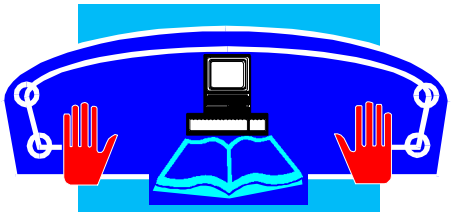

Feasibility Study For A Small Scale Dry Meat Operation At Cambridge Bay Nwt
Date of Report: 1986
Author: Whelan, Jack
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INTRODUCTION

Renewable Resources, Kitikmeot Region, Government of The Northwest Territories, contracted with me to study the feasibility of establishing a commercial dried meat (jerky) enterprise in Cambridge Bay, using indigenous meat animals and fish. The contract also called for recommendations for a plant and equipment, and an operating plan.

I made a trip to Cambridge Bay, Nov. 29 to Dec. 5, 1985, to study as many of the factors involved as possible, then took frozen samples of meat and fish with me to use in product development trials.

This is a report of the progress made toward fulfilling the contract.

The first thing that had to be determined was the feasibility of the idea. If the meat drying is approached *on* the same basis as commercial meat drying (jerky making) the plan would not be feasible. Commercial operators use the rounds and sometimes clods of beef, because these portions make manufacturing possible without labor being prohibitive. Wild animals have poorly developed rounds compared to domestic animals, and if only the rounds were used, the total available tonnage wouldn't be sufficient to support a project. Therefore, a process had to be developed whereby the whole carcass, including even small pieces, could be used to make an attractive, tasty product.

I developed a process and improvised standard equipment to commercially use it on wild meat; the feasibility and probable cost study is based on that process. The report includes details of the process and an operational plan.

Because the Northwest Territories have, at present, no detailed territorial meat regulations, and since slaughter conditions do not permit export from the territory, federal jurisdiction and regulations are not invoked. Therefore, this study also includes guidelines for the conduct of the proposed enterprise. These guidelines are based entirely on the Meat Inspection Regulations as administered by the Department of Agriculture; in other words, they are based on the federal regulations which are equal to or exceed the stipulations of any of the territories or provinces.

Rigid guidelines are necessary where a food enterprise dealing with the public is concerned. An unsanitary enterprise is a potential danger to the general health. The federal regulations are not just an arbitrary exercise of government power, they or something like them are indispensable to our health. They are really quite reasonable; the U.S. regulations are much more specific and rigid than ours. The preamble to the federal Meat Inspection Regulations reads, "The purpose of a meat hygiene program is to provide consumers with sound, safe, non adulterated, properly labeled meat products". The title of the similar act in the United States says it all - it is called "The Wholesome Meat Act".

Therefore, the production of a safe, sound, wholesome product must be one of the important goals to be added to the other goals of: proper use of renewable resources; use of local manpower skills; and founding a profitable local enterprise.

Even though the Meat Inspection Regulations are not enforceable, for production of meat products to be used within the territories, the Food and Drug Regulations of the Health protection Branch, Health and Welfare, Canada, do apply and must be followed. Therefore, the recommendations for product production, included in this report, are in accordance with Food and Drug Regulations.

Recommended specifications for a building or room to house the enterprise, and the necessary plumbing, etc., are included. These too are taken from the Meat Inspection Regulations.

Recommendations are also included for materials and equipment listed as acceptable under the Meat Inspection Act.

FEASIBILITY

Caribou and muskox can both be made into a jerky product that is equal to the beef jerky now on the market. The unique muscular make-up of the muskox increases the boning labor, but not enough to be prohibitive.

Ring seal can be made into a tasty jerky product, and the process that I have developed just about entirely eliminates the "cod-liver oil" flavor that is characteristic of seal. The complex skeleton, the flabby nature of the flesh, and the great amount of fat of the seal make it extremely laborsome to bone and trim out the lean meat necessary for drying. My limited experience with the samples from Cambridge Bay, showed that only 34% of the carcass was lean meat. At this rate, it would dry into a prohibitively expensive product, and should not be considered for a commercial enterprise. Moreover, the highly unsaturated fat of the seal, which runs off at any temperature above freezing, makes such a mess, it would be a distinct liability in a butcher shop.

I had no sample of Beluga for testing, but it is possible that it would be a totally different proposition than the seal. It seems that the larger size of the Beluga might yield large enough Pieces of lean meat so that it would be profitable to dry it commercially.

I tested lake trout, lake whitefish, and arctic char; all three make marketable smoked products. Of the three, lake trout is probably the only one with enough color to be made into a premium smoked product capable of competing with salmon.

All three fish can be made into a jerky-like product like the "Indian Candy" that is sold by the Pacific Coast Trade. All three can also be made into "kippered" products. They would likely be priced according to their appearance (color): (1) Lake trout; (2) Char; (3) Whitefish. The yield of the "jerky" or "candy" product is very low (about 15% of the whole fish) so if the initial cost of the fish was very much, the necessary high retail cost might price it out of the market. The yield of a kippered product is much higher (about 42% of the whole fish) so it might have a better market potential. A cost study can be done on fish product production if one is desirable.

Now we know that it can be done, but will it be profitable? There is no other operation, like the one proposed for Cambridge Bay, to use for experience. Consequently, it's been necessary to

reach the conclusions in this report by extrapolating from commercial jerky making, by using the experience of others in the meat trade, from my experience in fish processing, and from my experiments to develop commercial products from arctic meat and fish samples.

Because it was uncertain how much trial and error would be involved in the product development work, it was necessary to have the frozen sample quarters of meat cut into pieces. That way, a piece, rather than a whole quarter could be thawed for experimenting. Because the times that it took to bone out the pieces had no relationship to boning times for whole quarters, I had to find someone whose experience could be used. I was fortunate to find a journeyman butcher who has years of experience with butchering deer, moose, elk, and caribou. Of course, there is no experience available for muskox except that of the natives, and that is under conditions unappropriated for the proposed operation. The butcher's estimations of labor for boning are for apprentices, so labor should lessen with practice.

Commercial jerky makers use only rounds and clods of beef, these cuts are relatively easy to use in the process. The goal of the proposed operation, however, should be to use as much of the animal carcass as possible for jerky, because jerky can return far more revenue than other uses. Such a goal turned out much harder to reach than anticipated. A whole new process had to be developed so that a product with a marketable appearance could be turned out without excessive labor. We have such a product, and it is better looking than traditional commercial products. The estimate of the manufacturing labor is an extrapolation of my data from making small lots.

COST APPROXIMATION OF MAKING JERKY FROM CARIBOU & MUSKOX

MEAT COST - 65 muskox carcasses @ 250 lbs = 16,250 lbs.#
16,250 lbs. X 65% yield of lean meat = 10,563 lbs.*

65 carribou carcasses @ 100 lbs = 6,500 lbs.#
6,500 lbs. X 68% yield of lean meat = 4,420 lbs.*

* 10,563 + 4,420 = 14,983 lbs. total usable lean meat
14,983 X 40.5 yield of jerky from raw meat = 6068 lbs. jerky

16,250 lbs. + 6,500 lbs. = 22,750 lbs. carcasses
22,750 lbs. @ $1.00 = $22,750 cost of meat
$22,750 / 6068 lbs. jerky = meat cost per lb. jerky $3.75

DRYING POWER - 45 kw @ $.25 = $11.25
$11.25 / 100 lbs jerky per batch = drying cost per lb. .11

HEAT & LIGHT for plant approx. $500.00 mo.
$400 / 2,000 lbs. monthly jerky production = .20

MANAGEMENT, PART TIME - The co-op, for example, uses a figure of 5% of gross sales for management and supervision. Using the Cambridge Bay wholesale value of beef jerky of

$16.34 per lb. X 6068 annual lbs. proposed production =
$99,151 x 5% $4,958 / 6068 lbs. = .82

REPAIR & REPLACE - $1,000.00 annual is probably very high with such limited use - $1,000.00 / 6068 lbs. annually .16

FORMING MATERIALS - sausage casing,& clips .35

PACKAGING - vacuum bags and labels - 11 per lb.
11 @ $.05 = .55

LABOR - 1 proficient jerky maker @ $14.00 per hr.
$14.00 X 8 hrs. = $112.00 per day *
2 helpers and 2 packagers @ $7.00 per hr.
$7.00 X 8 hrs. = $56.00 X 4 = $224.00 *
* $112 + $224 = $336.00 / 100 lbs.= 3.36

EQUIPMENT COST RECOVERY - The daily production was figured using the small smoker as a basis, therefore the total cost of equipment and supplies should not exceed $70,000 at 10 years recovery = $7,000 yearly
$7000 / 6068 lbs jerky = 1.15

Total cost $10.45

Wholesale cost of beef jerky fob Cambridge Bay -$16.34>

Some charge must be made for either building rent or repayment of the capital cost of building.

Also there realistically should be some charge for interest on the money involved.

Of course, recovery of the equipment cost, building rent, and interest would diminish on a per pound basis, with increased use of the facilities.

For the products of a commercial enterprise to succeed in the market, they must be, certainly as good as, but preferably better than the competition. Better because existing products are hard to displace. This becomes, then, one of those chicken or egg propositions: a commercially attractive product cannot be made without certain commercial skills, tools and equipment; but, those necessary items can't be afforded unless sufficient market potential exists.

There is a good market now for imported commercial beef jerky in Cambridge Bay. There is no doubt that jerky from the local animals can replace beef jerky in the local market. But can the local market be expanded enough to get a reasonable payoff of the capital investment? If the market is expanded by reducing the retail price this will drastically effect profits and payoff. The obvious alternative for expansion, then, is outside of Cambridge Bay.

Expansion should take in, not only other N.W.T. communities including the best market - Yellowknife, but ideally, eventually entering the export market. Certainly, those very desirable

export dollars will be attracted to a good product that includes the romance of the Arctic. Because local fish can meet the requirements now, quality smoked fish products have the best immediate potential for entering the export market. They have an excellent profit potential if the necessary skills can be developed, and the right marketing program put together.

OPERATING PLAN

The proposed operating plan as outlined by Renewable Rescurces is as follows:

1. Acquire quality carcasses from individual hunters.

2. Cold store frozen carcasses until needed.

3. Convert carcasses into a finished product.

4. Market finished product through wholesale channels.

These are the things that are necessary to make the plan work:

1. Responsible management and supervision.

2. Hunter education and supervision to ensure quality carcasses.

3. Proper storage facilities and conditions to further ensure quality carcasses.

4. An adequate manufacturing establishment for producing a commercially competitive product.

5. Well trained and motivated workers.

6. A rigorous and well enforced sanitation program.

7. A responsible sales and distribution program without it forget all the rest. "

MANAGEMENT - SUPERVISION - EDUCATION

It is impossible to put too much emphasis on this requirement if the proposed project is to succeed as a commercial venture. And, if the goal of the enterprise is to convert renewable resources and native effort into as great a dollar value as possible, it is necessary to make the project a commercial venture rather than a subsistence project.

In my opinion, the fish packing operation now in Cambridge Bay, "while it is a long step into the business world for the natives, is relatively a simple enterprise compared to the proposed drying operation. Supervision and management for the drying operation must necessarily be much more demanding, because a finished product will be produced, and it must compete with excellent similar finished products already being used by the potential customers.

'I'he point where responsible management and supervision must start is in seeing that nothing but the highest qualit, raw product is accepted for processing.

Extraordinary effort must be made to guard against contamination of the meat. The effort must start with the slaughter of the animals and the original breaking of the carcasses. Care must be taken to protect the meat at all times from contamination from animals (dogs), hunting and transporting equipment, motor fuel, anything that can possibly add a substance, odor or taste that is unnatural to the meat.

As soon as the meat is chilled after slaughter, it must be covered with the bags that are prescribed, and tightly tied to prevent contamination during transportation and storage.

Each portion of each carcass should be tagged for positive identification, and the carcasses should be stored together and processed together. Every effort should be made to maintain this identity all the way through to the packaged finished product. In other words, t-e carcass would be given an identity number when it is weighed in, and this identity number would follow through to the individual packages of finished product. This is a quality control measure.

Primarily, this would put the responsibility on the hunter to see that everything possible was done to deliver a quality carcass to the processing plant. A very careful inspection of the carcass pieces should be made on weighing in, and a minute inspection again made when they are thawed. The inspection after thawing should try to detect the presence of any contaminant such as gasoline, oil, urine, etc. Hunters should be docked for any carcasses that show lack of care and if contamination is detected, the contaminated piece must be condemned. Naturally, if a portion of a carcass is contaminated, the whole carcass, and indeed the whole load must be suspect and held separate from other carcasses.

It is obvious that an informed hunter is an absolute necessity for producing a quality carcass. I can't pretend to know the best way of making the hunters appreciate the requirements that are imposed on the meat producer whenever meat is sold to the public , and why these requirements are necessary. But appreciate they must, so it will take someone who is capable of helping the hunters understand. The best I can offer is my assistance to that person.

COLD STORAGE

It is impossible to know how much storage will be necessary Until more is known about the supply and demand.

The building should have the same ability to be cleaned and drained as the processing plant. In other words, the floor, ceiling, and walls should meet the same specifications.

Walls - Same as floor for plywood substrate.

Coating - Descoglas #DG

Ceiling - Same substrate and coating as walls.

PLUMBING - Floor drains - Must not be less than 10cm inside diameter, and must be deep-seal trapped, and be properly vented to the outside air. The drain line must also be fitted with a backstop valve and should be sloped at least 2 cm per meter.
The drain inlets should be 30X20 cm (12X12 in.) and be covered by a perforated steel plate with holes no smaller than 4 sq. cm (5/3 in.). The total area of the holes must be at least 30% of the total area. The drain must also be fitted with a screw plug to prevent the water in the trap from evaporating when the plant is idle for long periods.
Federal regulations for meat plants call for the floor drain to be separate from toilet and lavatory drains. However, sewage disposal conditions in the arctic, present quite a different set of conditions than elsewhere. Because of the way that sewage must be pumped and transported in the arctic, human error or equipment malfunction can cause a building to be flooded with sewage. Therefore, a separate sewage reservoir, into which no other sewage can get, must be furnished for a meat plant. The meat plant sewage drain line must also be fitted with a backstop valve to prevent back pumping of sewage.

Hand lavatory - The hand washing lavatory in the production area must be supplied with warm water and be either foot or knee operated. It must be also directly drained into the drainage system.

Equipment sink - a 24 X 24 in. stainless steel sink is necessary for equipment washing, and a 24 X 36 in. stainless steel apron or drainboard must be attached to it. The apron and sink will also be used for draining curing meat. The sink must be fitted with its own trapped and vented drain.. Both hot and cold water must be piped to the sink.

Hot water system - The hot water system must be capable of supplying water at a temperature of 82 degrees Celsius (180 F) in sufficient quantity for a complete washup of the plant and equipment.

Washup water outlets - The meat processing area must be fitted with sufficient hose outlets to make washup easy.

Smoke oven drain - The smoke oven must be fitted with a condensation drain (or drains, depending on the model chosen) that is live trapped and vented

LIGHTING - The light must be bright enough for workers - and inspectors - to carry out their work efficiently and comfortably. This means a light intensity of 800

1 ux, measured one meter from the floor. The light should have a natural color so as not to distort the color of the meat.

The lighting fixtures must be of such a nature that they can be easily cleanedof dust, and they must be placed where anything falling off them cannot contaminate the meat being processed.

SPICE STORAGE - A separate storage (in a small plant, a closet or cupboard) must be available for meat additives ,and the necessary equipment for measuring and mixing them. In the small plant, this storage should be handy to the work area in the meat processing room.

CLEAN ING SUPPLY STORAGE - There must be a storage in the processing area for the necessarv supplies to clean and disinfect the areas an d equipment . But, it muse be separate and removed from the 'spice storage. Only cleaning or disinfecting materials, and lubricants, used in the meat production area, may be stored in this storage.

WORK CLOTHING AND SUPPLY STORAGE - Some storage is necessary, in the work area, for spare clothing, towels, knives, etc.

EQUIPMENT

1. Smokehouse - after looking at a number of ovens, both domestic and imported, I recommend the Enviro Pak on the basis of ability to process all kinds of meat and fish products. Its features and construction coupled with its price make it the best for the proposed project. The oven comes factory tested and is delivered ready to run with the exception of having utilities, drain, and smokestack connected . It is available in a full and a half size; the full size has twice the capacity of the half, but its price is only a third more. The larger model could - be considered if there is any thought of sizeable expansion.

Enviro pak model CHU-1000E	$35,730. co
No.2 dry bulb - wet bulb indicating Temp. control# system	4,045.00
2 speed motor	2,415.00
EG-VHD-2 Smoke generator	6,345.00
21 38x42 in. stainless steel smoking trays	5,460.00
Total	$53,995.00

OR

Enviro Pak model CHU-500E	27,413.00

No.2 dry bulb - wet bulb temperature control system	4,045.00
2 speed motor	2,415.00
EG-VHD smoke generator	4,370.00
14 Stainless steel smoker trays	2,170.00
Total	$40,413.20

These prices are FOB Portland,OR.

1 2hp. air compressor (for either smokehouse)	1,250.00
1 Jenny pressure washer (smoker & general cleaning)	1,195.00

SUPPLIER - Pacific Butcher Supply
2619 Clarke St., Port Moody, B.C. V3H 1Z4.
Phone (604) 936 0451 or 520 3811
Contact - Rick Valenti, President

**I Model B16C Butcher Boy meat saw 220/1/60	$4,375.00
**1 Model TCA-32 Butcher Boy grinder	2,595.00

**The newjerky process uses all of the carcass, so these two items are not necessary. What little sawing might be necessary can easily be done with the electric splitting saw.

1 Model SSBT-7230 McClintock boning table	657.00
1 Model SSBT-9630 McClintock boning table	968.00
1 Model 404 Jarvis splitting saw	440.00
1 Model GM2002 Bizerba (Elpack) Vacuum Pak machine	4,285.00
1 Model JK801 digital scale 30lb.	995.00
1 Digital printer	1,275.00
1 PVS single compartment ss sink 24X24X14in. deep c/w 24X36 in drainboard	868.00
1 18ft. painted and drilled meat rail	60.00
24 3/8X8in. "S" hooks @ $2.85	68.40
12 Beef rollers, single hook @ $17.25	207.00

* 1 3X5 ft. anti fatigue mat	60.00
* 1 3X8 ft. " "	80.00
* These may not be necessary on wood floors	
3 4in. boning hooks @ $13.50	40.50
2 1711 12in. boning room steels @ $26.00	52.00
3 Hand Guard SS mesh gloves @ $45.00	135.00
2 Ram tool holders @$39.75	79.50
Norton oil stone sharpener	226.00
2 Model BCA 1812A Brute mobile angle racks @ $385.00	770.00
1 All purpose bin truck 22 1/2 X 32 X 25 in. deep for brine	159.95
1 Foster cooler 36 3/8 X 35 1/4 X 89 in. high	2965.00
i Foster freezer 36 3/8 X 3S 1/4 X 89 in. high	4295.00

SUPPLIER Edmonton Butchers & Packers Supplies Group
11434 - 120th St., Edmonton T5G 2Y2
Phone 455 4128 Contact - Bernie O'Conner, Manager

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1 Hand lavatory, wall mounted, knee operated	$561.00
1 Roast tier model CHM	121.50
1 Box of 6 - 6in. Swibo boning knives @ $7.52	45.12
1 BOX of 6 - 10in. Swibo steaking knives @ $14.27	85.62
2 dozen semi mesh caps	12 .00
6 pairs steel toe butchers rubber boots @ $22.50	135.50
8 Wrap-around butchers coats @ $22.00	176.00
6 Neoprene butchers aprons (45in.) @ $14.90	89.40
2 48 in. meat trees @ $70.00	140.00
24 Aluminum meat pans 12 1/2 X 30 X 3/4 in. @ $18.80	451.20
6 Ventilated plastic tote boxes w/lids 22 3/16 X 18 3/4 X 3/4 in deep @ $19.60	117.60

SUPPLIER - Kelley-Roberts
3521 Jacombs Rd.
Richmond, B.C. V6V 1Z8
Phone (604) 273 4135
Contact - Jim Stubbs, Sales Manager

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1 Berkel automatic slicer 3500.00

SUPPLIER - Coast Island Agencies
Dept. 66, Box 4276 Station A
Victoria, B.C. V8X 3X4
Phone (604) 382 1112
Contact - Brad Reynolds

SUPPLIES

In order to meet the goal of producing wholesome meat products, only equipment and supplies, listed in the Reference Listing of Materials and Equipment as acceptable under the Meat Inspection Act, can be used. It is impractical for the management of a small enterprise to maintain a copy of the Meat Hygiene Manual and know its voluminous contents, therefore, it is suggested that reputable suppliers of meat equipment and supplies be relied on for advice.

KRAFT CARCASS BAGS

Prices are for 2500 bags order, add $87/m bags for less than 2500
* Chuck - 30X30 in. $323/M
Loin - 30X33 " $360/M all are side or end open 50 lb. kraft
Hind - 30X59 " $433/M fob Richmond
Front - 42X52 " $539/M
* Probable size needed

SUPPLIER Bulldog Bag 2651 No.5 Rd. Richmond, B.C. V6V 1Z8
(604) 273 8021

Often the above beef shipping bags are further protected against damage by covering them with a stretch stockinette material. This further Protection may not be necessary for the proposed operation.

STOCKINETTE TO COVER BAGS - Roll 12.5 kilo @ $9.65/kilo

75 mm FIBROUS CASING for forming shapes for slicing - $215/ 1000 ft.
CLIPPER for tying off sausages - $16.95
CLIPS - $15/ 1000

JERKY SEASONING Uniwest - 25 kg - $60.00

RE TO ADD TO SEASONING #2080 - 2.5 kg - $5.00

RKY PC UCHES 5 1/2 X 8 in. - $47.59 / 1000

PPLIER- Uniwest Packaging Products, 6718 - 78th ave.
monton, Ala. T6B 2J5 Telephone 466 3121

EANING & SANITIZING SUPPLIES
PPLIER - Norclean
Box 850 Old 'Airport Rd.
Yellowknife, N.W.T. X1A 2N6
-Phone 873 3559
Contact - Paul" Sastner

WORKERS

Any butcher training shouldwaituntilthereare facilities ere on the job training can be done. The butchering for a dried at project will be specialized, so a lot of general butcher aining would not only be wasted, but would also dilute the aining, to the detriment of the specialty.

The journeyman butcher, with extensive experience in big me butchering, who has been associated with me in this study, s recently sold his business. He is semi-retired, is helping t in other shops, and would be available for a short training urse if his assistance is desired.

I will be available for a short period to train workers in erating the plant and the whole processing program. It is ggested, however, that the training be in two stages, parating the meat from the fish processing, in order to avoid nfusing the workers. The two technologies are quite different om each other.

MEAT PLANT HYGIENE

31 PERATURE - The meat processing area must be maintained at a mperature of 10 degrees Celsius (50 F) to control the growth of at spoilage organisms.

ND WASHING - A foot or knee operated hand lavatory must be in e production area. It must be capable of supplying warm water, d be directly drained. The lavatory should be near the entrance the processing room so that personnel can immediately wash eir hands on entering the room. Dispensed soap, and disposable per towels must be available at all times. Cloth roller towels e not recommended. An easily maintained receptacle must be ovided for used towels.

A hand sanitizer bath should be provided as a follow-up for nd washing, and the sanitizing fluid should be fresh daily.

TER - All water used in the meat plant, for any purpose, must certified potable water.

SHUP WATER - Water, at a temperature of 82 degrees Celsius, st be available at sufficient hose outlets in the processing ea to facilitate cleanup. The washup hose, or hoses, must be ot on a rack off the floor when not in use.

hand 1 ers, and then only as prescribed on the label. Meat handlers should not be permitted to use nail polish; it can flake off and contaminate meat products.

No person can be allowed to handle meat with improperly bandaged. cuts or sores. Meat handlers with cuts or sores should have *them* treated and bandaged by either a trained first aid person or nurse.

The nursing station should be alerted by management to report any conditions of any nature, affecting the health of meat handlers, that would be a possible threat to public health. But it is the responsibility of management to be aware of the health of meat handlers, and not permit any sneezing, coughing, or spitting, any action that can possibly threaten the public health in meat process in q rooms. No person, suspected Of having a communicable disease can be allowed in meat processing rooms. Meat handlers must be trained nct to touch their hair, mouth, nose, eyes, ears, while handling meat.

WORKING APPAREL - To prevent contamination, washed and clean clothing must worn over or substituted for any other clothes that can come "in contact with meat. White smocks and aprons are recommended because it is evident whether they are clean or whether they need changing. Clothes worn in handling meat must not be worn outside the meat handling rooms. They must remain in the work area sc that they cannot be contaminated by outside sources.

Anyone working or entering an area where food products are open and exposed must wear an appropriate head covering. This is to prevent hair from falling on and contaminating the food. The head covering must be clean and in good repair.

Any protective devices such as: helmets, wrist guards, aprons, steel-meshed gloves,etc., must be made of materials capable of being cleaned and kept clean. If cotton gloves are worn, they must be changed for clean ones at frequent intervals to keep them from becoming overly. contaminated.

Work clothing, knives, meat hooks, steels, gloves,etc., should be stored in a central location near the work stations, in the meat processing room. All these items must be cleaned at the end of each work session, and be ready for the regular pre-operational inspection by management.

VERMIN CONTROL - Vermin are often disease carriers and because of this, must be controlled. If rodents or insects become a problem in a meat processing establishment, any and all means of physical or biological control should be exhausted before resorting to rodenticides or insecticides. Physical deterrents, such as screens, traps, electrical and sound barriers, and air curtains are effective. Biological controls can be used on the recommendation of health officers, or a registered pest control operator.

Obviously, rodenticides and insecticides are potentially dangerous food contaminants, and their use in food plants is a serious matter. Only materials that are approved for use in food premises may be used. The use of these chemical controls - often poisons - demand the utmost care; it is vital that management and

anyone who uses them thoroughly understand the hazard, and how t. avoid them through very careful use. It is imperative that management take full responsibility for the use of chemical controls. When it is necessary to appoint an employee for pest control, management must make certain of that person's ability to read, comprehend, and follow the instructions to the letter. Insecticides and rodenticides must not be stored in food processing rooms. It is desirable that they be stored as far away from food processing areas as possible, and always under lock.

MEAT ADDITIVES OR ITEMS FOR MEAT' TREATMENT - Salt, spices, etc. , must be inspected by management on receipt to insure that it is the commodity specified for its intended use. Suppliers can and do make errors in filling orders. On receipt, the supplies must be inspected to be surethey are not. affected by moisture, insect invasion, or contamination. Any package, of an ingredient to be added to food , that is broken on receipt should not be used; the contents may be contaminated.

Anything that is to be added to or used for treating meat (salt, spices, etc.) must be stored in a separate storage where it can be kept from excessive moisture, and free from dust or other contamination. In a small plant, where a separate spice room is not warranted, the storage will be handiest in the meat production room. Meat additives must be kept in closed, tightly lidded containers that are plainly marked for identity. To avoid the possibility of contaminating meat, no cleaners, detergents, or anything that is not a meat additive or is used in measuring or mixing meat additives may be kept in the spice storage.

Only cleaning or disinfecting materials . and lubricants, used in the meat product-ion area may be stored in the area. Again, to avoid meat contamination, the storage for these materials must be separate and remote from the spice storage.

PROCESSES

"Is it safe?" That is the "first consideration when preparing food for the public. The food must be free from any organisms or agents that could harm the public health.

In the section under "Hygiene" there were a number of safeguards to prevent pollutants from being introduced to meat or fish, and to keep disease or spoilage organisms from getting on them. If the food is sold fresh, that's all that can be done. If the animals were diseased, or if unwanted organisms were inadvertently added in the slaughter or subsequent handling, we are at their mercy. To be safe, the food must be well cooked before eating. Eating raw or undercooked meat and fish has contributed heavily to sickness and death, in aboriginal peoples, according to the health literature. But, the product that the proposed enterprise will make would normally be eaten without cooking or any other preparation - what would be done to make it safe?

A number of precautions would be taken to insure safety:

1.The product will be dried - microorganisms require water to

grow. Most disease organisms require a water activity cf .86 or higher; the water activity of both meat and fish products will be reduced to between .30 arid .50. Even yeasts and molds require double this amount of water to grow.

2. Federal Food and Drug regulations require that fish, that is sealed from the air, be protected against botulism by having a water phase salt content of not less than 9%. By drying fish (and meat) it is possible to achieve a water phase salt content of 9% without the product being too salty.

3. Commercial dried meat makers include the legal level of nitrates or nitrites in their product. This not only improves the appearance (color) of the meat, but it also, and this is extremely important, prevents botulinum spores from producing toxin. Nitrate compounds have received some baa publicity recently. The real concern ever these compounds, however, is in bacon; people cook bacon at high temperature and this causes the nitrates to form unwanted nitrosamines.

4. Homemade jerky is traditionally made by air drying. Some commercial jerky is also made this way, by drying at cool temperature, but most of the commercial jerky is now quickly made with heat. The proposed enterprise would use the hot method. It not only destroys unwanted organisms and possible toxins (final 82 degrees C), it also gives a far faster turnaround in manufacturing time.

MAKING JERKY FROM MUSK(2X, CARIBOU, SEAL, AND BELUGA

A. Remove meat from cold storage, remove wrapping, and hang to thaw.

B. As soon as thawed, wash pieces down while scrubbing with a clean cloth to remove hair, etc.

C. Trim any soiled "silverside" (underskin covering carcass) and damaged portions.

D. Bone out pieces and remove all skin, fat, and as much connective tissue as -possible. - To make good jerky, it is necessary to remove all possible fat, even if it means separating the muscles. If the muscle has a heavy connective tissue layer on it, skin it off; premium jerky is all edible meat. There will be scme small pieces as a result of getting rid of unwanted fat, etc.; they tOO will be used in the process.

E. Cut large muscles lengthwise, into pieces about 3 in. in diameter.

F. Segregate the pieces according to these categories:

(1) Less than 3/4 in. thick
(2) 3/4 to 1 1/2 in. thick
(3) 1 1/2 to 3 in. thick

G. To enable the curing brine to penetrate pieces at the same rate, slit the 3/4 to 1 1/2 in. pieces open lengthwise, but don't cut completely through; leave about a 3/4 in. connecting hinge. slit the 1 1/2 to 3 in. pieces twice, in the same way as the above pieces. Make the slits so that the piece is evenly divided into "flaps" this way the brine will penetrate the "flaps" of meat at the same rate.

H. Place all but the smaller than 3/4 in. pieces in as many of the plastic baskets as necessary, and all the rest, except the

very thin or very small, pieces in another basket.

I.Place all but the smaller than 3/4 in. pieces in brine and set timer for 25 minutes. At 25 minutes, place all but the very thin or very small pieces in the brine, and reset the timer for 20 minutes. The thin pieces pieces will pick up brine by being mingled with the larger pieces later.

J.Remove all the baskets from the brine at the end of 20 minutes; the thick pieces will then have had a 45 minute immersion.

K.Set the baskets to drain, shaking to remove as much brine as possible.

L.In order to get uniform pieces of jerky, stuff the various sized pieces of meat into 3 in.sausage casings using a roast tier as a stuffing horn. The 3in. pieces can be used alone, and t-e smaller pieces combined to fill the casing.

M.Tie off the stuffed casings into 12 in. sausages, and place them on aluminum trays.

N.Load the trays on to cooler cart, and place in the cooler to cure for 24 hours.

O.Remove cart from the cooler, and place it in the freezer until sausages are firm enough for slicing.

P.Remove one tray at a time and slice sausages into *uniform slices. *Local option - what does the consumer want - thinner pieces reduce capacity of smoker.

Q.Place slices on smoking trays, and load trays on smoker truck.

R.Place loaded smoker truck into oven that has been preheated to 60 degrees C (140 F).

S.At the end of one hour start smoke generator, and raise temperature to 71 degrees C (160 F).

T.At the end of 1 1/2 hours turn off smoke generator, and raise temperature to 82 degrees C (180 F).

U.At the end of 1/2 hour turn off oven and remove smoker truck to cool.

V.When jerky has thoroughly cooled, it may be packaged. It should be packaged as soon as possible after being finished, so that it will not lose further moisture. If it is necessary to hold jerky for any length of time (overnight perhaps) it should be removed from the even early enough to compensate. This will be determined by test under actual operating conditions.

In practice this time table will not be completely reliable because of varying conditions in meat animals and climate. Each batch will have marked test pieces that will actually be weighed, at the beginning and toward the end of the drying cycle, to test for degree of drying. This small extra effort is necessary to assure both quality and profits.

MAKING CHAR - TROUT - AND WHITEFISH “CANDY”

1.Thaw, scale,gut, and head fish, taking the lug bone and pelvic fins off with the head.

2.Fillet the fish and remove the rib bones, and fins. For a better product, the small lateral bones should be removed by cutting on each side of the row of bones, down to the skin, then discarding the narrow strip together with the bones.

3.Cut the fillet into strips running from head to tail, by just cutting through the flesh down to the skin, but not through it.

The thin parts of the fish should be cut into wide strips, and the thicker parts into narrow strips, so that they will brine and dry mere evenly.
4.Brine fillets 7 to 10 minutes, according to thickness, in the following brine: 2 1/2 lbs. salt to 1 1/4 lbs brown sugar dissolved in 160 ozs. water.
5.Remove fillets from brine and place on inclined smoker trays to drain.
6.Load trays on smoker truck, and place in smoker at 30 degrees Celsuis (85 F') for 4 hours. The smoke generator may be started at the end of 2 hours and run for 2 hours. At the end of 4 hours, remove the truck from the smoker.
7.Remove the fillets for reworking. Cut the fillets, across, into two pieces, then skin each piece removing and separating the partially dried strips. Discard the skin.
8.2 lace the strips orfish back on the smoker trays and real ace in the smoker at 30 degrees Celsius (85 F) for another 20 hours. The smoke generator may be run for several more 2 hour intervals according to the taste of consumers.
9.At the end of th e further 20 hours drying, turn the heat in the smoker up to 70 degrees Celsius (160 F) for one hour.
10.Remove the strips from the smoker and coolquickly.
11.Vacuum pack as soon as cool.

As in the case of the jerky, this timetable may not prove to be accurate for all conditions or smokers, so actual drying should be monitored by weighing test strips placed on foil pans.

PACKACING - The most popular commercial jerky is the vacuum packed variety. Vacuum packing allows the product to be sealed from the air, thus from further drying. This type of jerky is dried to between 30 and 35 % moisture, quickly cooled, then sealed from the air. Consumers find this type of higher moisture product tastier and easier to eat; it is also more profitable to produce - by stopping moisture loss, product loss is also stopped. Under the arctic atmosphere, a product would quickly dry from 30% to about 6% if it were not protected. This amounts to a loss of about $3.60 from the wholesale value of each pound of product - a potential loss of at least $20,000 annually.

LABELING - The beef jerky now being sold in Cambridge Bay is labeled with a specific net weight. This is economically disastrous for several reasons. First of all it requires individual attention to each package to try to get the advertised content weight. But, more importantly, it is virtually impossible to meet the weight exactly because pieces are all sizes and weights. The sad fact is that weights must be exceeded to meet advertised values - the packages from Cambridge Bay averaged a 10% overweight. This would mean a minimum loss Of $8,500to the potential enterprise. A computing scale, that weighs a package and quickly prints a label giving weight and price, pays for itself before very long.

Fo ll owing:

1. Desco Recommendations for meat plan t
2. Floor plan and layout of meat plant

6 copies

DESCO COATINGS
OF ALBERTA LTD.
8017 CORONET ROAD
EDMONTON, ALBERTA
(403) 466-3101

January 7. 1986

Jack Whelan
c/o C & P Secretarial Services
Qual i cum Bay
V a n co u ver, B.C.

Dear Jack:

RE: CAMBRIDGE BAY MEAT PLANT PROPOSAL
CAMBRIDGE BAY. N.W. T.

Further to our conversation today, we enclose. samples and brochures as requested. For floors and integral base we recommend Neo-V Barrier and Morritex H.D. The Neo-V Barrier would be installed under the Morritex H.D. to help prevent minor structural cracks from transmitting throught the rigidMorritex H.D. The texture of this floor can be varied, remembering that as texture increases, slip-resistance increases and maintenance tim increases. This system has been utilized in many processing plants and commercial kitchens throughout Alberta. We would recommend the use of two layers of Plywood (1st sheet minimum 5/8" thick, top layer minimum 3/8" thick) and stagger the joints.

For the Wall Coatings, we have the same recommendation for substrate as the floors. Use screws (not nails) to secure-the plywood. We recommend Descoglas #RM because of its easy maintenance, stain resistance and physical toughness.

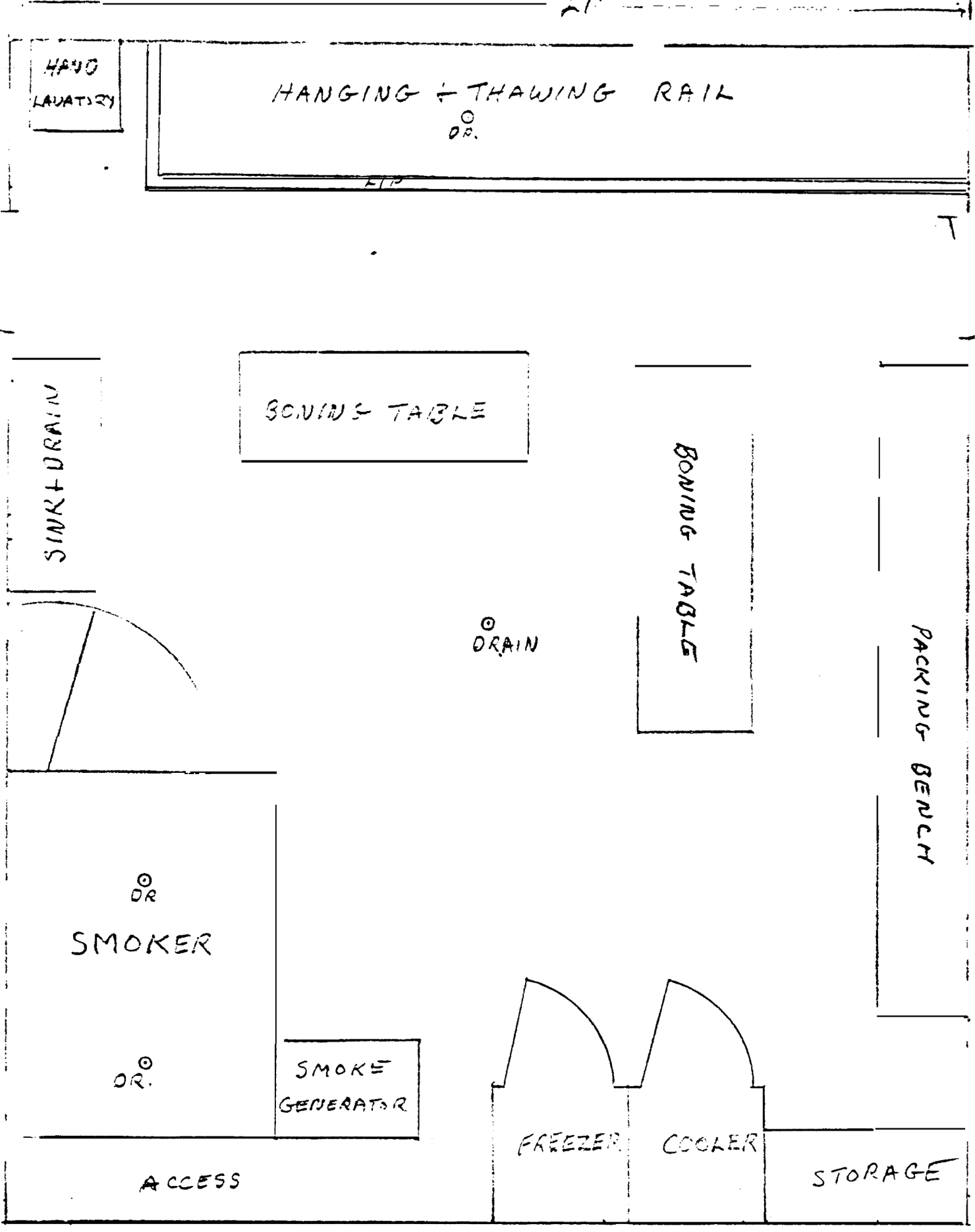
Depending on area's involved, a budget unit cost for Neo-V Barrier and Morritex H.D.wouldbeapproximately $6.00/sq. ft. installed in Edmonton. The Descoglas #RM would go for about $4.5[illegible]/sq. ft. installed in Edmonton. Extra costs would be for freight, transportation and room and board, A mere accurate budget couldbe given once areas are confirmed. Descoglas #DG would be $2.00/sq.ft.

We have been doing projects in N.W.T. for over 25 years. In Cambridge Bay, we have installed Quartzite Epoxy Flooring and various Wall Coatings at the Cambridge Bay School in 1972/73. Trusting this proposal touches on the aspects you were looking for.

Yours Truly,
DESCO COATINGS OF ALBERTA LTD.

Daryl Samycia
Projects Manager

/ts


HAND LAVATORY
HANGING + THAWING RAIL
DR.
SINK + DRAIN
BONING TABLE
BONING TABLE
DRAIN
PACKING BENCH
DR
SMOKER
DR.
SMOKE GENERATOR
FREEZER
COOLER
STORAGE
ACCESS