction, Inc. (KRI). He explained how he and his crew are upgrading the KRI equipment, most importantly by replacing the direct-flame drier with a steam-jacketed drier. The steam-jacketed drier will produce more consistent product without burning the meal, and thus not adding ash content to the end product. KRI also has acquired other equipment to help increase production capacity from 150 to 200 tons per day. (See related story at right.)

Learning the product

Dr. Ron Hardy of the NMFS Northwest and Alaska Fisheries Center in Seattle said those looking at the 250,000 metric tons of fish waste Alaska produces annually must figure out the best use for the material generated from it. The U.S. consumes 405,900 metric tons of fish meal per year for aquaculture feeds, including catfish, trout and eel, creating a solid market for the 150,000 metric tons of meal that could be recovered in Alaska annually.

He suggested processors begin by taking a strong look at the market.

"The question is, is aquaculture feed the best use for your waste?" Hardy said. "You have to know what goes into the feed, and what the fish farmers' needs are."

The West Coast market for fish feed is about 10,000 metric tons per year, far smaller than Alaska's potential production. "So you would have to keep the Orient in mind for selling your meal feeds," Hardy said.

He also urged processors to consider the economics of meal processing in terms of their own production capacity. "There are only two regions in Alaska where there is sufficient concentration of fish processors to have meal plants: Kodiak and Dutch Harbor," Hardy said. "You have to have year-round fisheries, and you have to keep operating 24 hours a day. What are you going to do with your seasonal fisheries? How will they affect a meal plant's operation?"

Hardy compared fish meal to fish silage and liquefied fish, noting production methods, nutritional and enzymatic differences, and the assets and liabilities each experiences on the market.

Fish silage is ground fish that has been liquefied under acid conditions by endogenous enzymes present in the ground fish tissue. The pH of silage is kept around 4 to inhibit microbial spoilage. Liquefied fish is also liquefied by endogenous enzymes, but the material is heated to accelerate the process, which takes about an hour or less. Pasteurization at this stage reduces microbial load and also inactivates the enzymes.

Both materials have to be acidified to pH 4, and unless formic acid is one of the acidulents, then a mold inhibitor must be added, because mold will grow at pH levels where bacteria won't grow. This is important because mold can produce dangerous toxins even in environments where spoilage is not detected.

Fish meal is the result of rendering fish (i.e., removing the oil) and drying it to less than 10-12% moisture, then grinding it. At 10-12% moisture, bacteria and mold do not grow.

Each material has its advantages and disadvantages for producers. Fish meal is well established, versatile, easily stored and free of pathogens after drying. However, it requires high capital investment and year-round availability of fish, and its nutritional composition is hard to control.

Fish silage is stable, easy to handle and produce to specifications, and can be made with nearly any raw material with low capital investment. However, it enjoys a very limited market, has a high moisture content (and is costly to ship), and both enzymatic activity and pathogen levels are unpredictable during storage.

Liquefied fish provides a protein that is stable for years, and the water fraction will counteract any combustion that otherwise might be created during oxidation of the oil. However, liquefied fish is not a commercial item, is not readily purchased on the market, and is really only advantageous because it requires low capital investment, and therefore doesn't require a year-round source of raw material to be profitable.

"Every ton of farmed fish requires 3/4 ton of fish meal," Hardy said. "This is too significant to ignore for Alaskan processors, as the aquaculture industry in the world expands." By 1990, the world will produce at least 90,000 metric tons of farmed Atlantic salmon per year, and about 21,000 metric tons of Pacific salmon, with increases appearing most rapidly in Japan and Chile, Hardy said.

"The world market for meal is around 3 million metric tons, with Peru and Chile the top two producers, and the U.S. down around seventh," Hardy said. "Right now prices are high, but they won't stay that way because the Japanese won't pay high

prices for much longer. They are already working in Chile to upgrade brown meal so they can get cheaper feeds." Alaskan producers would have to concentrate on producing high quality at low prices, he said.

"Protein for life"

Duncan Law, Professor Emeritus at the Oregon State University Seafoods Lab, said in his presentation that he has come to think of fish by-products as "protein for life."

"The trouble is that the countries that need the protein the most are the ones that have no money to buy it," Law said as he showed slides of malnourished children from several countries. "I would like to see protein technology advance to the point that it can be more evenly distributed to the people who need it."

Before that can happen, protein producers, including fish waste processors, must find ways to make money from their product. And for that, Law had a few suggestions. He discussed the conversion of protein from amino acids in foods to energy in the body. He touched on how the product form (pellets, dough, etc.) can affect the fish farm, positively or adversely. For example, Law said some fish farms use ground sardine mush for feed. Some of the particles of mush float to the bottom and collect while decomposing. "Sometimes farms that do this will experience a big burp of methane coming up off the bottom, and the methane kills their fish," he said.

In the case of moist pellets used in salmon farms, Law said it is important to keep all the pellets uniform in size, because salmon eat and quit eating all together, and those fish who spent the eating time struggling with a large pellet didn't get to eat much.

Law said that it's important for fish processors to learn everything they can about aquaculture feeds even if they are not producing feeds. He said that for a fish processor to think of fish



Randy Mullen (left) and Dan James, both of KRI, inspect fish meal products at the conference.



Dr. Ron Hardy, NMFS, is a specialist in mariculture feeds and productive use of fish processing waste.

waste as waste, or even as by-products is a mistake: that the material should be considered valuable protein.

"Protein is very, very important worldwide, especially high quality protein," he said. "In China, they eat everything — fins, tail, head—there's nothing left for meal. That's good for them, because they are using every bit of available protein. And it's good for you, too," he said to the processors in the audience, "because the protein you are discarding is an extremely valuable resource."

Law showed slides from a recent trips to China during which he visited eel farms, meal plants and even conducted a Caesarean section on a huge sturgeon. "We were demonstrating how you could remove the eggs, sew her back up, and within 20 minutes the sturgeon would be good as new and would produce more eggs in three or four years," Law said. "This is just one more example of the best use of protein—that you don't have to kill the fish just to get the roe."

Law also discussed his involvement with Advanced Hydrolyzing Systems (AHS), a company run by his sons and based on technology Law developed. Hydrolysis is the decomposition of a chemical compound by reaction with

water. AHS developed the technology to produce concentrated fish, a brown, viscous, deboned paste. According to AHS literature, the process of making concentrated fish is less destructive to protein than the fish meal production process. Thus the protein in concentrated fish is less denatured than in meal; protein levels are very high, and ash is low.

"We intend to use this technology to solve the problem of human nutrition," he said. "When that happens, our real concerns about seafood wastes will be settled."

For more information from any of the three speakers, contact AFDF or:
Dan James, Manager, Kodiak Reduction, Inc., Box 355, Kodiak, AK 99615. (907) 486-5984

Dr. Ron W. Hardy, Supervisory Research Chemist, National Marine Fisheries Service/NWAF, 2725 Montlake Blvd. East, Seattle, WA 98112. (206) 442-7626.

Duncan K. Law, Professor Emeritus, Oregon State University Seafoods Laboratory, 250 36th Street, Astoria, OR 97103. (503) 325-4531.

New equipment increases KRI production 30%

A few years ago a group of Taiwanese buyers visiting Kodiak asked to see the meal plant. Their guides parked in front of the building and walked the visitors through the open garage doors. They stepped ten feet inside the door, said "We have seen enough," and walked out.

Dan James would like them to come back.

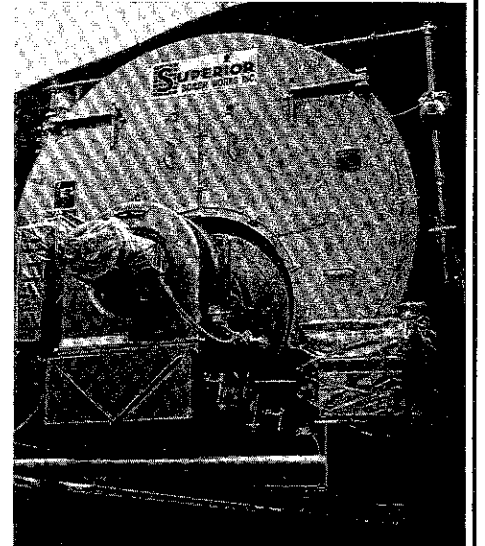
James is manager of Kodiak Reduction, Inc. (KRI), and is seeing the plant through its two-stage equipment upgrade. For several years KRI suffered a bad reputation and a worse production record. Now, thanks to increased commitment by Kodiak fish processors, the sweat of the brow among KRI workers and a little AFDF S-K money, KRI is on its way toward efficient production of high-quality fish meal at a rate of 225 tons per day.

"When I started here in February 1986, we were bringing in \$300 per ton for fish meal. A year from now I hope to be earning \$700 or \$800," James said.

The changes are happening in two stages (See "KRI plans meal upgrade," The Lodestar Winter 1988). The first stage began with moving out old equipment and constructing bases foundations and support systems for the new equipment. But the changes weren't really evident until the first piece of equipment, a 16-ton boiler from Superior Boiler Works arrived on a Sea-Land barge. "It's a beauty," said KRI's Randy Mullen, who was probably not commenting so much on the boiler's robin's egg-blue color (one hesitates to say "sky blue" in Kodiak) as much as the significance the boiler will have in the plant.

The boiler will feed steam to the dryer and to the evaporator, and will cook the meal. In addition, it may help heat the plant and save KRI the cost of the 100 gallons per day of fuel oil the plant now requires.

About a week after the boiler arrived, the new steam-jacketed drier was unloaded from another barge. This drier is the cornerstone of the new KRI upgrade. It has a higher production capacity rating than the direct-flame drier just removed from the plant, and its indirect heat will not burn the product, harm the proteins, or increase unwanted ash content to the meal through burning.



KRI's new boiler awaits installation in Kodiak. At press time nearly all the equipment was installed.

Last year, Kodiak processors generated 102 million pounds of fish waste. KRI processed 69 million lbs., and 33 million lbs. were barged out to sea and dumped. "Between June 88 and May of 1989, we expect to process 90,000 tons into meal, and only barge out 11,000 tons," James said.

KRI sells its product to the Orient for shrimp and eel feeds. However, James said, that market is not as big as was expected, and their increased production will require more marketing work. In April, KRI processed 2,265,700 lbs. of raw waste before shutting down for improvements. The proximate analyses ranged as follows:

Protein: 65.4%-67.9%;
Ash: 18.5%-19.8%;
Fat: 5.0%-5.6%;
Moisture: 7.4%-7.8%.

Recoveries were:

Meal: 10.3%;
Bone: 1.73%.

Oil was not produced because the plant doesn't have the equipment yet.

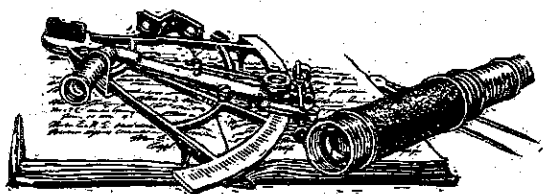
"There are still a few problems with the facility," James said. "It's not an ideal building, and we have to make up for some of its failings. But we are at least improving quality, and the phone is still ringing off the hook, even though we have been shut down for a month for construction."

KRI is scheduled to reopen June 20, and will install the second-phase equipment upgrades in the spring of 1989.

Right: Duncan Law extrudes fish pellets from a hand-held sample kit he brought to the waste utilization conference.

Far right: AFDF's booth at ComFish '88. From left: Mary Gore, ASMI; Barbara Culver, AFDF; Howard Buysman, Alaska Butcher Supply; Loretta Lure, AFDF.





director's log

By Mel Monsen, Jr.
AFDF Executive Director

The Foundation and the surimi industry have cleared another major hurdle with the approval of a label for "Spicy Bites," a surimi/meat blended product. This represents the first time a mixture of fish (the product is 15% surimi) and meat has been approved by USDA.

Even with this achievement behind us, several questions remain ahead. Are surimi producers suddenly going to be flooded with orders from meat processors? Are blended products going to leap from R&D labs right onto retail store shelves? Will food companies now consider the possibility of using surimi as an ingredient in their products?

The questions are legion. They must be asked in view of the Foundation's original objective. Why did AFDF take on a task of this magnitude, to demonstrate that a surimi/meat mixture could be approved by USDA?

The Foundation searched extensively for the area of the food industry that demonstrated the greatest potential opportunities for developing a surimi market outside analogs. All our research pointed toward one market: the processed meat industry. We began to systematically identify, investigate, and contact meat companies that matched our criteria — companies that were interested, equipped, and had the wherewithal to seriously investigate the potential of surimi.

We went along our way trying to excite research and development personnel about the benefits of using surimi as an ingredient in their formulations, but soon we ran into a roadblock. It was evident that practical considerations imposed at least three conditions that needed to be met before large companies could begin extensive experimentation with surimi:

- 1) surimi would have to have demonstrated functional value in their product;
- 2) it had to be economical when compared to existing alternatives; and
- 3) it had to be approvable by the regulatory agencies.

"With the approval of the sketch Spicy Bites label, we have passed through the final roadblock."

We and our members and other S-K researchers around the country were already busy developing information on the functionality and cost benefits of surimi. We began concentrating on obtaining USDA approval for a demonstration product containing both surimi and meat. Now, with the approval of the sketch Spicy Bites label, we have passed through the final roadblock.

This accomplishment will put us back on the trail, extolling the virtues of surimi to a meat industry we hope will embrace it as a desirable protein. And this time, we have answers to many more questions.

If we successfully articulate the benefits of using surimi in processed meat formulations, what will happen? I'm not sure we have the answer to that question, but comments range from, "It's the worst thing that could happen,"

to "It's exactly what we need!"

The surprising negative comment, which was expressed to me rather eloquently, is that surimi might become a low-valued commodity with limited profit potential as it begins to compete with other ingredients in processed meats. This argument has merit when one considers that the only U.S. market right now is in relatively high-margin seafood analogs. But it is also true that many processed meat products provide similar profit possibilities, and surimi, if functional in small amounts in a blended meat product, would retain all of its present value.

Another less alarming opinion is based on the fact that there is currently an oversupply of surimi, and that wholesale pricing for analogs is extremely competitive. There is a very real potential that surimi prices will drop soon. Creating a new demand for surimi in the processed meat world could provide the broad-based demand and market stability that surimi producers envision.

Realistically, the potential for surimi in meat products is just that — a potential. It can lead to many different results, both good and bad. The key for the surimi industry is to *actively* pursue results that will benefit our industry the most.

The editor's turn



Off the Cuff

"Inspiration does not come like a bolt, nor is it kinetic, energetic, striving, but it comes into us slowly and quietly and all the time, though we must regularly and every day give it a little chance to start flowing, prime it with a little solitude and idleness. You should feel, when creating, not like Lord Byron on a mountain top, but like a child stringing beads in kindergarten — happy, absorbed, and quietly putting one bead on after another."

—Brenda Ueland

By Krys Holmes

These are not happy figures: Someone dies of malnutrition every two seconds. It takes about that long read this sentence. As many people starve to death around the world as would be killed if 300 jumbo jets crashed every day, or if the bomb that exploded over Hiroshima were set off somewhere in the world every three and a half days.

Now, there's not much one fisherman or one fish processor can do about these statistics. But Duncan Law, Professor Emeritus at Oregon State University and now research director for Advanced Hydrolyzing Systems in Astoria, Oregon, believes we each have a responsibility to do *something*, particularly those of us who live in the neighborhood of the world's most bountiful fisheries. And in Law's mind, responsibility and opportunity seem to be the same thing.

Law is helping develop a method of producing fish protein concentrate, in dried form, that could be easily adapted into the diets of people who live in third world nations. He's doing this work not because it will make his company rich — though he does see some economic potential down the road — but because he sees it as a completion of the work he has done his whole professional life.

"I've been with the university for 40 years, and for most of that time I've tried to develop new ways to use waste materials from fish," Law said. "Quite a while back, we stumbled on a procedure for utilizing waste to make fish food. That became a major project, and we worked on it for several years. Well, it's just a short jump from developing a protein for animals to adapting it for humans."

Law would like to see more fish plants in Alaska produce by-products from their waste, and he looks forward to the day those plants direct some of their product toward correcting the world's human nutrition imbalance.

"To be perfectly honest," he told me, "producing fish protein from waste is more profitable when you sell it for *feed* than it is when you sell it for *food*. It's not remunerative at all yet to produce fish protein concentrate for humans. But you can at least break even. Consider that one plant alone throws away eighty tons of waste a day, waste that easily could be converted into a protein — some of which could be made into human-grade protein. Even if you broke even on the human-grade protein, you have accomplished more for the world than if you dump it at sea."

The idea of using fish waste to feed hungry people is no revelation. But now, Alaskan processors are developing the capacity to produce what was only talked about before. More plants are working year-round. More of them are handling varied species. As the industry matures, the economics of seafood processing will begin to establish its own balance. And, Law reminds us, that balance must include an equilibrium between profits and principle.

"Too many operators on the West Coast, and in Alaska, are too oriented toward the fast buck," Law said. "Well, I'm too old for that. I guess when you get older you start thinking about things that are more important than money. I'd like to see companies who have some concern for the rest of the world, and who operate at a profit also."

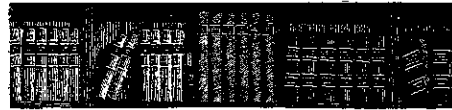
As Alaskan plants plan future expansion into fish waste processing — and there are many signs that it's happening rather rapidly — it would be good to consider the humans, along with the eel fry, whose bellies might benefit from our now-wasted protein.



Flatfish processing line tour

AFDF sponsored a flatfish processing line tour at Eagle Fisheries during ComFish '88; 60 people observed the line in operation. Some of them had a chance to talk serious business with Bob Slade of Baader N. America (at left).

LODESTAR LIBRARY



“The man who does not read good books has no advantage over the man who can’t read them.”

— Mark Twain

What’s in store for small boats in Bristol Bay?

By Loretta Lure

Diversification seems to be the key word for small boat fishermen facing increasing management pressures on their fisheries. What are the alternatives open to Bristol Bay boats under 32 feet?

A workshop held in Dillingham in April entitled “Alternative Small Boat Fisheries” (part of the 1988 Bristol Bay Fisheries Conference) gave about 30 Alaskan fishermen a chance to discuss some of them. The conversation covered black cod, grey cod, halibut, capelin, yellowfin sole, clams, smelt and fresh water white fish. The participants discussed when and where each fishery takes place, what gear is used, current prices and markets, and how local fishermen can get started.

Capelin was abundant in the Togiak area a few years ago but problems with sorting, size, volume and price hindered growth of that fishery. Nevertheless, the capelin market is still open, especially in Japan where its roe is used as a substitute for herring roe or is dried whole and used as a bar snack food. Seine nets should be used for capelin because gillnets are harmful to the roe.

Longlining or pot fishing for black cod are possible alternatives for small

boats because they require conversions that are relatively easy for Bristol Bay gillnetters. There are two different types of longlining gear; the issue of gear conflicts between longlining and pot fishing must be considered when making gear decisions.

It is assumed that yellowfin sole must be a volume fishery to be commercially viable. One method of harvesting yellowfin in volume is pair trawling, where two boats pull one large trawl net. One problem with this method is the difficulty of transferring large hauls of fish from a boat to a floating processor, but many participants agreed that if a way could be found to successfully fish for yellowfin in-shore, and processors were willing to work with smaller deliveries of fish, a Bristol Bay yellowfin sole fishery would have great potential.

There is no quota for fresh water white fish on the Yukon and Kuskokwim Rivers, and this fishery attracted some interest during the discussion. The product can be sold with the proper permits, but the market is dominated by Canadian suppliers, and breaking in might be a problem for small operators.

Surf clams could represent a poten-

tially large harvest. Surf clams live in the tidal mud and are dug rather than fished for. At one time, there was great interest in a surf clam fishery by the Germans and on the East Coast for use in chowder. But concerns over paralytic shellfish poisoning (PSP), combined with high transportation costs, keep demand low for this product.

Halibut was the center of some concern as well. There is currently no legal halibut fishery in Bristol Bay, but it may be possible to obtain a permit for an experimental fishery for local fishermen. Halibut skates and hooks are fairly inexpensive, and a past experiment revealed that the best time to fish for halibut is immediately following the herring season. Halibut bait could be a problem for Bristol Bay fishermen because it must be fresh and because local waters are full of starfish, which thrive on halibut bait.

The fishermen at the conference took great interest in the many alternatives offered. Most of them indicated that, even for small boat fishermen, diversification is one positive way to deal with the consequences of limited entry.

The workshop was moderated by Paula Cullenberg of the Marine Advisory Program in Dillingham.

(Women, too.) Some of the books AFDF offers may be just the advantage you need. To obtain either of them, send a check drawn on a U.S. bank for the amount shown along with your order.

Opening the door to surimi quality

\$10.00

A concise collection of data on many aspects of surimi quality, including shelf life, water-holding capacity, microbiological quality, and development of a Hazard Analysis and Critical Control Point procedure for the surimi process. Most of the research was done through the Fishery Industrial Technology Center (FITC) and by National Marine Fisheries Service, as part of AFDF’s surimi research.

Rendering Profits: The AFDF Fish Oil Seminar Proceedings

\$7.00

These are the proceedings from AFDF’s October 28, 1987 fish oil seminar held in Seattle, and include papers on current fish oil research, fish oil and human health, in plant by-product recovery methods, and cost-effective treatments for finished fish oils. It is an excellent reference for those investigating fish oil in Alaska.

Surimi: It’s American Now

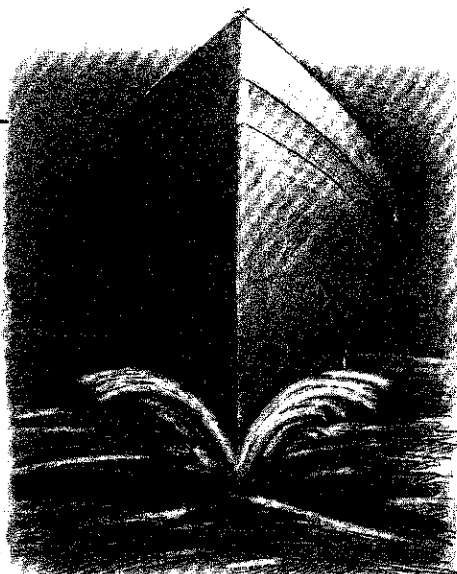
\$50.00

Still a few copies left of AFDF’s comprehensive surimi research book. It includes surimi processing, functionality, applications, markets and other information relevant to anyone participating in or investigating surimi.

For a copy of AFDF’s complete publications list, write to Deborah Bloom, AFDF, 508 West Second Ave., Suite 212, Anchorage, AK 99501.

Alaska Fisheries Development Foundation conducts research and development projects to encourage more efficient use of Alaska’s vast and valuable fisheries resources. Contact our staff any time with your questions and ideas, or to apply for membership.

Deborah Bloom - Secretary
Loretta Lure - Assistant. Project Manager
Peter Moore - Project Manager
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Krys Holmes - Editor

INDUSTRY

News

Groundfish exports break record

U.S. surimi exports increased ten-fold in 1987, says the National Marine Fisheries Service. Exports of other Alaska groundfish products to Japan reached a record high just above 60 million pounds. This figure is up from 28 million pounds exported in 1986.

Alaska exported 50 million pounds of sole, turbot, cod and rockfish that were sold frozen, headed and gutted. The remaining 10.4 million pounds of exports were Alaskan surimi. NMFS says 40.6 million pounds of surimi were produced in Alaska last year, ten times 1986 production levels.

Alaska pollock exported to Europe increased to three million pounds in 1987, up from one million in 1986.

New smoked fish plant

Nenana Native Council was awarded a \$20,000 contract from the state of Alaska to build a licensed fish processing plant that will produce smoked fish, chips and sausage. The products will be marketed retail throughout Alaska.

New handbook helps trawlers cut crab by-catch

The Highliners Assoc. has produced a booklet called "Minimization of King and Tanner Crab By-Catch in Trawl Fisheries Directed at Demersal Groundfish in the Bering Sea." The document is the result of a NOAA grant, and is available from the Highliners Association, 405521st Avenue West, Seattle, WA 98199.

Shocking behavior

Producers of the Giesselbach Electrical Fishing System say their electrical shock method of coaxing flatfish off the bottom and into beam trawls really works. The system uses a pulsating 20 HZ charge to create an electrical field. Thus the net can be towed a half-meter off the bottom resulting in less garbage in the haul, lower fuel consumption, reduced mortality of juvenile fish and a 50% savings in labor required to haul, clear and reset the net. (Source: Alaska Fisherman's Journal)

Fish in schools

The Alaska legislature passed a law establishing a \$100,000 fund for school district grants to promote fisheries education in statewide schools. Under the program, school districts could apply for state grants to sponsor job training and other educational curricula devoted to Alaska's fisheries. Rep. Adelheid Herrmann (D-Naknek) sponsored the bill.

Bacteria inhibitor developed for surimi?

Wesman Foods, Inc. of Beaverton, Oregon is studying the use of its product, Microgard, in surimi. Microgard is a bacteriostatic inhibitor of gram-negative bacteria, yeasts and molds. It is made by culturing grade A skim milk with select strains of dairy products and pasteurizing them. The product is currently used in pasta, salad dressing, cream cheese, salsa and pizza sauce. For more information contact Sarah Zottola, Wesman Foods, Inc., 15420 N.W. Greenbier Parkway, Beaverton, OR 97006; (503) 645-7777.

Bob McVey retires

Bob McVey, regional director of the National Marine Fisheries Service, retired from his NMFS post on May 2. He sat on the North Pacific Fisheries Management Council for 12 years, and has been active in a wide variety of fisheries development and management activities. He and his wife, Betty, will stay in Juneau.



the LODGE STAR

Charting the course of fisheries development today

Alaska Fisheries Development Foundation, Inc.

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"We don't need more facts. We need to know how to make sense of the facts we have."

—Michael Kinsley

US, USSR sign fisheries agreement

The U.S. and the Soviet Union on May 31 signed a new bilateral fisheries policy that acknowledges mutual fisheries interests and lays groundwork for future cooperative fisheries management agreements.

The pact, which was signed at the Moscow summit, included allowing limited access to each other's fishery resources, joint product marketing, cooperative salmon conservation, and recognition of mutual interest in fisheries stocks that range in and outside of each country's 200-mile limit. It also addresses cooperation in exercising rights and duties under international law to coordinate fisheries con-

servation in the Bering Sea — particularly in the Donut Hole.

The agreement is the first in a series of hoped-for agreements between the US and the USSR to study and manage the fisheries resources of the Bering Sea. Critical to that goal will be an international scientific symposium on Bering Sea fisheries, which is scheduled July 19-21 in Sitka. There, fisheries scientists from several nations will present data to help both the US and the USSR set fishery management goals and policies for the Bering Sea in the future.



Alaska Fisheries Development Foundation
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Anchorage, Alaska 99501

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