A PILOT PROJECT FOR THE MONITORING AND ANALYSIS OF THE PARASITE *TRICHINELLA SPIRALIS* IN WALRUS MEAT HARVESTED BY SALLUMIUT: A LOCAL INITIATIVE TO PROTECT THE COMMUNITY AGAINST TRICHINOSIS.

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ABSTRACT

Repeated outbreaks of trichinosis acquired through the consumption of parasited walrus have occurred in Nunavik in the 1980's. Two communities, Ivujivik and mostly Salluit, have been affected. As a result Sallumiut had largely reduced their annual walrus harvest. Preoccupied by the socioeconomic impacts of this walrus hunt's quasi abandon, hunters and Municipal Authorities looked for solutions.

With the support of the Makivik Corporation's Renewable Resource Development Department, the Innulitsivik Health Center and the Community Health Department of Laval University Hospital Center, the Municipal Corporation of Salluit submitted a research project aimed at experiencing in the 1992 fall hunt a local walrus meat analysis procedure that would ensure a safe consumption of walrus and thus contribute to the revival of the hunt.

The intervention, that comprised the analysis of meat samples with a digestive method, was locally planned, realized and evaluated by its participants. Logistic and coordination pitfalls compromised the full attainment of the expected benefits. However, a new interest for the walrus hunt, the development of local expertise and responsibility in the management and operation of the protection program, as well as a clear community intention to pursue and locally control the intervention on an annual basis, all represents positive results. Further local and regional efforts will be required in order to ensure better adaptation and eventual regional extension of the program.

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LIST OF ABBREVIATIONS

cc	Cubic Centimeter
CLSC	Local Community Services Center (formerly Nursing Station)
DFO	Department of Fisheries and Oceans
DSC-CHUL	Community Health Department of Laval University Hospital Center
ELISA	Enzyme Linked Immunosorbent Assay
Epid.	Epidemiological
FRCP(C)	Federation of the Royal College Physicians (Canada)
Hosp.	Hospitalization
HSP	Hunter Support Program
KRCHSS	Kativik Regional Council of Health & Social Services
LPG	Larvae per Gram
MAPAQ	Québec Ministry of Agriculture, Fisheries and Alimentation
MD	Medical Doctor
MDV	Veterinary Medicine Doctor
mm	Millimeter
MSSS	Québec Ministry of Health and Social Services
Ph. D.	Doctor in Philosophy
RN	Registered Nurse
TNI	Taqramiut Nipingat Inc.

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They all deserve to be thanked.

INTRODUCTION

The parasite induced disease trichinosis has been recognized for many years as a potentially serious community health problem in the Arctic [1, 2]. It was however first diagnosed in Nunavik only ten years ago [3], and since then, proposed public health measures have proven insufficient to prevent further outbreaks [4]. To date there have been five documented outbreaks of trichinosis, attributed to the consumption of infected walrus meat, affecting close to one hundred people in Nunavik a number of which required hospitalization.

In the fall of 1990 a group of consultants met in Povungnituk at the invitation of the Kativik Regional Council of Health and Social Services. They discussed the issue of trichinosis in Nunavik and established the basis on which to develop a protection program. The consensus attained [Appendix 1] was to center the intervention on setting up "... a monitoring program to test the meat for safety before it is consumed." This testing procedure should be carried on "...in the North as close as possible to the landing site." It was stressed that such a program should start on a small scale, count on the participation of regional and local partners and rely on the coordination of the local efforts by the Municipal Authorities.

Simultaneously, one community of Hudson Strait, Salluit, was becoming increasingly concerned by the impacts of trichinosis on individual health. Furthermore, the repeated local outbreaks had caused a decline in popularity for potentially infected meat resulting in breakdown of family and community tradition related to harvesting of walrus. As a consequence Salluit initiated communications with various government and non-government agencies with the view of persuading "responsible" public authorities to act [5].

In the fall of 1991, the idea emerged among interested partners (Salluit Municipal Corporation, Makivik Renewable Resource Development Department, Innulitsivik Health Center and DSC-CHUL) to develop a one year (1992) local trichinosis protection program. A research protocol was developed and funds were requested.

This report presents the intervention as planned, realized and evaluated by its participants. It describes the chronological development of the pilot project in order to facilitate its understanding with the view of eventual application to other interested Nunavik communities. The evaluation highlights weaknesses in the project and recommends improvements in order for the community to fully attain its objective of efficient protection from further trichinosis outbreaks. To that effect a plan is proposed for the development of a regional protection program and is addressed to some of the pertinent partners.

PART ONE

THE FRAME OF INTERVENTION

1.1 Trichinosis

Trichinosis is caused by the nematode *Trichinella spiralis*. This microscopic parasite has the particularity of being able to maintain its infectious potential for a new host even after being encysted for years in the flesh of a previously infected animal [6]. Unfortunately, due to its small size, infected meat cannot be identified by unaided visual inspection. Once meat infected by *T. spiralis* is eaten, the parasite enters a digestive phase in the intestine of its new host. The microscopic cysts containing the parasites are digested and the liberated larvae are allowed to spread in the digestive tract of the new host. There, within two days of ingestion, male and female larvae reach adulthood (1.5 to 3.0 mm long) and begin mating. In the following days each female produces approximately 1,500 larvae. This forms the beginning of the migratory phase during which new born larvae enter the general blood circulation through the lymph system and ultimately migrate to the muscular system where they become progressively encysted. Once encysted they are ready for the start of a new reproductive cycle if this flesh is ingested by another predator.

In human the average incubation period lasts 11-13 days. Two distinct clinical syndromes have been documented in Arctic trichinosis. The first one presents itself with the dominant muscular symptoms of pain and weakness. This form can be seriously debilitating and occasionally lead to death as a result of meningoencephalitis (infection of the brain and surrounding envelopes and fluids) or myocarditis (infection of the muscular fibers of the heart). Epidemiological and clinical data collected from recent Nunavik outbreaks [7] strongly support the hypothesis that this muscular presentation follows a first time exposure to the parasite. The other mode of presentation shows the dominant digestive symptoms of abdominal pain, vomiting, diarrhea and loss of weight, all of variable intensity and duration. This syndrome would result from a second (or more) exposure. Both forms may also include associated clinical manifestations such as fever, skin rash, fatigue and periorbital edema [4]. Although severe and prolonged episodes of either muscular or digestive syndromes are frequent, in most cases recovery is usually complete, occurring slowly after an acute phase of about two weeks.

1.2 Trichinosis in Nunavik

While progressive control of the disease was achieved in the South as a result of improved feeding and inspection of swine, Arctic communities continue to face this potentially serious, albeit preventable community health problem.

Two hundred and forty-six (246) cases were recorded in Canada from 1973 to 1982. This represents a rate of 0.06 cases/100,000 per year. Seventy-one (71) of those 246 Canadian cases occurred in the Yukon and North West Territories for a rate of 11.0 cases/100,000 per year [8, 9]. In Nunavik 78 cases over a six year period (1982-1987) have been documented of which 16 (20%) required hospitalization in the South [4, 7]. These 78 cases would represent for that period of time an incidence of 200 cases/100,000 per year for the region.

The parasite has been identified amongst a total of 104 different mammal species worldwide [10]. In Nunavik, a study conducted from 1983 to 1987 on species hunted by Kuujjuammiut and Sallumiut revealed that 6 % of white (Arctic) foxes, 15.7% of red foxes, 13.2 % of wolves, 60% of polar bear and 2 % of walrus were harboring the encysted parasite [11]. Unfortunately, a complicating factor involving the arctic strain of *T. spiralis* is its adaptation to rigorous northern conditions. Of particular importance are its ability, once encysted, to withstand extended periods of freezing [12] and its viability after fermentation involved in the traditional preparation of "Igunak" (aged meat). These characteristics render inspection or prolonged cooking, where even the center part of the meat has changed color from pink to gray (temperature higher than 65.6°C) the only prophylactic measures assuring a satisfactory level of safety in consumption.

In a 1983-84 study [13], serologic tests were done to document the presence of antibody against different parasite among Nunavimmiut. They indicated an increasing gradient of exposure to trichinosis from Inukjuak to Quaqtaq albeit with a peak in Povungnituk. Nine percent (9%) of the analyzed Nunavik sera indicated previous infection from *Trichinella spiralis* . Studies done among Sallumiut in 1983 showed that people over 40 years of age were twice as likely to be seropositive than those under 20 [7].

Five documented outbreaks of trichinosis occurred in Nunavik in the last decade [4,8]:

TABLE 1.1

Main Characteristics of Nunavik Trichinosis Outbreaks

Dates	Place	Cases	Hosp. (South)	Source of infect.
02-82 to 03-83	Salluit	10	4 cases	Walrus (Epid. Survey)
10-83	Ivujivik	4	1 cases	Walrus (Epid. Survey)
02-84	Salluit	8	2 cases	Same animal as above
04-84	Ivujivik	15	4 cases	Walrus (Epid. Survey)
10 and 11-87	Salluit	41	5 cases	Walrus (meat analysis)

This last outbreak in Salluit exemplifies the potential extension of such an infection having as its source a single but large animal whose meat was widely distributed in the community. Out of the 88

persons who ate part of an infected walrus, 41 met diagnostic criteria for trichinosis.

Walrus meat has been incriminated in all outbreaks documented in Nunavik. This is in accordance with other published data on Arctic trichinosis where walrus [1,2,14,15,16] and occasionally polar bear [15,16] have been found at the origin of the infection. As mentioned earlier, other Nunavik animals are known to harbor *T. spiralis* (polar bears, wolves, foxes, dogs) however those species, if ever eaten, are usually well cooked before. The documented proportion of *trichinae* infected walrus in Nunavik of 2% [11] is also in accordance with other available data (Greenland: 1%) [15]. These prevalence rates were indirectly corroborated by the data gathered in relation to the documented outbreaks that have affected Nunavimmiut. During the period 1982-1987, out of 592 harvested walrus, four (4) were found at the origin of proven trichinosis outbreaks. This would represent a minimal infectious rate of 0.7%.

Nunavik communities that suffered from trichinosis do harvest walrus in traditional annual fall hunts conducted particularly at Nottingham and Salisbury Islands. However one of the documented outbreak had as its origin an isolated walrus killed close to the mainland shore near Salluit.

1.3 The walrus hunt

Over the last fifteen years Sallumiut, through the acquisition of modern hunting equipment and vessels, increased their marine fishing and hunting capabilities permitting greater access to various species central to local diet, economy and culture. Walrus used to comprise a significant portion of the sea mammals harvested by Sallumiut for subsistence consumption. Available data [Appendix 2] indicate that, from 1978 to 1986, the number of animals killed each year was generally on the rise in Nunavik. However from 1987 to 1991 a decline has been observed, possibly as a result of trichinosis outbreaks and some indications of preference for store bought food among the younger generation [17]. An additional possible cause for decline is the reduction in the number of dog teams in Nunavik which were traditionally fed walrus meat. The potential impact of trichinosis on the hunt has to be seriously considered however as suggested by the produced harvest figures in correlation with the repeated outbreaks that particularly affected Salluit in 1982, 1984 and mostly 1987. Excluding figures from Ivujivik (harvest data commencing in 1981) and Povungnituk (harvest data commencing in 1986), the Nunavik Annual Walrus Harvest Chart indicates that from 1974 to 1986 Salluit was by far the largest walrus hunting community in the region, reporting 410 catches on a total of 810 for the whole territory. For that period of time, these figures correspond to an average of 31.5 catches per year for Sallumiut alone by comparison to 30.8 catches per year for all other reporting communities. In the period from 1987 to 1991, while pooled average annual harvests for all other

communities increased to 37 animals, the average for Salluit declined to 4.4 per year. Thus, from one period to the next, Salluit saw its proportion of the regional harvest decline from 50.6% to 10.6%.

1.4 Previous intervention attempts

Beginning in 1983 different interventions have been proposed in order to prevent the occurrence of trichinosis outbreaks in Nunavik. DSC-CHUL and Innulitsivik Health Center provided community information. A recommendation made to cook all walrus meat revealed itself culturally inappropriate. An attempt was made to offer testing of individual meat samples at local Nursing Stations (now CLSCs) or in southern laboratories. However, inappropriate protection resulted from analysis being non systematic or based on relatively insensitive methods (direct trichinoscopy). More sensitive digestion trichinoscopy was equally handicapped by unacceptable delays in results being transmitted back to communities.

Following Nunavik's largest outbreak that occurred in Salluit in 1987 a plan was drawn for the fall hunt of 1988 in which the Innulitsivik Health Center laboratory was considered as the site for testing communities' samples. The experiment proved impossible and was not completed considering the amount of laboratory work to be provided in a very short period of time and the lack of appropriate physical resources and personnel.

The following year (1989) a protection plan including meat sample analysis was reviewed [18] by DSC-CHUL and discussed with KRCHSS and the Municipal Corporation of Salluit but no systematic sampling and analysis attempts were done. "Misunderstanding as far as respective leadership and responsibilities seems to be the key to the paralysis we are witnessing."[19] was the conclusion drawn a few months later. The persisting confusion on the legal responsibilities of government organizations derives from the fact the community walrus hunt is uniquely a subsistence activity. Federal and provincial inspection agencies have as a consequence taken the position that this falls outside their respective areas of jurisdiction and are not prepared to cover costs of inspection.

1.5 The objectives of the project

The proposed intervention was established with the following facts in mind:

a) formal responsibilities were never clarified in Nunavik regarding protection of humans against trichinosis;
b) previous protection efforts appeared ill-focused and inefficient;
c) one community with a long tradition of walrus harvesting has been significantly affected and has expressed its concern regarding this issue;
d) the walrus hunt is linked to significant cultural, economic and nutritional values;
e) there is no existing simple, fast and reliable meat analysis method that could be used directly at the hunt sites.

From there, the following principles of action were developed:

a) the intervention should rely on and support the hunters role, values and culture;
b) the intervention should be integrated in a community development perspective;
c) it should count on the development of local expertise;
d) it should include the operation of a meat monitoring method that is systematic (analyses all hunted walrus), that benefits from sufficient funding without being costly and that can provide reliable results within acceptable delay;
d) it should be considered part of a larger local food promotion initiative.

Accordingly the following intervention objectives were established:

to define, realize and evaluate, with the community of Salluit, in the frame of a one year pilot-project, a trichinosis protection model
- -that would be locally based (including its meat analysis component);
- -that would be operated under the authority and coordination of the Municipal Corporation;
- -that could be reproducible, reliable, inexpensive and run self sufficiently over the following hunting seasons;
- -that could contribute to the re-valorization of the walrus hunt;
- -that could be exportable to other interested communities.

PART TWO

THE PROJECT

2.1 The Pilot Project Proposal

As initially presented the proposed intervention had as its objectives "...to study and document, in the 1992 fall walrus hunt, the applicability of a comprehensive trichinosis protection model involving two main components: health promotion (valorization of local food) and local inspection of walrus meat for the presence of *T. spiralis*."

The planned intervention was based on the collaboration of a consultant team composed of wildlife and community heath professionals (Makivik Corporation's Renewable Resource Development Department, Innulitsivik Health Center, DSC-CHUL) together with local Salluit partners (Hunter Support Program, walrus hunters, Health Committee, CLSC, Taqramiut Nipingat Inc.) From the onset, the intent was to have the planning, realization and evaluation of the project under the authority and leadership of the Municipal Corporation.

The expected roles of the consultants included:

- -to define the theoretical and technical frame of the intervention;

-to coordinate the establishment of the necessary technical protocols (sampling, tagging, meat analysis);

-to propose guidelines for a local food promotion campaign;

-to support the training of key local communicators (information campaign), hunters (sampling, tagging procedures) and of a local technician (meat analysis and report production procedures);

-to coordinate the evaluation of the conduct and the results of the intervention;

-to present a final report to the funding agency and partners.

The municipal authorities, in addition to promoting the project, conducting all related activities at the local level and administering its financial components, were more specifically expected:

-to , choose the local technician, define his/her role, precise training modalities and supervise the person on the job;

-to assist participation of the boat captains and hunters regarding sampling, tagging and dispersal of the meat on return from the hunt;

-to coordinate all aspects of the hunt and community information having a potential impact on the project's success;

-to coordinate the local planning and realization of the local food promotion campaign;

-to elaborate with Taqramiut Nipingat Inc. (TNI) production of a video regarding the project;

-to participate in the evaluation of the project.

The proposed project suggested some elements on which to base the evaluation of the intervention:

-the degree of involvement of community leaders in planning and realizing the promotion and information campaign;

-the performance of a hunt in itself as a result of an information and monitoring program and the restoration of confidence in the consumption of walrus meat;

-the reliability of the process as observed by the degree of compliance to the established protocols (sampling, tagging, meat analysis and report production);

-whether the rapidity of local analysis and transmission of the results satisfied community expectations;

-the degree of collaboration in between the different partners involved;

-the community intention to pursue an annual protection plan.

The timetable of the intervention was to be coordinated with the traditional fall hunt season typically occurring in late September-October. All preparations were to be completed from May to August. The evaluation phase was to be mainly carried in late fall at the completion of meat analyses. The report was to be produced and diffused by February 1993.

2.2 The planning

The planning as well as the realization and the evaluation of the project had to consider three main components: the community, the technical and the training aspects. These are complementary and closely linked to each other. They will be treated as a unit in the sections of this report describing the planning and the evaluation of the project. However these three aspects will be the focus of specific presentations in the sections dealing with the preparation and the realization of the experiment.

The approval of the project within the frame of the MSSS-KRCHSS joint Community Health Subsidy Program was announced in April 1992. As the Municipal Corporation of Salluit and Makivik Corporation were still strongly committed to the realization of the project in spite of the budgetary limitations imposed, a meeting was scheduled for May, in Salluit, regrouping under the authority of the Mayor all pertinent community partners and outside consultants in order to define the bases of the intervention.

On May 21, a one day planning meeting was held in Salluit [see list of participants in Appendix 3]. Unfortunately, the Mayor as well as the consultant from Innulitsivik Health Center couldn't attend. TNI filmed the meeting and interviewed both consultants on the occasion. The first part of the meeting allowed local participants to voice their desire for continuation of the walrus hunt and the safe

consumption of walrus meat in the community. It permitted, with the help of video productions and discussions, to clarify the issue of animal and human trichinosis in Nunavik. The main goal of the one season intervention was discussed and agreed as to define and experiment, under the authority and coordination of the Municipal Corporation, a reliable local walrus meat analysis program in order to protect the community against trichinosis and contribute to the re valorization of the walrus hunt. The second part of the meeting offered everybody the possibility to analyze and comment the previously proposed protection plans and define the operational protocol of the project to be conducted.

All present participants agreed that:

-the Municipal Corporation of Salluit would be responsible for the coordination of the proposed experimental one year local protection plan;

-within the frame of the present project the meat analysis program would not be accessible to other regional communities and the Municipal Corporation of Salluit should specify this point to other communities if ever a regional interest is manifested. However, in the eventuality that the presently conducted project is proven successful, the Municipal Corporation of Salluit will be ready to assist other interested communities in the implementation of such a program;

-for an easier conduct of the experiment, there would be only one hunting trip, at the end of September or beginning of October, involving two boats from Salluit. The hunting expedition would normally take from 7 to 10 days. From 15 to 25 animals would be brought back to the community. The consultants would be informed of the chosen hunting dates at least two weeks in advance in order to adjust the technical and training components with the hunt itself (buying, renting and

transportation of the necessary equipment; hiring, training, and transportation of a teaching technician and also initiation of the local technician);

-Makivik Renewable Resource Development Department would identify and provide to the person(s) chosen to conduct the on board tagging of meat, the appropriate tagging material and support the related training if necessary;

-tagging of the meat would be done at the time and site of the hunt and would be under the ultimate responsibility of each boat captain;

-a local technician would be chosen by the community (provided with a list of needed skills written by Makivik Renewable Resource Development Department) and would be trained appropriate sampling and analysis techniques by a biologist appointed by Makivik Renewable Resource Development Department;

-these two persons would sample the required muscle groups at the time the boats will be unloading to shore, some distance from the community, on their return from the hunt;

-the Municipal Corporation was going to provide a location for the analysis to be done or make necessary arrangements for it;

-the main researcher would supervise the updating and provision of the most appropriate meat analysis equipment and protocol. He would also make sure that the trainer technician is prepared to assume his/her technical and supervisory role;

-the boat captains and the Municipal Corporation (through the operation of its Hunter Support Program) would maintain an embargo on the meat until it has been tested parasite free;

-the Municipal Corporation was going to be responsible for all aspects related to community information in regard of this pilot project;

-TNI was going to document the whole process in order to inform the region of this Sallumiut initiative and help other communities to implement in coming years such a procedure for trichinosis protection if judged pertinent and if the present project is proven applicable and efficient;

-The main researcher was going to coordinate the evaluation of the project and present a final report on its conduct.

A certain number of questions remained unanswered as key participants couldn't attend the initial meeting in Salluit. They dealt mainly with:

-the community information process in regard to the hunt and the proposed protection plan;

-the protocol of selecting a local technician;

-the designation of a local coordinator to ensure daily details of the operation would be completed.

It was proposed that the delegate mayor would discuss and agree with the Mayor on his return these points. The Mayor would then inform the participants of the orientations and decisions taken on these issues.

2.3 The intervention

The intervention itself unrolled in two phases: the preparation and the realization.

2.3.1 The preparation

2.3.1.1 Community aspects

Most of the community preparation elements were covered in the frame of the just described planning meeting where it was agreed that the follow up would be assumed by the local coordinator. Some of the meeting's unanswered questions were debated at the Municipal Corporation and it was later confirmed that the Mayor would keep on coordinating the project including the issues related to the selection of a local technician and the setting up and implementation of a community information plan. Unfortunately, the topic of a local food promotion campaign could be neither addressed in the planning nor preparatory phase of the project. The consultant from Innulitsivik Health Center who was to support this aspect of the intervention had just fallen seriously sick and couldn't be replaced. The two remaining consultants couldn't assume this responsibility either.

Salluit choose its technician one month ahead of the predicted hunting season. This person was an aaniasiurtiapik working part time at the CLSC.

2.3.1.2 Technical aspects

The preparatory phase had to consider important technical aspects in order to choose equipment which was the most reliable, efficient and adaptable. The consultants intensified research on this aspect once approval of the project was announced.

Proper tagging at the site of the hunt is necessary to ensure the identification of all butchered and transported pieces of meat. This identification is essential to permit all the pieces of an infected animal can be traced back to a single carcass allowing rejection of that animal in the event sampled meat tests positive for parasites. DFO custom made tags were selected.

The issue of optimal sampling was also reviewed. In swine, the diaphragm pillars (crus) are known to concentrate more larvae per gram (LPG) then any other muscle when the animal is infected. These pillars thus represent the most reliable muscle to sample in the swine testing protocols. This type of knowledge does not exist yet for walrus permitting the selection of a specific muscle as a preferred target for sampling and analysis. Moreover, as it theoretically takes only the simultaneous ingestion of a single couple (one male and one female) of larvae to cause the disease, a test for the identification of *Trichinella spiralis* in walrus should include the analysis of the largest amount possible considering the existing technical and professional limitations. From previous studies on walrus and the more general knowledge that the parasites usually tend to concentrate in highly oxygenated muscles

five muscular groups were chosen for sampling: masseter, deltoid, intercostal, diaphragm and hind (back).

A review was also completed of the techniques developed for the analysis of the meat samples to select the one most appropriate for the northern context. None of them can be considered 100% accurate. Most existing tests have been developed for swine although some have proven appropriate for walrus or other wild species as well. Unfortunately this is not the case for the ELISA (Enzyme linked Immunosorbent Assay) technique that is now the standard and most sensitive test in swine. It can detect infected animals harboring as low as 0.01 Larvae Per Gram (LPG).

The simplest of all tests is called direct trichinoscopy. All it requires is a microscope and a well-trained technician. It consists in squeezing small amounts of sampled meat in between two slides and examining them under a microscope at 40X magnification. It requires at least 20 examinations to properly analyze one gram of meat and three (3) minutes should be given to the examination of a single slide. This method has the obvious disadvantage of being time and labor intensive even in the hands of a skillful technician. Thus its major limitation is attributable to its relative insensitivity. In order to identify slightly infected animals the required amount of samples and associated analysis time by a technician would be prohibitive. Using reasonable analysis time per animal would at best permit detection of *Trichinella spiralis* in a sample harboring at least from 1 to 3 LPG.

Knowing that past studies identified infection with specimens harboring as low as 1.0 LPG [20] this method has to be disqualified as a possibility for a systematic protection program.

Another common analysis method exists based on pepsin-digestion of samples. It consists in the application of a protocol that, in its first stage, mimics the digestive work of the stomach where the combined effects of hydrochloric acid, pepsin, heat and movement rapidly digest the meat samples. After a predetermined period of time the digestion process is stopped in order to maintain the integrity of the encysted *Trichinella* larvae. In the following steps of the procedure the larvae are recovered through sedimentation or filtration and then identified and counted under a low magnifying microscope. The theoretical sensitivity of the procedure directly varies with the amount of meat digested per animal and that of sediment observed under the microscope. It reaches 1.0 LPG when 1 gram of tissue is examined. The complete analysis of 25 grams from a single animal would theoretically provide a sensitivity of 0.04 LPG. Specific laboratory equipment has been designed for optimal standardization and rapidity of operation. The easiest to operate due to its automatization is the Trichomatic 35 ^{R} that was identified at the beginning of the project as the instrument of choice to operate in a northern context. Unfortunately technical unreliability had just recently obliged the manufacturer to return the model to its designers. An alternative digestive method was developed by Dr. Robert Lavoie, medical biochemist from Laval Hospital in Quebec City, at the time

DSC-CHUL was preparing for the 1989 Nunavik walrus sample analysis. The practical sensitivity of the method varies in accord to the number of slides examined per animal. On an average, 40 slides are necessary to spread out and examine all the sediment coming from 25 grams of digest and thus attain the theoretical sensitivity of 0.04 LPG. The much more practical analysis of 2 slides provides a sensitivity of 0.8 LPG. This method uses for digestion of meat samples the Stomacher ^{R} 400 Lab-Blender [Appendix 4] plus a standard centrifuge machine, a low magnifying binocular microscope and simple accessories. This digestive procedure appeared as the only existing reliable, relatively inexpensive and locally applicable method. Table 2.1 summarizes the Main Characteristics of the different *Trichinella spiralis* Meat Analysis Methods.

TABLE 2.1

Characteristics of *Trichinella spiralis* Meat Analysis Methods

Method	Sensitivity	Validation for walrus	Local applicability	Costs of local application	Comments
Trichinoscopy	1-3 LPG	yes	yes	low	not sensitive enough
ELISA	0.01 LPG	no	no	..	no validation for walrus
Digestive method (25 gr./animal	0.04 to 0.8 LPG	yes	the object of pilot project	the object of pilot project	tech. more complex
DNA polymerase chain reaction	Researches being carried on; promising; probably available in 4-5 years				

Once established the technical frame of the intervention, the few weeks before the hunt were devoted to completing the last material adjustments:

-the availability of the necessary equipment:
- . Stomacher ^{R} 400 Lab-Blender (graciously provided by Baxter Canlab Company);
- . centrifuge machine (provided by Innulitsivik Health Center);
- . microscope (provided by The Ungava Tulattavik Health Center);
- . required laboratory material;

-the availability of a location for the analysis to be carried on. The community had indicated that the DFO trailer was the only place available to perform the analysis and arrangements were finalized by Makivik Renewable Resource Development Department (DFO kindly agreed to its use).

The analysis protocol [Appendix 5] was completed in order to improve its sensitivity and perform complementary investigations (specific muscle group larvae's concentration, direct compression trichinoscopy and sampling for experimental ELISA) if an animal would test positive with the digestive method [Appendix 6].

2.3.1.3 Training aspects

Once the most appropriate technical components were determined a technician/supervisor was selected and instructed regarding objectives and protocol of the study. Through Makivik's Renewable Resource Development Department, a McGill University

parasitology student (Ph.D. candidate) was hired to oversee sampling and analysis on site in Salluit. This person was initially trained at Hôpital Laval (Québec City) regarding the utilization of the selected equipment and protocol. [Appendix 7]. It was clearly stated that this specialist would have as a central task the role of supporting the apprenticeship of a local technician in all aspects of sample collection and analysis in order that future program might be completed independently by local personnel. The local technician was to be chosen in regard of the following criteria: interest and dedication towards the project, sense of responsibility, patience and precision, methodical mind, bilingualism, manual ability and availability at the time of the hunt. The field of learning was to include theoretical and practical elements such as:

- walrus anatomy, dissection and sample taking;
- sample identification (from animal tags to individual microscope slides and report sheet);
- laboratory installation, operation and basic maintenance of the following equipment: Stomacher ^{R} 400 Lab-Blender, centrifuge machine and microscope;
- application of the digestive method for *Trichinella* identification including: preparation (dilution) of hydrochloride acid, sample preparation, digestion, recovery of the larvae and larvae identification;
- report production;
- health risks and self protection at work.

It was planned that the training of the local technician would take place in Salluit and require a period of approximately one week. Infected rat meat was provided by Dr. Charles Tanner from the McGill Institute of Parasitology in order to permit adequate training of the technician on site in Salluit.

2.3.2 The realization

2.3.2.1 Community aspects

Two 40 feet long vessels, the Aqurvik and the Qasiriak, left Salluit on September 14 for a walrus hunt at Nottingham Island. Unfortunately the Mayor and Coordinator of the pilot project resigned from both functions by mid September. The replacing Mayor appointed his Municipal Secretary-Treasurer to temporarily coordinate the project. No local food promotion campaign was carried out and no public information on the conducted trichinosis protection plan was broadcast. TNI was not part of the hunting expedition and it also didn't record the sampling procedures carried on by the technicians at the meat cache sites. It however filmed the different steps involved in the testing process and interviewed both technicians.

The boats returned to Salluit on September 25. A total of 14 animals had been killed, all at Nottingham Island. Twelve of them were cached at some distance of the community. Meat from two animals stayed on board of the Aqurvik that anchored in front of the

village. No community-wide distribution occurred before the analyses were done and proved negative for *Trichinella*. However, the Municipal Corporation gave the authorization that a small amount of meat be brought to shore by the captains and some crew members after private and public (through the local FM radio station) notice was given to boil the meat before eating it.

Two other communities showed an interest in the project and even asked that their walrus meat be tested. One request came from a hunting vessel from Kangirsujuak that accompanied the Salluit boats to Nottingham during the hunt. It was explained by the Salluit mayor that in the current pilot project analyses were limited to Salluit alone. The second request came in the first week of October from the Akulivik Municipal Secretary and was addressed directly to the main researcher. A boat from Akulivik was on its way back from Nottingham Island with walrus meat on board and the Municipal Secretary requested that the trainer technician go to Akulivik and test all the meat. The nature and limitations of the pilot project were explained and it was mentioned that extension of the program to other communities would be considered if proven successful. In the interim it was suggested that the community contact the proper Community Heath Authorities in order to receive the pertinent recommendations on how to manage with the potential health risks related to the consumption of hunted walrus. The main researcher and the Municipal Secretary of Akulivik both contacted the Povungnituk based Community Health Advisor to KRCHSS to this effect.

2.3.2.2 Training aspects

When the hunting parties left with short notice a week ahead of the planned date, the tagging equipment and formal related training had not been provided to the crews. However the boat captains were briefed by the local coordinator, before leaving and at sea, on the procedures related to tagging and protocol for handling the meat on return from the hunt.

The trainer technician in accordance with the planned hunting dates arrived in Salluit on September 28, 3 days after the boats. As a first step the laboratory was set up and preliminary orientation and training of the local technician was started. Some sampling of the 2 animals that were kept on board of the Aqurvik was done and tested first. Results were available by September 30 and were negatives thus allowing the boat to be unloaded and the meat to be distributed in the community. On the following days both technicians with the help of the HSP Responsible and the two boat captains sampled the two groups of animals cached a few kilometers from the community. In one of the caches all pieces of meat were properly tagged the captain having had access, before leaving Salluit, to extra tagging material from another research program. It was then easy to regroup all the pieces from a single animal and perform methodical sampling. Identification in the other cache was less successful. Although tagging had been well performed (and even samples from different viscera had been collected) due to the rudimentary tagging material used

(pieces of rope and cardboard) some labeling was lost to the point were it was impossible to regroup complete animals and thus collect systematic samples.

The trainer technician stayed in Salluit for ten days. The training and working session of the local technician took seven days while, beside acquiring the required sampling and laboratory skills, an inuktitut version of the meat analysis protocol was established.

2.3.2.3 Technical aspects

Samples from twelve (12) of the fourteen (14) killed animals could be examined. Whenever possible, samples from the five specified muscles were pooled for examination. When not, the available groups of muscle were divided in equal parts in order to add up to the required 25 grams of meat per analysis. Each sample was tested two times. A standard report production sheet was established [Appendix 8]. A written report [Appendix 9] summarizing the findings was produced and given to the Municipal Corporation on October 07 providing basic recommendations on the degree of safety of the harvested walrus. A list of the used materials was established [Appendix 10]. The results of the analyses by boat and by walrus are shown in Table 2.2:

TABLE 2.2

Walrus Meat Analyses Results; Salluit; October 1992

Animal#	Number of samples per animal	Results Ts**	Cest.***
Qasiriaq			
1	4/5 (X 2)*	-	-
2	5/5 (X 2)	-	-
3	5/5 (X 2)	-	+ (1/10 slides)
4	5/5 (X 2)	-	+ (1/10 slides)
5	5/5 (X 2)	-	-
6	5/5 (X 2)	-	+ (3/10 slides)
Aqurvik			
A	1/5 (X 2)	-	-
D	3/5 (X 2)	-	-
E	1/5 (X 2)	-	-
F	2/5 (X 2)	-	-
G	5/5 (X 2)	-	+ (1/8 slides)
H	4/5 (X 2)	-	-
I	0/5		
J	0/5		

* (X 2): A second exam was done on the sampled muscle groups
** Ts: *Trichinella spiralis.*
*** Ces: Larval cestode of unknown species.

All analyses were found to be negative for *Trichinella spiralis.* Four (4) of the twelve (12) animals were found to be positive for larval cestode. In three of them it was seen on only one slide over 8 or 10 slides observed per animal. In one animal three of the

examined slides tested positive for cestode larvae. An attempt was made to locally identify the cestode but due to the lack of proper equipment to isolate and fix the parasite it proved unsuccessful. On the basis of analyses for *T. spiralis* , the walrus harvested by the vessel Qasiriaq was assumed to be safe even if eaten "raw." The evaluation of the Aqurvik hunt was less certain. The first two animals analyzed (G and H) for which 5/5 and 4/5 of the targeted samples were tested were assumed to be safe. The tags theoretically related to two animals (I and J) were or lost or unattached to any pieces of meat. For the 4 remaining animals, it was presumed that all tagged pieces were relatively safe to be eaten raw but that all untagged pieces should be suspect and boiled before being eaten [Appendix 9].

No specific community recommendation was provided regarding the unidentified cestode. Subsequent cestode identification trials were attempted and didn't reveal any parasite. The first one was carried at the Institute of Parasitology on previously digested material. The other was done by DFO's Maurice Lamontagne Institute (Mont Joli) on frozen meat collected randomly at the cache site.

2.4 The evaluation

The evaluation of the project was a continuous process but more formally an evaluation meeting, individual interviews and complementary questionnaires permitted to document most points of interest [see list of participants and informants in Appendix 3].

On November 2, a one day meeting was held in Salluit including most of the partners involved in planning and implementing the intervention. A letter [Appendix 11] had been faxed and addressed two weeks earlier to all Nunavik Municipal Corporations inviting them to delegate an observer at the meeting in order to be provided with first hand information regarding access to such a program for interested communities. No observers from other municipalities attended the evaluation meeting.

While in Salluit the researchers conducted individual interviews with most of the local participants. The technician in charge of the training was also met in Montréal.

The observations on which most participants agreed were the following:

-notwithstanding the difficulties related to the non availability of proper tagging equipment and absence of formal instruction, the proposed procedure appeared fairly simple for the hunters as no on board sampling was requested. However some confusion on the procedures to be followed was observed due to

independent samples having been requested for contaminant analysis from the same hunted animals;

-the observed period of 5 days in between the arrival of the boats and the availability of some tested meat was perceived as acceptable;

- the hunters and the technicians indicated a preference for the sampling to be done at the time of unloading the boats at the cache site. This would require less work for them and would have made the results available in a shorter period;

-complete local autonomy for meat analysis would impose less restraints to the captains in terms of hunt departure date;

-the two technicians were satisfied with their laboratory arrangements, equipment and support provided by the Municipal Corporation, the boat captains and researchers;

-the application of the proposed sampling and meat analysis protocols were not too complex even for an untrained technician who declared herself prepared to undertake the sampling and the testing of the meat in a coming hunting season with the condition that there be no change in the equipment, protocol and report production sheet used;

-minor adjustments to the list of required equipment and extra training will be necessary in order to fix *Trichinellae* harboring slides permitting external confirmation. The same requirements will apply in order to permit the isolation and fixation of eventual larval cestodes;

-it appeared to many that the local coordination was deficient in some points:

. no plan was established regarding community information on the conducted trichinosis protection program;

. the arrangements for a location to perform the analyses had to be done at the last minute by Makivik Renewable

Resource Development Department and not the Municipal Corporation as previously agreed;

. the booking and invitations especially of local partners to the planning and evaluation meetings was poorly organized;

. TNI didn't document the hunt with its tagging component, neither the sampling step of the procedure.

- some deficiencies were also observed in the way the consultants themselves supported Sallumiut in the realization of the planned intervention:

. the question of an information plan on the trichinosis protection project being carried on couldn't be worked out satisfactorily by the Municipal Corporation and TNI without the support of the Innulitsivik Health Center;

. Makivik Renewable Resource Development Department faced difficulties that compromised the hunter's access to the necessary tagging material and to a clear understanding of the tagging and sampling procedures. However it must be recognized that agreed forewarning regarding departure date was not provided;

. the meat testing protocol was designed to attain the sensitivity of 0.8 LPG. This is considered enough to rule out significant infection in walrus but may represent a borderline acceptable test considering the fact that no ideal sampling target muscle has been identified as mainly concentrating the parasite in infected walrus and as infections were documented with specimens (swine) harboring as low as 1.0 LPG;

. the preparation of the local participants was deficient with regard to the management of the walrus meat in relation with the analyses results. Recommendations were provided as to the degree of safety of the tagged and untagged pieces of meat but no follow up was done to document how these translated into practical action at the

cache site. Additional discussions in between participants are required in order to agree on the following points:

- how to store and use the meat of a *Trichinellae* harboring animal;
- how to store and use the pieces of meat that couldn't be tested;
- how to determine the redistribution of the «safe» meat if untested or infested animals compose a significant portion of the total harvest.

- notwithstanding the just mentioned difficulties, the local participants' intention to pursue a yearly protection plan was very clearly expressed as also was the opinion that a lot has been learned in the conduct of the pilot project. Local partners firmly indicated that they are now in a position to locally coordinate and operate a similar program for the coming hunts. In order to better prepare for this the local partners present at the evaluation meeting recommended to the Municipal Corporation to officially appoint a Coordinator for the program in 1993. The local participants also proposed that the Municipal Corporation, through its Hunter Support Program, acquires a Stomacher^{R} 400 Lab-Blender and provides the yearly required funds necessary to operate the trichinosis protection program.

PART THREE

DISCUSSION

In order to analyze the conducted project performance it is necessary to recall its objectives including:

> to define, realize and evaluate, with the community of Salluit, in the frame of a one year pilot-project, a trichinosis protection model
>
> -that would be locally based (including its meat analysis component);
> -that would be operated under the authority and coordination of the Municipal Corporation;
> -that could be reproducible, reliable, inexpensive and self sufficiently run over the following hunting seasons;
> -that could contribute to the re-valorization of the walrus hunt;
> -that could be exportable to other interested communities.

It is legitimate to think that the pilot project had for the first time succeeded in defining and operating a workable model for trichinosis protection in Nunavik.

The innovation lay first in the process experimented that was established on the community based definition, planning, realization and evaluation of the program. This proved essential in order to take into account and reinforce the hunters and community expertise,

responsibility and tradition. This was of prime importance as exemplified by the fact that the captains, their crews and the whole community were remarkably compliant to the advice of avoiding large distribution of the meat before it has been tested. This may have been facilitated by the fact that the meat was cached at some distance from the community, by the knowledge that tested meat was going to be available just a few days after landing but most of all by the fact that the hunters and the HSP took formal responsibility regarding community access to the harvested walrus. This control avoided the introduction of untested meat in the community and thus the necessity of managing a complex piece by piece and house by house identification system.

The innovation is also founded on some technical components of the intervention. To be mentioned is the relatively simple procedure applied by the hunters as only tagging was necessary at the time of the hunt; the more complex, time consuming and precision requiring task of standardized sampling being carried on at cache sites by the technicians responsible for the meat analysis. The captains were already quite familiar with the idea and practice of tagging having viewed and experienced the process in previous studies. In the absence of specific tagging material, this knowledge permitted them to correctly identify the two thirds of the harvest. Also deserving mention are the chosen testing protocol and equipment that seemed quite easy to operate thus making possible the conduct of a reliable local monitoring. However its operation on an autonomous basis in the

hand of the locally trained technician would need to be reassessed as minor modifications to the used protocol may be judged desirable in order to increase the method sensitivity, as complementary skills might be required in case the presence of nematodes or cestodes are suspected and as a single short term training does not necessarily prepare anyone to perform optimally a full year later.

Of additional interest is the video documentation of the experiment done by TNI. Unfortunately this organization was facing major logistic and organizational difficulties as a result of the fire that had destroyed its main office, studio and archives in Salluit during the spring of 1992. As a consequence it didn't participate in some key phases of the project however it gathered valuable material that permitted the elaboration of a 30 minute production entitled "Walrus Laboratory in Salluit". This video production was broadcasted three times in January 1993 on CBC North. Realized more as a documentary for the general public than a direct operational guide for the implementation of the program, this video illustrates the conduct of the project from its planning to its evaluation including important aspects of its realization. Although this production may have positive community educational impact it cannot serve as an appropriate tool supporting the practical acquisition of the managerial and technical skills required to operate a local protection program. A more goal oriented approach and better coordination among involved partners would be required to produce such a guide if it becomes necessary.

More generally it should be recognized that the hunters and the community proved that they were able to cope with the program requirements they had themselves determined. Of more concern however is the fact that the local coordination has failed establishing continuity, congruity and leadership regarding aspects of the intervention. This has been particularly exemplified by the fact that limited community information was provided on the conducted trichinosis protection program. The deficiency in the local coordination has also imposed on the researchers-consultants a substitutive role that was time consuming and that, from a distance, permitted at best to support the intervention in its more basic and technical aspects. The local coordination difficulties that were observed can be traced back to two major factors:

-the amount of work to be accomplished by a local coordinator has been largely underestimated. The absence of the coordinator at some key planning stages and the necessity to change coordinator at the exact time of the hunt didn't help clarifying those requirements and hardly permitted the local coordinators to fully play their role;

-the expectations placed on the coordinator in regard to the community information were not matched by any formal assistance by the consultants.

It is to be noted that the objective considered in the pilot project proposal to have the intervention accompanied by a larger local food promotion campaign was not maintained after the planification meeting. With no participation from the Innulitsivik Health Center, the two consultants judged that the intervention should focus at first on the establishment of the monitoring program. That in itself was

perceived as a satisfactory promotion effort considering the limited frame, available resources and time table of the project. However it should be recognized that the conduct of a hunt was clearly encouraged by the fact a meat analysis program was considered. One has to go back to 1986 to see as many walrus being brought back to the community. Most would agree that the question of the walrus hunt survival may be seen as part of a larger health promotion intervention. The question of how to promote the development of northern food products and practices in a concerted plan aimed at improving the individual, cultural, economic and political strength in Nunavik is starting to be debated. The discussion of such promotional frame exceeded the intention and possibilities of the present Sallumiut initiative. Nonetheless the experimented model opens the way to the development of a more comprehensive food monitoring program that might consider, if judged pertinent, other biophysical contaminants. It also can serve as a base for the establishment of a wholesomeness control mechanism essential to the eventual development of inter community food trade in Nunavik.

Salluit and other already interested Nunavik communities still face some challenges in the implementation and maintenance of a trichinosis protection program. A first and permanent one is to guarantee the technical reliability of the procedures. This implies the continuous updating of technology and protocols, the initial training of local technicians, their constant refreshing and supervision. It also implies the acquisition and maintenance of adequate equipment.

However the community members' and, most of all, the walrus hunters' involvement and control in the yearly planning, realization and evaluation of thc local protection program are and will continue to constitute its central and determining component. These efforts also depend on the local and regional political will to maintain and develop such a program as costs are involved and as the issue of who is or should be responsible remain unsettled. The present project only indicates that operating a reliable, local and community managed trichinosis protection plan in Nunavik is possible at relatively low cost although it appears unrealistic to reach the objective of attaining complete local autonomy of operation in one hunting season.

PART FOUR

PROPOSITION FOR THE DEVELOPMENT OF A REGIONAL TRICHINOSIS PROTECTION PLAN.

The following plan of action takes into account the previously mentioned observations and is put forward to the attention of the regional and local managers.

. As no governmental agency has accepted responsibility with regard to the operation of a public protection mechanism applying to local "subsistence" products such as walrus meat;

. as these products are essential to regional nutrition, economy and culture;

. as the *Law Concerning Northern Villages and the Kativik Regional Government* clearly establish the jurisdiction of the Municipalities and thus of the Kativik Regional Government itself in such matters (article 174.1),

the Kativik Regional Government should take formal responsibility for the development of a regional trichinosis protection program. Accordingly it should:

a) determine to which extent such a program should be developed in the region;

b) ensure its funding;

c) determine through which regional structure or organization the program should be managed or contracted;

d) evaluate with pertinent regional partners (Health and Education Institutions, Makivik and Land Holding Corporations, Hunters' associations, Stores, Municipalities,...) the pertinence, feasibility and modalities of a permanent regional food promotion intervention that would integrate trichinosis control and other regionally determined wholesomeness measures.

The mandate of the regional structure, mentioned in point c, that will be given the responsibility of coordinating the program would cover two complementary levels: first, organization, second, the training and quality control aspects:

-it will play a role in the regional promotion of the program;

-it will have to define the criteria for community admissibility and make these known;

-it will be in charge of budgeting and managing the funds allocated to the operation of the regional program;

-it will have the responsibility to continuously update and adjust the scientific and technical components of the intervention;

-it will have a major role in supporting the planning, implementation and evaluation of the program at the local level;

-it will be in charge of training and supporting the local walrus hunt coordinators and technicians.

By reason of its existing interest and expertise in this field, the Makivik Corporation's Renewable Resource Development Department should receive, temporarily and until formal regional responsibility of

the program is determined, the mandate of supporting, if not the whole regional development of the program, at least its maintenance in Salluit. This Makivik Department should also ensure fundamental research on the walrus population that compliments the local protection program.

Municipal participation should be established on a voluntary basis. By reason of the fairly complex technical aspects of the protection program and in order to facilitate its orderly development, access to the program should be offered to a maximum of two new communities per year. Akulivik and Kangirsujuak have already expressed their interest. Before being accepted however, their Municipal Corporations should clearly indicate their intention to participate and their commitment to locally manage the program. Within an interested community, all boat owners who intend to perform a walrus hunt should be linked to the Municipal trichinosis protection program.

Each participating community should count on approximately $16,000.00 a year to operate the program ($20,000.00 the first year) [see details in Appendix 12]. The eventual sharing of equipment and teachers in between communities would reduce these per community costs.

This budget, beside covering minimal technical supplies, mostly covers the transportation (for training and supervising) and salary of

a local walrus meat monitoring program coordinator who, under the authority of the Municipal Corporation, will be responsible for:

-organizing and presiding over yearly planning, evaluation and other pertinent meetings involving local and regional partners regarding the walrus hunt and the local trichinosis protection program;

-coordinate parties involved with regard to the timing of the hunt;

-provide pertinent community information on the hunt and on the trichinosis protection program;

-ensure that the hunters are provided with adequate tagging material and related knowledge;

-under delegation from the Municipal Corporation and with the assistance of the boat captains, decree and enforce an embargo on the meat until it is tested parasite free;

-coordinate the hiring, training and supervision of the local technician and his assistant;

-ensure that the technician and his assistant are provided with all the required equipment and laboratory space;

-make the arrangements with the local CLSCs (Nursing Stations) on the training and the use by the local technician of the centrifuge machine and the microscope;

-produce a brief yearly report on the conduct of the local monitoring program, its results and the improvements to be made.

(N.B. The Salluit experience indicates that some benefits are potentially obtained when this coordinator is also the local person responsible for the Hunter Support Program).

This budget available at the municipal level would also cover the salaries and transportation (for training and supervision) of:

- a local technician and his assistant who will participate in the definition of the local program and be responsible for the sampling, analysis procedures and production of related reports;

- a technical supervisor who will be a regional resource person and whose role will be to support the training and the work of the local technicians and to implement the required quality control mechanisms. He will also play a role in the updating and adapting of the scientific and technical components of the protection program. The creation of teaching tools will be one of his tasks.

The CLSCs (Nursing Stations) and Regional Health Centers will also play an important role in this trichinosis protection plan. First, it is the responsibility of doctors and nurses to maintain a high degree of awareness towards trichinosis in walrus hunting (and receiving) communities. People should be informed yearly of the local public health recommendations applying to the consumption of walrus meat. Health Centers should support community information and initiatives in trichinosis protection. Finally, CLSCs should facilitate the local technicians' access and training in the use of some required pieces of equipment (centrifuge machine and microscope) they have at hand.

CONCLUSION

Trichinosis is a parasitic disease acquired, in human as well as in animal species, through the ingestion of meat coming from an animal that had previously been infested by the small parasite *Trichinella spiralis*. Sometimes asymptomatic, the disease may provoke, in some cases, severe and prolonged digestive and/or muscular symptoms and impairment. In the southern regions of Canada the disease is mostly acquired through the ingestion of contaminated and insufficiently cooked pork. However, as a result of improved swine breeding techniques as well as meat control analysis on commercially marketed products, the disease has been almost eradicated in the South. This is not the case in the Arctic where the highest Canadian rates are now observed. Although no doubt present, trichinosis had not been formally diagnosed in Nunavik until the 1980s. However, from 1982 to 1987, 5 outbreaks, all related to the consumption of infested walrus, were recorded, affecting 78 people from Salluit and Ivujivik. The impact was particularly evident in Salluit. The community, known for years as reporting half of the annual Nunavik walrus harvest, almost abandoned the hunt. Preoccupied by the situation the hunters and the Municipal Corporation looked for solutions. As no Public Agency was ready to assume formal responsibility towards this "subsistence" activity, and, as no meat testing procedure or protection

method had been shown adequate yet, the Salluit Municipal Corporation, supported by a small team of wildlife management and community health consultants, decided to submit, for the fall 1992 hunting season, a pilot project aimed at assessing the feasibility of operating a protection program that would be locally defined, realized and evaluated. The protection model was to include community information aspects as well as technical components such as tagging, sampling and local analysis of the walrus meat before distribution and consumption.

The fact that the intervention was locally planned by its participants, permitted each involved partner to have a general perspective of the project as well as a clearer idea of his and others' roles and responsibilities. The consultants' main roles were to bring up to date the scientific and technical components of the intervention and support the local partners in their own learning. All community aspects were to be taken in charge by a local coordinator designated by the Municipal Authorities. As no simple and 100% accurate method exists that would permit identification and disposal of infested walrus right at the site of the hunt, a chain of actors and activities had to be carefully coordinated to achieve the desired results. The hunters were central in all phases of the project. They were the ones, with the responsible of the local Hunter Support Program, who were to define the hunting modalities, to take charge of the tagging, disposal and control of the meat (through an embargo) until it was tested parasite free. The two technicians, one monitor and his local counterpart, were

in charge of sampling and analyzing the meat. A local coordinator was to act as a formal link in between all partners in order for the planned intervention to unroll in a coherent manner.

All these efforts have yielded benefit. As many as fourteen walrus were brought back to the community, an event not seen in many years. The technical part of the intervention also went fairly well. However, easily solvable tagging problem occurred that resulted in one third of the hunted pieces that couldn't be analyzed. The meat sampling procedure at the cache site was quite easy but required a second handling of the meat pieces by the hunters as the trainer/technician arrived in Salluit three days after the boats came back from the hunt. However the two first walrus, tested and found parasite free, were ready to be distributed in the community less than 24 hours after the technicians took samples from them. The analysis, that was all negative for *T. spiralis* parasite, was described by the technicians as not too complex to operate even though a real laboratory type of installation is required and a rigorous observance of the testing protocol (digestive method) is mandatory in order to correctly identify infested animals. The local technician acquired, within a week of theoretical and practical training, enough knowledge, skills and confidence to consider operating the technical aspects of such of a program on an autonomous basis in coming years.

Some difficulties however were observed at the local coordination level. The first coordinator, who was also the Mayor of

Salluit, resigned from both functions at the exact time the boats were leaving for the hunt. A new coordinator was appointed to the project. This lack of continuity was further complicated, in the case of the first coordinator, by a lack of availability to cope with the multiple and underestimated tasks required, and in the case of the second, by a lack of leadership. These coordination deficiencies imposed on the non-local consultants a substitutive role that permitted, at best, to support the basic technical aspects of the project but didn't generate as much community impact as could have been realized. General public information on the intervention was non-existent as was any formal and comprehensive effort aimed at validating not only the walrus hunt but also other local food products and related practices as a whole.

However the pilot project attained its objectives of demonstrating the technical feasibility of operating a local trichinosis protection model. The hunters and technicians involved showed much interest, skill and willingness to learn. They strongly feel that this protection program should be locally operated each year and that they are now prepared to contribute in it. They are eager to keep on playing an active role in the definition and operation of a longer term program. The involvement they have demonstrated may open the way, if judged pertinent, to the development of a larger local or regional food promotion initiative that may include a more comprehensive food monitoring program and the establishment of wholesomeness control mechanisms essential to the eventual

development of inter community food trade. However the difficulties observed in regard to coordination of the pilot project indicates the fragility of such initiatives. To be successful, the commitment of hunters and community members have to be matched by an equivalent effort at the political and managerial levels.

The last part of the report briefly presents a proposition for the development of a trichinosis protection plan in Nunavik that might serve as a basis for discussion and facilitate decision making.

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A PILOT PROJECT FOR THE MONITORING AND ANALYSIS OF THE PARASITE *TRICHINELLA SPIRALIS* IN WALRUS MEAT HARVESTED BY SALLUMIUT: A LOCAL INITIATIVE TO PROTECT THE COMMUNITY AGAINST TRICHINOSIS.

APPENDIXES

APPENDIXES

APPENDIX 1

MINUTES FROM REGIONAL WORKSHOP ON TRICHINOSIS HELD IN POVUNGNITUK, NOVEMBER 21, 1990

Minutes from Regional Workshop on Trichinosis held in Povungnituk, November 21, 1990

List of Participants

Ms. Carole Beaulne, Coordinator of Inuulitsivik CLSC
Ms. Suzanne Bruneau, Consultant of Kativik Regional Council of Health and Social Services (Kativik CRSSS)
Dr. André Corriveau, Community Health Advisor of Kativik Regional Council of Health and Social Services (Kativik CRSSS)
Dr. Janine Gauthier, Veterinarian of Ministry of Food, Fisheries and Agriculture of Québec (MAPAQ)
Dr. J. Dick MacLean, Director of Center for Tropical Dikado, Montreal General Hospital
Mr. Ali Novalinga, member of Inuulitsivik Board of Directors
Mr. James Novalinga, Interpreter
Mr. Stas Olpinski, Director of Research Center, Makivik Corporation
Ms. Carmen Potvin, Chief technician, Inuulitsivik Laboratory
Mr. Tamusi Qumak-Novalinga, Municipal Councillor, Povungnituk
Dr. Charles Tanner, Parasitology Institute of McGill University
Dr. Normand Tremblay, Director of Professional Services, Ungava Hospital

Observer for the morning session

Ms. Esther Morin, Nurse from Kuujjuarapik

Representation was also sought from the communities of Akulivik, Ivujivik and Salluit, as well as from the Kativik Regional Government but it could not be obtained.

Dr. Corriveau opened the workshop at 9:45 AM welcoming all the participants and explaining the purpose of this regrouping of experts and concerned stakeholders, that of trying to achieve a consensus on the need to develop an integrated monitoring program for preventing trichinosis in our region and on the form such a program could take. The agenda for the meeting (appendix 1) had been send to the invited participants with the invitation letter.

Mr. Qumak opened the discussion by saying he was pleased to have been asked to participate in this meeting but that it was news to him that eating walrus meat could make anyone sick. He expressed his concern that a recommendation should be made not to eat such food because he would be reluctant to endorse it.

Dr. Corriveau reassured him that the purpose of the group was explore ways to continue promoting consumption of this meat while ensuring its safety by a testing mechanism. He also explained that because of the 10-14 day delay between infesting of the meat and beginning of symptoms, misdiagnosis often resulted because many manifestations of the illness are non-specific.

It was also pointed out that infested animals do not appear sick and the worm is so small that it cannot be seen with the naked eye, so that there is no indication that the meat may not be safe.

The first formal presentation was than made by Mr. Stas Olpinski who reviewed briefly the situation of trichinella parasitosis in animal populations in the Nunavik region in the light of most recent research data. Although Trichinella spiralis is found in all carnivores (polar bears, foxes, wolves, etc.) only that in walrus appears to pose a threat to humans because it is the only animal potentially infested with the parasite whose meat may be eaten raw.

The Trichinella found in Arctic regions is found to be very resistant to freezing and dessication on curing of the meat, contrary to types found commonly in the south. It will only be killed effectively by heat.

A map identifying the main hunting areas for walrus was shown. Mr. Qumak was asked whether in his lifetime he had ever noticed a walrus eating another carnivorous animal. However, he could not recall such an incident. He also mentioned how following the kill the stomach of the walrus is often cut open and only shellfish is usually found there.

The level of infestation of walrus is believed to be quite low. In the 1984-1985 sampling study, one walrus out of 49 was found to be positive. The larval concentration in the meat of affected animals also appeared to be quite low and no muscle group seemed to contain more than any other.

Dr. MacLean next reported on 6 outbreaks that have occurred between 1982 and 1987, 5 of them in our region (3 in Salluit, 2 in Ivujivik) involving nearly 100 clinical cases. Prepared slides could not be shown because of a breakdown in the projector. A copy of a paper on this subject was distributed for reference. (Appendix 2)

The incubation period will last between 10 to 19 days. There are two (2) distinct clinical patterns. One is characterized primarily by muscular symptoms (pain and weakness) and it is from this group that most cases requiring hospitalization emanate. This syndrome is quite debilitating and may occasionally lead to death. The acute phase will last about 2 weeks followed by a slow recovery. Data analysis should suggest that this syndrome is a first time exposure to the parasite. The average age of these patients was 19 years as compared with an average age of 38 years for those presenting primarily with diarrhea and other infestinal symptoms (nausea, vomiting and cramps). This second syndrome appears to be characteristic of people who are exposed for a second (or more) time.

The average period of debilitation and inability to up back to work was found to be 2-3 months. Thus there are 3 levels of costs:

- on the individual	:	morbidity + loss of revenue
- on the community	:	important loss of productivity in situations where large numbers of individuals are affected (the 1987 outbreak in Salluit involved 52 clinical cases).
- on the health care system	:	overtime, blood tests, evacuation and hospitalizations (20% of those with muscle tricase and 9% of those with diarrhea).

The incidence of Trichinosis we were told is over 100 times greater in the Arctic than it is in the South.

At the end of Dr. MacLean's presentation, Dr. Corriveau asked from the participants whether any of them had doubts this constitute a public health problem in our region, given that most villages now participate in a walrus hunt each year.

Ms. Potvin questioned whether this problem - although real - should be given priority over more common ones such as chlamydia or even soxoplosmosis. However, as pointed out by Dr. MacLean one must distinguish between sero-prevalence surveys such as in the case of toxoplasmosis and incidence of new cases. furthermore, Trichnosis occurs in concentrated episodes on a seasonal basis.

11:00-11:20 Coffee break

Following the coffee break a review was made of the current situation in terms of the walrus hunt and its consumption. Mr. Olpinski presented data collected since 1974 about walrus hunts in each community of Nunavik, with large fluctuation from year to year to a high of 152 animals in 1986.

Mr. Qumak informed us that walrus hunting has been a traditional activity of last summer and that he participated in yearly hunts throughout the 1930's, 40's and 50's. There was a period of decreased hunting in the 60's and 70's but following the introduction of larger boats (Peterheads) it has again become a regular event. This year 9 walrus were caught. Animals are cut in 4 or 5 pieces at the site of the hunt and upon arrival these are cut in smaller portions.that are distributed to the whole community where it will be eaten once or twice a week, most of the time raw until supplies are exhausted. Favorite portions such as the head and neck are buried in the ground until Christmas time to be used for communal feasts at that time. It seems that less and less young people consume walrus meat except on a very occasional basis.

In response to a question Mr. Qumak also said that hunters will eat some walrus during the way back from the hunt but as a rule, people prefer the taste of the after it has been aged somewhat.

The next presentation was made by Ms. Suzanne Bruneau who reviewed the options that had been outlined in a document prepared by an external consultant, Dr. Paul Brassard, last summer. Although there can be a number of variations, they can be grouped in two categories:

1) Focus on an information program to warn the population about potential risk associated with the consumption of raw walrus, encouraging that it be cooked instead or avoided.

2) Setting up a monitoring program for the meat, testing it for safety before it is consumed, with several sub-options in terms of technology to be used and location of testing.

Participants were asked to reflect on these two alternative during the lunch break.

Following lunch Dr. Corriveau briefly reviewed the two option that stand before us at this point in time. The main arguments against the first option would be the following:

1) This approach has already been in use for a number of years and has proven ineffective in preventing new outbreaks from occurring. This has also been the experience in the Northwest Territories where new outbreaks were recently reported from Rankin Inlet (240 cass) and Chesterfield Inlet (3 cases).

2) Its philosophy runs counter to efforts at encouraging Inuit to retain traditional lifestyle and diets. It may scare people away from eating walrus meat, especially discouraging young people to begin eating it. However it is less labor intensive and much less experience.

Mr. Qumak voiced his opinion that the second option would be preferable provided test results could be obtained quickly (in one or two days). If this could be achieved he feels that most people cold be convinced to wait a little while before eating the meat.

There was a discussion whether testing could occur at the site of the hunt, using hand-held microscopes. A crew member could be trained in the procedure. This option had been promoted a few years ago by Dr. Jean-François Proulx and Jean Grégroise of Inuulitsivik. However it is felt to be a sub-optional strategy primarily because of the relatively low level of infestation of the walrus meat, making direct microscopy a poorly sensitive test in the best of hands.

A digestion method would improve sensitivity by 50 to 100 fold but would have to be done in a laboratory facility (or equivalent). Partly automatized systems such as Stomacher (R) or Trichomatic (R) would render the analysis fairly simple and this cold readily taught to non-specialized personnel.

An immunological technique (E.L.I.S.A.) could potentially be the optional solution for the future. However, it is much more expensive to acquire, requires expert technical personnel and, more importantly has not been validated on walruses. It was pointed out that antibody levels fall rapidly in humans one year after infestion and that if this was the case in walruses as well false negative results could readily occur. However, it was felt that this avenue should be explored possibly as a special research project alongside a monitoring program.

The idea of selecting Ivujivik as a test site was brought up since many crews from other communities do make a stop there on their way back from the hunt. However this is not universally the case and could not apply to communities from the Ungava region and those further south to Povungnituk who hunt in different areas.

A consensus quickly developed that testing should be done i the north as close as possible to the landing site. Ideally testing should be done in each community if monies available would allow being enough equipment.

Dr. MacLean cautioned the group against beginning too big and recommended only one test site in the beginning, gradually expanding the number of sites as we gained more experience. Others suggested 2 test sites, one for the Ungava coast, one for the Hudson Bay coast. This issue was not settled.

Dr. Gauthier expressed he opinion that it would be possible to train local Inuit personnel for this purpose since the identification of the worm is quite specific.

Mr. Olpinski pointed out that the main difficulty would be that of proper tagging of the meat carcasses and efficient transportation of samples. Adequate training would be required of new numbers prior to the hunt.

Stas Olpinski then suggested that the time had arrived for the participants to put on their organizational hat and state what each could be expected to contribute to such a venture.

Dr. Corriveau agreed with this. He pointed out that although the Law concerning Northern Villages and the Kativik Regional Government clearly outlines the duties and responsibilities of Municipalities and of the Kativik Regional Government itself in such matters (article 174.1) spirit with other stakeholders. Our object shall not be to identify one organization "responsible" to pay for such a program but to ask "what are <u>you</u> willing to contribute, what is this worth to you?"

If a monitoring program can prevent illness and thus decrease demand on health care services, then clearly health institutions (the Regional Council and the hospitals) should find an interest in it and be willing to contribute. If it will improve health of their citizens and prevent service delivery systems from breaking down because of ill-health, then municipalities ought to be willing to participate. Even though this food is not "sold" in the market place, its distribution to the general public should trigger involvement of MAPAQ in the spirit of its public protection mandate.

Similarly, the Hunter Support Program must be willing to assume some share of responsibility toward the impact of activities it finances both directly and indirectly.

Dr. Corriveau also expressed his hope that this venture could be the beginning of a much more comprehensive food monitoring program that cold eventually cover a wide range of possible food contaminates from PCB, toxic metals, to microorganism and others.

On behalf of the Inuulitsivik laboratory, Ms. Potvin expressed a willingness to offer some laboratory space for equipment and to provide supervision for staff that would be hired for this specific purpose, provided the technicians received training themselves and would not be held accountable. Dr. Normand Tremblay voiced his opinion that it would be surprising if Ungava Hospital expressed any kind of interest in participating given the current prevailing managerial philosophy. Stas Olpinski stated that Makivik Corporation might be able to provide space ad technical supervision for the testing program although it could not be expected to contribute financially.

In the absence of other community representatives, the delegate from Povungnituk, stated that as far as Mr. Qumak was concerned he felt confident that Council would accept responsibility for specimen collection and shipping and for transmitting test results back to the community if a clear proposal was made. Dr. Gauthier stated that technical assistance could be expected from MAPAQ, possibly for training of personnel, calibration of equipment, supplying positive meat samples and controls, etc...

Dr. Corriveau then offered to work with Ms. Suzanne Bruneau, on a proposal that would be developed along the following principles:

1. Municipal autonomy would be respected. Only communities willing to participate wold be included in a monitoring program;

2. The Municipal level would coordinate the effort at the local level, insuring proper sample collection and transportation to a test site, then adequate transfer of information to the public;

3. To begin with, meat sample would only be tested in one or two locations but if all goes well, the program could be entirely decentralized to the local level;

4. The automated digestion technology will be favored but research with ELISA techniques must continue;

5. Once the specific costs have been identified, grants will be sought if required at the regional and provincial level to tie all the pieces together.

It was made clear that this proposal, once drafted, will be submitted for review to all participants in this meeting and then presented first to the Kativik Regional Council of Health and Social Services, then to the Kativik Regional Government and the assembly of Mayors for endorsement. An attempt will be made to complete a first draft before the first week of January 1991.

This outline appeared to get the support of all participants. Dr. Corriveau thanked everyone for their participation and for helping this being a very production and constructive session.

The meeting was adjourned at 16:15PM

Minutes prepared by André Corriveau

APPENDIX 2

ANNUAL WALRUS HARVEST FOR NUNAVIK (1974-1991)

From: "Report on the 1991 Beluga Whale and Walrus Subsistence Harvest by the Inuit of Nunavik". Lorraine F. Brooke, DFO, May 1992.

Table 5

Annual Walrus Harvest for Nunavik (1974-1991)

Community	Harvest Year																	
	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91
<u>Hudson Bay Communities</u>																		
Kuujjuarapik	0	1	2	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0
Umiujaq	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	-	0
Inukjuak	4	7	1	3	2	8	7	7	2	0	15	9	11	12	7	0	8	8
Povungnituk	-	-	-	-	-	-	-	-	-	-	-	-	11	0	16	0	-	6
Akulivik	12	15	18	0	0	3	5	24	8	1	0	16	1	18	10	1	4	9
Sub-total	16	23	21	3	2	11	12	32	10	2	15	26	23	30	33	2	13	23
<u>Hudson Strait Communities</u>																		
Ivujivik	-	-	-	-	-	-	-	33	29	57	-	16	0	19	8	11	-	13
Salluit	57	59	13	1	0	5	36	30	73	2	27	16	91	1	8	0	10	3
Kangiqsujuaq	2	5	4	7	0	0	9	0	0	1	0	17	41	2	0	0	0	3
Quartaq	13	9	5	7	0	7	10	3	2	6	9	8	7	6	10	4	12	10
Sub-total	72	73	22	15	0	12	55	66	104	66	36	57	139	28	26	15	22	29
<u>Ungava Bay Communities</u>																		
Kangirsuk	7	7	7	9	2	1	8	4	5	7	3	13	3	0	7	5	-	6
Aupaluk	-	-	1	0	0	0	0	0	0	1	1	3	0	0	0	0	3	2
Tasiujaq	0	0	2	0	0	0	0	0	0	0	0	0	9	7	3	5	3	6
Kuujjuaq	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Kangiqsualujjuaq	0	1	1	0	0	1	0	0	0	0	0	0	0	3	0	5	0	0
Killiniq/Taqpangayuk	1	4	0	1	-	-	-	-	-	-	-	1	0	0	-	-	-	-
Sub-total	8	12	11	10	2	2	8	4	5	8	4	17	12	10	10	18	6	14
Total	96	108	54	28	4	25	75	102	119	76	55	100	174	68	69	35	41	66

(-) No data available.

1991 harvest

APPENDIX 3

LIST OF MEETINGS PARTICIPANTS

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LIST OF MEETINGS PARTICIPANTS

Planning meeting; Salluit; May 21, 1992

Mark Kakayuk, Municipal Councilor, Resp. Local HSP Program.
Jimmy Kakayuk, boat captain
Noah Isaac, boat captain
Eva Paujungie, Health Committee
Elijah Isaac, Health Committee
Eva Sakiagak, Taqramiut Nipingat Inc. Manager
Putulik Ilisituk, Taqramiut Nipingat Inc. Producer
Isaki Padlayat, Salluit Land Holding Corporation
Susie Ilisituk, Aniasiurtiapik and meeting translator
Don Cameron, Municipal Secretary-Treasurer
Stas Olpinski, Director, Co Reserchер; Head Makivik's Ren. Resource Development Dept.
Jean-François Proulx, main researcher, DSC-CHUL

Evaluation Meeting, Salluit, November 02, 1992

Mark Kakayuk, Municipal Councilor, Resp. Local HSP Program
Jimmy Kakayuk, boat captain
Noah Isaac, boat captain
Eva Paujungie, Health Committee
Elijah Isaac, Health Committee
Timmiaq Paujungie, TNI Producer and meeting translator
Maggy Kakayuk, Aaniasiurtiapik and local technician
Don Cameron, Municipal Secretary-Treasurer, project coordinator
Gregory Kaminski, Renewable Resource Dev. Dept., Makivik Corp.
Jean-François Proulx, main researcher, DSC-CHUL

Individual Interviews: (evaluation phase)

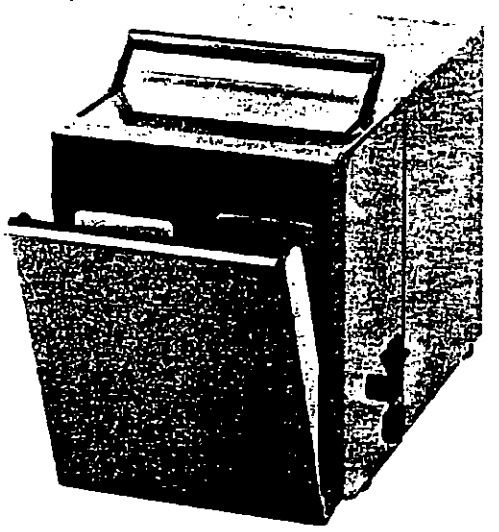
Mark Kakayuk, Municipal Councillor, Resp. Local HSP Program
Timmiaq Paujungie, TNI Producer
Maggy Kakayuk, Aaniasiurtiapik and local technician
Don Cameron, Municipal Secretary-Treasurer, project coordinator
Paul Papigatuk, former Mayor and first pilot project coordinator
Christine Gagnon, Parasitologist, training technician, McGill
Serge Provençal, RN, Salluit.

APPENDIX 4

STOMACHER [R] LAB-BLENDER TECHNICAL CHARACTERISTICS

STOMACHER

Lab-Blender



For cleaner, safer
and more effective blending

STOMACHER Lab-Blender

UNIQUE BLENDING METHOD

First introduced in 1972, the STOMACHER Lab-Blender provides a unique and extremely effective method of blending materials for analysis. Unlike the usual blending process, with the STOMACHER Lab-Blender the sample is clamped securely in a disposable plastic bag. Two reciprocating paddles operate on the bag to apply controlled pressure to the sample/diluent within it — so there is no contact between the machine and sample.

BENEFITS

The STOMACHER Lab-Blender has been shown to have the following benefits when compared with conventional methods:

1 A blending process completely free of contamination, eliminating potentially hazardous aerosol formation * and the need for cleaning or sterilising machine parts.

2 Blending takes only 30 seconds, which means a large throughput of samples can be handled.

3 Damage to microbial cells and tissues is minimised — a preferable condition when it is desired to perform subsequent membrane filtration.

4 If required, the bag can be easily heat sealed prior to the treatment of hazardous material.

5 A reduced temperature rise of sample during blending.

6 The STOMACHER Lab-Blender is very robust, reliable, quieter in operation and simple to use.

WIDELY USED

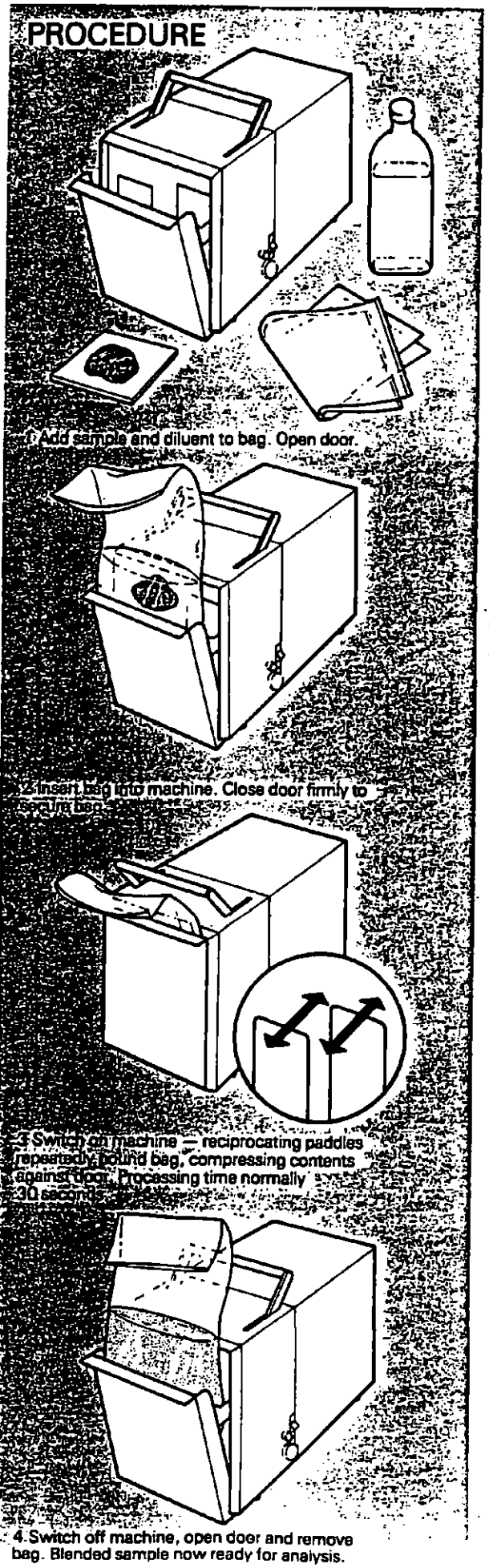
While used mainly to effect the release of micro-organisms from a sample undergoing microbiological analysis, the STOMACHER Lab-Blender has many other applications (see opposite and references).

The many establishments now using it for these various applications include:
Food Quality Control Laboratories
Hospital Pathology Departments
Public Health Laboratories
Pharmaceutical/Cosmetic Laboratories
Medical/Veterinary Research Laboratories

BAGS

Plastic Bags for use in the STOMACHER Lab-Blender are available in clean-packed or sterile form, and can be supplied made from either Polythene or PVDC — Copolymer. For blending dried foods, grain, rice and so on, the stronger PVDC bags are recommended.

PROCEDURE



* *Quotations from the 'Code of practice for the prevention of infection in Clinical Laboratories and Post Mortem rooms', published by the DHSS 1979 (The Howie Report).*

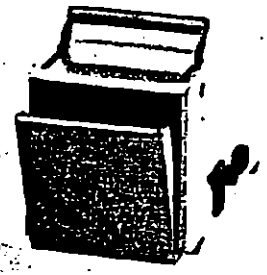
1 Page 25, paragraph 20.
SHAKERS AND HOMOGENISERS — INFECTIOUS HAZARDS
'Aerosols containing infected particles may escape from shakers and homogenisers between the cap and the vessel. A pressure builds up in the vessel during operation.'

2 Page 32, paragraph 25,
INFECTIOUS HAZARDS IN CHEMICAL PATHOLOGY, Section a, part IX
'Faeces must not be homogenised in open homogenisers. Homogenisers must not disperse droplets or aerosols into the room.'

STOMACHER 80

Specifications
Capacity 5-80ml
Dimensions 29cm x 15cm x 18cm
Weight 9kg

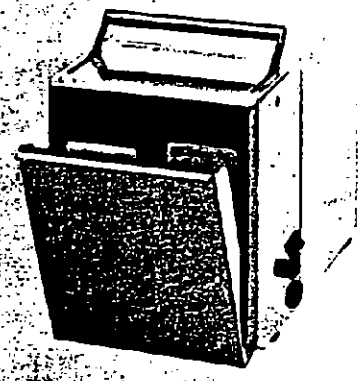
Applications
Tb. work with Sputa and Tissues. Quality Control on ointment and cream samples. Tissues in animal research.



STOMACHER 400

Specifications
Capacity 80-400ml
Dimensions 46cm x 24cm x 33cm
Weight 19kg

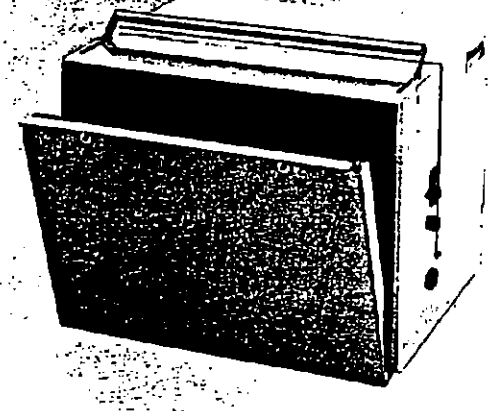
Applications
Microbiological analysis of food samples. The examination of powders. Trace element analysis of activated sludge by atomic absorption. Conductivity measurements of processed foods for nitrites and other salts.



STOMACHER 3500

Specifications
Capacity 1000-3500ml
Dimensions 48cm x 46cm x 41cm
Weight 31kg

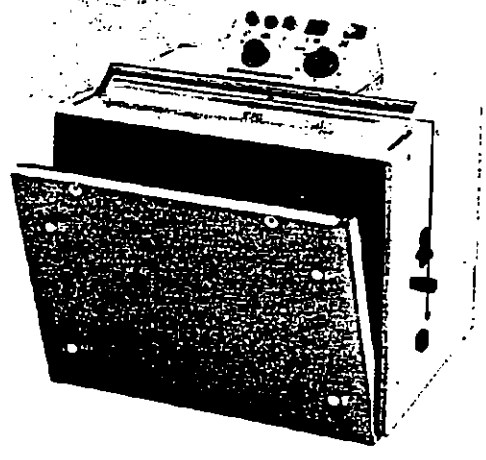
Applications
Faecal fat analysis. Menstrual blood loss analysis.



STOMACHER 3500 THERMO

Specifications
Thermostatic control ±1°C. Range 35-45°C
Capacity 1000-3500ml
Dimensions 48cm x 48cm x 56cm
Weight 39kg

Applications
Examination of muscle samples from animal carcasses for Trichinella Sp.



All STOMACHER Lab-Blender models are available in Standard Voltages. 230-250 volts, 50Hz/110 volts, 60Hz.

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Seward policy is one of continuing development and we reserve the right to amend specifications without prior notice.

seward medical

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APPENDIX 5

MEAT ANALYSIS PROTOCOL ADAPTED FROM DR. ROBERT LAVOIE, BIOCHEMISTRY DEPARTMENT, LAVAL HOSPITAL

ISOLATION OF TRICHINELLA LARVAE

The parasite that causes trichinosis is a nematode. Trichinosis occurs as a result of the invasion of muscles by the larvae.

The symptoms occur after the ingestion of meat infected with larvae. Within the intestine, encysted larvae are liberated by the process of digestion. These penetrate the intestinal wall where they reproduce. The female worm releases larvae which reach muscles by the circulatory system.

The worm is killed by freezing at -30 C for 24 hours, or by cooking.

Here is the method for detecting the presence of larvae in the muscle of infected animals:

MATERIAL REQUIRED

- Stomacher machine
- Water bath at 37 C
- 1 L Flasks
- Polyethylene Digestion Bags (400 ml)
- Weighing containers
- Measuring Spoons (2 ml, 5 ml and 25 ml)
- 600 ml Beakers
- Volumetric Pipette (10 ml)
- Conical Centrifuge Tubes (12 ml)
- Disposable Transfer Pipettes
- Centrifuge
- Stop watch
- Strainers (0.2 mm mesh size)
- Scissors
- Microscope Slides
- Coverslips
- Microscope

CHEMICALS

- Water
- Ice
- HCl concentrated 35%
- Pepsin 30,000 U/g

1) Preparation of HCl solution:

Measure 992 ml of water, place a portion, i.e. 200 ml in a 1 L flask. Pipette 8.3 ml of 35% HCl into a 1 L Flask, and add the rest of the water to the flask. The total volume will be 1 L. Gently swirl the flask.

Place the flask in the water bath (37 C). We will require 400 ml of warm HCl solution per digestion bag. This flask can serve for a maximum of 2 digestions. Additional flasks should be made up for additional digestions.

If only a digestion is to occur, the remainder of the HCl solution can be kept for future use.

2) Sample Preparation:

Each animal will consist of one sample. 5 grams of meat should be taken from the following tissues: jaw, ribs, back, shoulder and diaphragm. For each tissue, mince the meat with scissors or knife into small cubes (5 mm X 5 mm). 5 grams of meat will fit in a 5 ml measuring spoon (well packed).

Two bags will be used per digestion. Place one bag inside the other. This is to prevent loss of fluid should one bag burst. Place the 25 g of meat (5 g per tissue) in a digestion bag.

3) Digestion:

When the HCl solution has reached 37 C, preheat the stomacher machine by inserting a digestion bag with 400 ml of hot tap water. Remove as much air from the bag as possible prior to closing the door of the stomacher. Close the door and activate the machine.

While the stomacher preheats, add 400 ml of warm HCl solution to the bag containing the minced meat.

Add the pepsin: 1 2 ml full spoon, to the bag containing the meat and acid. Remove immediately the preheating bag, and insert the digestion bag (meat + HCl + pepsin). Activate the machine for 12 minutes.

During this time:
1) Place ice cubes in water in a 600 ml beaker.

2) If necessary, add 400 ml of warm HCl solution to the other bag, and leave in the water bath.

4) Recovery of the larvae:

After 12 minutes of digestion, remove the bag from the stomacher. (If necessary, remove other bag from the water bath, dry the exterior, add pepsin, and begin digestion in the Stomacher).

Filter the entire content of the bag through the strainer into a 600 ml beaker. Mix the contents well, and fill 2 conical centrifuge tubes.

Centrifuge the tubes 10 minutes at 1,500 R.P.M.

Decant the supernatant, and resuspend the pellet.

With a disposable pipette, place of portion of the resuspended pellet on a microscope slide, cover with a coverslip, and look for larvae using the microscope.

APPENDIX 6

ADDENDUM TO PROTOCOL

Complementary notes to the "*Research Protocol* " as stated by Stas Olpinski, dated September 4, 1992 at the attention of Christine Gagnon and to the laboratory procedures as determined by Dr. Robert Lavoie and entitled "*Isolement des larves de la trichinose*"

Using the Stomacher 400, 25 grams of meat per animal harvested are to be tested in a single procedure thus avoiding any type of pool digestion. 5 grams of meat per specified muscle (jaw, shoulder, ribs, diaphragm and back) will be added to compose the 25 grams of meat to be tested per animal.

In case of a positive test, three additional procedures should be carried on:

a) evaluation of separate muscle group concentration of larvae using the same stomacher 400 digestion protocol and 25 grams of meat from each specified muscle of the infected animal.

b) direct compression trichinoscopy. A small amount of meat (more or less half a gram) per specified muscle group of the infected animal is to be divided and pressed in between two microscope glasses. 10 to 12 specimen per specified muscle group will so be obtained. (50 to 60 for the whole positive animal) A careful inspection (60 to 90 seconds per specimen) with the microscope (magnification of 40 to 50) will be conducted and the average number of identified *trichinella spiralis* cysts per glasses will be noted for each muscle group.

c) ELISA. A preliminary assessment of this technique for the identification of *trichinella spiralis* infested walruses will be conducted if a positive test is to be obtained through the standard digestive method. 2 to 3 grams of meat per specified muscle group of the infested animal should be collected, identified, frozen and carried South at the attention of Dr. Charles Tanner (Institute of Parasitology; 514-398-7725). 2 to 3 grams of meat from at least 2 "normal" animals should also be collected, identified, frozen and brought to Dr. Tanner as check samples.

APPENDIX 7

CONTRACT OF THE TRAINER TECHNICIAN

APPENDIX 7

MEMORANDUM OF AGREEMENT date the 3rd day of September, 1992.

BETWEEN: Makivik Corporation
Renewable Resource Development Dept.

(hereinafter referred to as the "Company")

OF THE FIRST PART

AND: Christine Gagnon
P.O. Box 145, Laird Hall
MacDonald College Ste-Anne-de-Bellevue
H9X 3V9 (514) 457-9453

(hereinafter referred to as the "Contractor")

OF THE SECOND PART

WITNESSETH THAT in consideration of the mutual covenants and agreements herein contained, the parties hereto covenant and agree with each other as follows:

1. The Contractor shall, during the period commencing on the 3rd day of **September, 1992**, provide the services detailed in the Terms of Reference attached hereto to form part hereof and initialled by the parties for identification; **the contract will terminate no later than October 31st, 1992**

2. The Contractor shall report directly to **Stas Olpinski**, the Company's representative for the purposes hereof;

3. The Company, for the satisfactory performance of the services referred to in Section 1, shall pay the Contractor at the rate of **$100.00** per day worked;

   Note: per diem refers to 7 hr/day workday; if workday is in excess of 7 hrs payment will be awarded at $14.28/hr based on time sheets.

As estimated by the Contractor, the services to be performed by the Contractor shall be accomplished in no more than **fourteen** work days. As a result, the parties agree that in no event shall the fees payable by the Company to the Contractor pursuant to this Agreement, exceed **$1400.00**.

4. The Company shall assume directly or reimburse the Contractor upon presentation of justifying receipts for the following expenses:

Airfare: Montreal - Salluit (return) tavel warrants to be issued by Makivik
Travel to Quebec City: Return bus fare Montreal Quebec City or car mileage @ $0.35/km (bus receipts must be provided)
Accomodation: In transit (if required) and on locaiton in Salluit @ $65/day to be paid to host
One night hotel accomodation in Quebec (if required); receipt must be provided
Expenses per diem: meals not to exceed $30/day (backup receipts must be provided for food purchased)

Unless otherwise authorized in writing by the Company, all other expenses incurred by the Contractor in carrying out his duties shall be for his account.

5. The Company shall pay the Contractor for his services following submission by the Contractor of invoices outlining days worked, services rendered and expenses incurred, if any, together with justifying evidence, such invoices, the last of which is to be accompanied by the documentation required in section 6, to be submitted as follows:

Payment for services to be made upon completion of work as per attached Terms of Reference.

Notwithstanding the foregoing, the Company may hold back part or all of any payment if, in its sole opinion, the work to be performed is not proceeding at the pace established in the Terms of Reference;

6. At the termination of this Agreement, the Contractor shall forthwith transmit to the Company all completed work and in the event of early termination, all work in progress including all research , reports, papers, material and information relating thereto which shall become the property of the Company;

7. Notwithstanding anything to the contrary, this Agreement may be terminated by either party by giving **48 hrs** notice thereof in writing to the other party. In such event, the Contractor shall be entitled to be paid all fees earned and reimburse all expenses incurred until such termination date;

8. It is understood and agreed that this Agreement is a contract for the performance of a service and that the Contractor is engaged as an independent contractor and is not nor shall he be deemed to be an employee, servant or agent of the Company.

9. The Company shall not be liable for any injury or damage (including death) to the person or for loss of or damage to the property of the contractor in any manner based upon, occasioned by or in any way attributable to the Contractor's services under this Agreement, unless such injury, loss, or damage is caused by the negligence of an officer or servant of the Company while acting within the scope of his employment;

10. The Contractor shall at all times indemnify and save harmless the Company for and against all claims, demands, losses, costs, debts, damages, actions, suits or other proceedings by whomsoever made, sustained, brought or prosecuted in any manner based upon, occasioned by, arising out of or attributable in any way to the performance or purported performance of the Contractor's services under this Agreement.

11. The Contractor shall not assign this Agreement or any part thereof without the permission of the Company.

12. Any notice, document or other communication required or permitted to be given hereunder shall be in writing and shall be sufficiently given if sent by prepaid registered mail from a Post Office in Canada addressed in the case of the Company to:

Stas Olpinski, Head
Renewable Resource Development Department
Makivik Corporation
P.O. Box 179
Kuujjuaq, Quebec
J0M 1C0

or addressed in the case of the Contractor to:

_____

_____

_____

_____

or if delivered by hand at such addresses. Each of the foregoing shall be entitled to specify a different address by giving written notice as aforesaid to the other. Any such notice, if mailed, shall be deemed to have been given on the third business day following such mailing or, if delivered by hand, shall be deemed to have been given on the day of delivery if a business day or if not a business day, on the business day next following the day of delivery.

13. This Agreement shall be deemed to be made in accordance with the laws of the Province of Québec.

14. The present Agreement has been drafted in the English language at the express and mutual consent of the parties; la présente Convention a été rédigee en anglais á la demande expresse et conjointe des parties.

IN WITNESS WHEREOF the parties hereto have executed this Agreement the day and year first above written.

_____ Per:

_____
Witness

_____ Per:

_____
Witness

"TERMS OF REFERENCE"

Pilot Project for the monitoring and analysis of the parasite Trichinella spiralis in walrus meat harvested by Sallumiut: a local initiative to protect the community against trichinosis.

Research Protocol

The contractor, Christine Gagnon will be responsible for the following work related to this project:

Training session Quebec City

Under the supervision of Dr. Lavoie (Laval University) the contractor will receive instruction in the use of the stomacher 400 machine to be used for digestion analysis of walrus meat samples (for the presence of Trichinella spiralis larvae). The contractor will be responsible for picking up the stomacher 400 machine from Baxter Canlab, 6800 Trans Canada Highway Pte Claire, Quebec H9R 5L4. The contact person is Ghyslaine Verroneau as per arrangements with Dr. Jean-Francois Proulx (Main Researcher in this project (418) 985-2888). The contractor in collaboration with Dr. Lavoie will identify the laboratory equipment/supplies required to conduct digestion analyses in Salluit and provide such list to Stas Olpinski (Associate Researcher in this project (819) 964-2951) Stas Olpinski will make arrangements for purchase and shipment of equipment/supplies required (either Canlab or Fisher Scientific).

Training and Analyses in Salluit

The contractor will travel to Salluit on dates corresponding to the timing of the walrus hunt in Salluit (at present it is projected hunters will be leaving Salluit during the week of September 21st, 1992). Based on previous walrus hunts conducted by the community of Salluit the average duration of hunts is 10 days. The contractor should expected to travel Montreal to Salluit on September 28th. Travel arrangement will be made by Stas Olpinski.

The contractor will bring with her to Salluit samples of a rat infected with Trichinella spiralis in order that the analysis protocol developed with Dr. Lavoie may be explained and shown to the Salluit trainee.. Arrangements for obtaining an infected rat have been made with Dr. Charles Tanner (Institute of Parasitology (514) 398- 7725) and the contractor is to contact Dr. Tanner to pick up the specimen prior to travel to Salluit.

In Salluit the contractor will be responsible for training Maggie Qaqayuk (819) 255-8035). the local Salluit resource person pertaining the sampling and analyses of walrus meat.
Two boats are to be participating in the walrus hunt from Salluit and a maximum of 25 walrus are anticipated to be harvested.

During the walrus hunt itself the animals will be butchered into large segments (generally 6 pieces). A crew member will be responsible for marking each piece

with tag permitting unique identification of each animal will be marked with the same number coding) on return to Salluit, individual walrus will be re-grouped in caches according to tag coding permitting samples to be taken from individual animals without mixing between animals. As per arrangement with the community of Salluit no meat will be distributed to residents prior to completion of all analyses. Samples from each animal will be taken by the contractor and the Salluit trainee in the following manner.

1) Muscle samples are to be collected from following locations on each individual (re-grouped) walrus carcass.

jaw	shoulder
ribs	diaphragm
back	

Meat samples from each individual muscle group will be placed in individual whirl pack bags and identified with coding specifying walrus #(as per tag attached on board vessel) and muscle group (ie jaw, shoulder etc)

2) Meat samples will be stored refrigerated prior to digestion analyses. Analyses as per protocol defined during the contractors training session with Dr. Lavoie will be conducted at a location in Salluit as per arrangements made with Paul Papigatuk. Assistance pertaining to the use of microscope, centrifuge and other sundry items is to be given by Serge Provencal, nurse at the Salluit nursing station (919) 255-8975, as per arrangements with Dr. Andre Coriveau of Innulitsivik hospital in Povungnituk, (819-988-2957 ext. 259).

- it is particularly important that the Salluit trainee is involved in <u>all</u> aspects of sample collection and analyses in order that future analyses may be completed independently by Salluit personnel. A detailed written protocol is to be developed by the contractor to facilitate future analyses.

- in addition to digestion analyses, compression trichonoscopy is to be attempted to evaluate effectiveness of this procedure as compared to digestion.

Detailed records pertaining to analyses results are to be maintained pertaining to positive/negative presence of trichinae. These results will be provided both to project researchers, the community of Salluit and local health authorities. On completion of the project a meeting will be scheduled between the contractor and project researchers to discuss this years operations and recommendation for future analyses.

It should be noted that Paul Papigatuk, Salluit Mayor (819-255-8956) is the key contact person in Salluit regarding this project and will play the lead role regarding liaison pertaining all issues.

APPENDIX 8

REPORT PRODUCTION SHEET

PILOT PROJECT FOR MONITORING TRICHINELLA SPIRALIS IN WALRUS MEAT HARVESTED BY SALLUMIUT

DATE Sept 30/92 Oct 4/92 (2nd time)

ANIMAL IDENTIFICATION 7

TISSUES ANALYZED: Rib, Jaw, Diaphragm, hind, shoulder

PROCEDURE FOLLOWED: Shoemaker

RESULTS: (NEGATIVE) ✓ POSITIVE: INTENSITY: _____

IF POSITIVE, WHICH TISSUES AND AT WHAT INTENSITY?

TRICHINOSCOPY RESULTS: _____

IF POSITIVE, ATTEMPT TO OBTAIN LIQUID FROM THE MUSCLES FOR ELISA TESTING. NOTE BELOW THE IDENTIFICATION METHOD USED ON THE TUBE:

COMMENTS:

1st Digestion

Tube 1 → 1st slide -ve
2nd slide -ve.

Tube 2 → 1st slide -ve.
2nd slide -ve

2nd time

-ve
-ve (cysts)

-ve

-ve

APPENDIX 9

SUMMARY OF REPORT ANALYSIS AND RELATED RECOMMENDATIONS

October 7, 1992

Here is a summary of the animals that were tested for the presence of Trichinella spiralis, and the results of the analyses:

Noah's Boat:

The following animals were tested and no parasites were found:

- Walrus # 2
- Walrus # 3
- Walrus # 4
- Walrus # 5
- Walrus # 6

We were only able to analyze 4 out of 5 muscles from Walrus # 1. These were found to be negative. It can probably be assumed that this animal is safe to eat raw or frozen.

Jimmy's Boat:

We were only able to analyze one complete walrus from this boat: Walrus # 7. This animal was found to be negative. For Walrus #8 4 out of 5 muscles were analyzed. These were found to be negative. Thus, walruses #7 and #8 are assumed to be safe to eat raw or frozen. For all other walruses, we cannot say whether they are safe or not. We can say that the following pieces are safe:

- Walrus #4: Rib, head and shoulder
- Walrus #6: Rib
- Walrus #5: Head
- Walrus #1: Hind Quarter

All untagged pieces should be assumed to be unsafe since we were not able to test these animals.

Thank-you.

Christine Gagnon

Christine Gagnon

APPENDIX 10

INVENTORY OF REQUIRED MATERIALS

INVENTORY OF MATERIALS FROM PILOT PROJECT
FOR ISOLATION OF *Trichinella spiralis* FROM WALRUS MEAT
IN SALLUIT

Material	Had	Used	Remaining
Transfer Pipettes	500	70	430
Microscope Slides	10 boxes	2.5 boxes	7.5 boxes
Coverslips	10 ounces	2 ounces	8 ounces
Stomacher Bags	550	90	460
Centrifuge Tubes	500	60	440
Disposable Weighing Dishes	500	30	470
Gloves	1 box	1/3 box	2/3 box
Lab. Wrapping Film	1 box	1/10 box	9/10 box
HCl acid	500 ml	100 ml	400 ml
Pepsin	500 g	70 g	430 g
Thermometers	2	-	2
Thermometer Case	1	-	1
Water Bath	1	-	1
Boiling Flasks (1 L)	6	-	6
Beakers (500 ml)	6	-	6
Graduated Cylinder	1	-	1
Volumetric Pipettes	10	-	10
Pipette Bulb	1	-	1
Tube Rack	1	-	1
Scissors	1	-	1
Measuring Spoons	2 sets	-	2 sets
Strainers	2	-	2
Cutting Board	1	-	1
Knife	1	-	1
Spring-Fold Back Clips	12	-	12
Pens for marking Glass	3	-	3
Dish Cloths	2	-	2
Tea Towels	2	-	2

It should be noted that the amount of material purchased was based on 25 animals all being positive, thus necessitating 150 tests to be done.

APPENDIX 11

INVITATION LETTER TO THE NUNAVIK MAYORS

APPENDIX 11: INVITATION LETTER TO THE NUNAVIK MAYORS

October 14, 1992

Mr. Jobie Epoo
Mayor
CNV of Inukjuak
Inukjuak (Québec)
J0M 1M0

Sir,

As you may be aware a research program is currently being implemented in Salluit in order to document the feasibility of locally testing walrus meat, harvested by the community, for the presence of Trichinella spiralis a parasite causing trichinosis.

This research is funded, in part, through the Kativik Regional Council of Health and Social Services community health subsidy program. It is coordinated by Dr. Jean-François Proulx, Community Health Advisor and involves regional partners including Makivik Corporations' Renewable Resource Development Department, Inuulitsivik Health Centre, Taqramiut Nipingat Inc., the Salluit Municipal Corporation, Kativik Regional Government Hunter Support Program, the Salluit Hunting, Fishing and Trapping Association, Salluit's walrus hunters and the local Health Committee.

Out of the five outbreaks of trichinosis (a disease caused by a small parasite present in approximately 2% of walrus) that have affected Nunavik communities in the 1980's, three have occurred in Salluit. In addition to some people becoming sick, the population as a whole, has become concerned about the safe consumption of raw walrus meat resulting in the abandonment of Salluit walrus hunts in 1990 and 1991.

This fall two Salluit vessels conducted a community sponsored walrus hunt however before meat was distributed within the community selected samples were tested for the possible presence of Trichinella spiralis by a locally selected/trained technician and her supervisor.

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Kativik Regional Council of Health and Social Services
Conseil régional Kativik de la Santé et des Services sociaux
P.O. Box 900. Kuujjuaq (Québec) J0M 1C0
Tel (819) 964-2222 Fax: (819) 964-2888

This research program is currently in it's evaluation phase addressing the following questions:

Is the procedure locally feasible as currently structured?

Is it technically too complex?

Is the training of hunters and the technician adequate?

Has community information and support been adequate?

Are the roles and responsibilities of partners involved clear and pertinent?

Should this program be repeated next year?

If yes what modifications should be considered and who should assume coordination and funding?

In order to discuss these points a meeting is scheduled in Salluit on October 29th, 1992 that will involve the forementioned partners.

Recently some other communities indicated an interest in implementing such a program if the pilot-project carried out in Salluit is proven a success.

Public diffusion of results is planned through a TNI video production and written research reports. However in order for interested communities to get first hand information on the planning process and implementation of such a program, an invitation is transmitted to your community to delegate a representative to attend the meeting as an observer. Unfortunately there are neither sufficient funds within the research budget to cover travel costs nor delegate pay. It will therefore be up to individual communities to bear all costs of sending representatives to this meeting.

If extra clarifications are required by the delegate observers on any aspect of this years pilot project in Salluit, the researchers will be available to answer their questions in an evening meeting. It is not the intent to take any decision about possible program in other communities but rather to provide basic information on trichinosis and prevention methods which could be brought back to local authorities. Depending on the outcome and participation of other communities at this meeting a subsequent meeting will be scheduled at a later date to further discuss and planify similar program in interested communities.

/3...

Please rest assured that we would be pleased to welcome your community delegate on this occasion.

Sincerely,

Jean-François Proulx, MD
Community Health Advisor

Putulik Papigatuk
Mayor
CNV of Salluit

ᐆᑦᑐᐱᕆ 14, 1992

ᔪᐱ ᐃᐳ
ᓯᕗᓕᕐᑎ
ᐃᓄᒃᔪᐊᑉ ᑯᐊᐳᕇᑦᓴᖓᑦ
ᐃᓄᒃᔪᐊᒃ

ᐊᐃ,

ᒫᓇᐅᓕᖅᑐᖅ ᖃᐅᔨᒪᖅᑯᓕᕋᐱᑦ ᖃᐅᔨᓴᕐᓂᐅᔪᒥᒃ ᐱᔪᒥ ᓴᓪᓗᓂ ᒫᓇ, ᐃᒪᒃ ᐊᓪᓚᓯᒪᔪᖑᑎᖃᕋᓱᒍᑦ ᐱᒍᓐᓇᕋᓱᐊᕐᓂᒥᒃ ᓄᓇᓕᐅᑉ ᖃᐅᔨᓴᕐᑕᐅᓂᖏᓐᓄᑦ ᑕᒪᒃᑯᐊ ᐊᐃᕖᑦ ᓂᕿᖏᑦ, ᐱᔭᐅᓱᑦ ᓄᓇᓖᒍᑦ ᑲᒥᓇᓱᐊᕐᓱᑭᑦ ᐃᒪᐃᑦᑐᒥ ᐱᑕᖅᑲᕐᑎᓗᒍ ᐋᓐᓂᐊᓇᕐᑐᒥᒃ ᑕᐃᔭᐅᔪᒥ Trichinella spiralis-ᖑᓂᕋᕐᑕᒥ ᐱᓕᕿᓱᒥᒃ ᐋᓐᓂᐊᒥᒃ ᐃᓗᓯᒪᖕᖏᑐᓂ ᓂᕆᓂᒃᑯᑦ, ᐆᓇᓕᕿᓱᒥ ᐊᒻᒪᓗ ᓂᕿᖏᓐᓂ ᓴᖕᖏᓕᑎᑦᓯᓱᖑᑦᓯᓂ ᐃᓄᓐᓂᒃ.

ᑖᓐᓇ ᖃᐅᔨᓴᕐᓂᐅᔪᖅ ᕿᓇᐅᔭᒃᑯᑦ ᐃᑲᔪᕐᑕᐅᓂᖃᕐᒪᑦ ᐃᓚᐃᓐᓇᑰᓗᐊᖅ ᑖᑦᓱᒎᓗ ᑲᑎᕝᒃᑯᑦ ᓄᓇᓕᓕᒫᑦ ᐋᓐᓂᐊᓂᓕᕆᓂᖓᑕ ᐊᒻᒪᓗ ᐃᓄᓕᕆᓂᖓᑕ ᑲᑎᒪᕕᖓᓐᓄᑦ, ᓄᓇᓕᐅᑉ ᐋᓐᓂᐊᓂᓕᕆᓂᖓᑕ ᐃᑲᔪᕋᓱᐊᕐᓂᒎᑦ ᐱᓇᓱᐊᕐᑕᐅᔪᐃᑦ ᐱᒍᑦᔨᕝᖓᓐᓄᑦ. ᑕᒪᓐᓇ ᑐᑭᒎᐊᕐᑎᑕᐅᓂᖃᕐᑐᖅ ᑖᑦᓱᒎᓗ ᐋᓐᓂᐊᓯᐅᕐᑎᒪᕆᒻᒎᑦ ᔫᓐ-ᒐᕌᓐᓯᐊ ᐳᕿᒎᑦ, ᓄᓇᓖᒥ ᐋᓐᓂᐊᓂᓕᕆᓂᕐᒎᑦ ᖃᐅᔨᒪᑎᑦᓯᔩᐅᔪᖅ ᐊᒻᒪᓗ ᐃᓚᖃᕐᓱᓂ ᑕᒪᓐᓇ ᓄᓇᓕᓕᒫᑉ ᐃᓚᕌᑦᑐᕝᒍᑎᖏᓐᓂᒃ ᐃᓚᐅᑎᓪᓗᒍ ᒪᑭᕝᒃᑯᑦ ᐱᕿᕆᐊᓪᓚᕗᓯᐊᕐᓂᒎᑦ ᐃᑲᔫᑎᖏᑦ ᐱᕙᓪᓕᐊᔭᐅᔪᑦ ᐱᓕᕆᕝᖓᓐᓄᑦ, ᐃᓅᓕᑦᓯᕝᐅᑉ ᐋᓐᓂᐊᕝᖑᑎᖓᓐᓄᑦ, ᑕᕐᕋᒥᐅᑦ ᓂᐱᖕᖁᒃᑯᖏᓐᓄᑦ, ᓴᓪᓗᑉ ᑲᕙᒫᐱᒃᑯᖏᑦᑕ ᑯᐊᐳᕇᑦᓴᖓᓐᓄᑦ, ᑲᑎᕝᒃᑯᑦ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᒃᑯᖏᑦᑕ ᒪᕐᑲᐃᑦᑎᓂ ᐃᑲᔪᓇᓯᐊᕐᑎᖏᓐᓄᑦ, ᓴᓪᓗᐃᓗ ᒪᕐᑲᐃᓐᓂᓕᕆᔩᒃᑯᖏᓐᓄᑦ, ᐃᖅᑲᓗᓐᓂᐊᓂᑦᒎᑦ ᐊᒻᒪᓗ ᑭᒥᒋᐊᕐᓂᐊᓂᕐᒎᑦ ᑎᒥᖁᑎᐅᔪᖅ, ᓴᓪᓗᒥᐅᓪᓗ ᐊᐃᕖᕐᓯᐅᑎᖏᑦ ᐊᒻᒪᓗ ᓄᓇᓕᖓᑕ ᐋᓐᓂᐊᓂᓕᕆᔨᐊᐱᒃᑯᖏᓐᓄᑦ.

ᑕᓪᓕᒪᐅᔪᑦ ᐱᖃᑦᑕᓂᐅᓯᒪᔪᑦ ᑖᑦᓯᒪ ᓱᒃᑯᓇᕐᑐᔫᒃ ᓂᕿᖓᓐᓃᓱᑦ ᐊᐃᕖᐅᑉ (ᐋᓐᓂᐊᖑᔪᖅ ᐱᑎᑕᐅᑦᓯᓂ ᒥᕿᔪᐊᐱᓪᒎᑦ ᖁᐱᕐᕈᒎᑦ ᐱᑕᖃᓱᒎᑦ 25-ᐳᓴᓐᑎᖓᓂ ᐊᐃᕖᐅᑉ) ᓱᕐᕋᐃᓂᖃᕐᓯᒪᑦᓯᓂ ᓄᓇᕕᐅᑉ ᓄᓇᓕᖁᑎᖏᓐᓂ ᐊᕐᕌᒍᔪᓂ 1980-ᖓᓐᓂ ᐱᖓᓱᐃᑦ ᓄᐃᓯᒪᑎᑦᑐᒋᑦ ᖃᐅᔨᔭᐅᓯᒪᔪᑦ ᓴᓪᓗᓂ. ᐃᓚᒋᐊᕐᓗᒍᓪᓗ ᐃᒫᒃ ᐃᓚᖏᑦ ᐃᓄᐃᑦ ᐋᓐᓂᐊᓕᖃᑦᑕᓯᒪᑎᑦᑐᒋᑦ ᓄᓇᓕᖓᑕ ᐃᓗᐊᓃᑦᑐᓗᒫᑦ ᐃᓄᐃᑦ ᑭᓯᑦᓯᒋᑦ, ᐃᓱᒫᓗᑎᖃᖃᑦᑕᓯᒪᓕᕐᒪᑕ ᓱᒃᑯᓇᕐᑐᖃᑐᐃᓐᓇᓇᐊᖃᕐᓂᖏᓐᓂᒃ ᑕᒪᒃᑯᐊ ᐊᐃᕖᑦ ᐃᓗᒪᖕᖏᑐᑦ ᐊᒻᒪᓗ ᑕᒪᓐᓇ ᐊᐃᕖᕐᓯᐅᓂᖅ ᓴᓪᓗᓂ ᓄᖅᑲᖓᓪᓚᑲᐃᓐᓇᑎᑕᐅᑎᓪᓗᒍ ᐊᕐᕌᒍᓐᓄᑦ 1990 ᐊᒻᒪᓗ 1991.

ᑕᒡᓗᓂ ᐅᑭᐊᑦᓴᐅᔪᒥ ᒪᕿᔫᑉ ᓴᓪᓗᐃᑦ ᐅᒥᐊᖁᑎᒃ ᐊᑑᑎᓂᖅᑐᕕᓃᑉ ᓄᓇᓕᖓᑕ ᐱᒍᑦᔪᓂᖓᓄᑦ ᐊᐃᕖᕐᓯᐅᑎᑕᐅᑦᓯᑎᒃ, ᑕᐃᒪᐃᓪᓚᑦ ᑕᒪᒃᑯᐊ ᓂᕿᖏᑦ ᐊᐃᕖᑦ ᑐᓂᐅᖅᑲᑕᐅᓕᐅᕋᑎ ᐃᓄᓐᓄᑦ, ᓇᐅᑦᓯᑐᕐᓃᑦ ᐱᔭᐅᖅᑳᓕᐅᑲᑦᑐᕖᓂᑦ ᐱᑕᖅᑲᒪᖓᑦ ᑖᑦᓯᒥᖓ ᖁᐱᕐᕈᐊᐱᐅᔪᒥᒃ ᑲᒪᕿᔭᐅᑦᓯᑎᒃ ᓄᓇᓕᐅᑉ ᑎᓕᓯᒪᔭᖓᓄᑦ ᖃᐅᔨᒪᔪᒪᓇᓗᑦ ᓇᐅᑦᓯᑐᕐᑎᒍᑦ ᐊᒻᒪᓗ ᑖᑦᓯᒪ ᓇᐅᑦᓯᑑᕐᑎᐅᑉ ᐊᖓᔪᖅᑳᖓᓄᑦ

ᑲᑎᕝ ᓄᓇᓕᓕᒫᑦ ᑲᑎᒪᔨᖏᑦ ᐋᓐᓂᐊᓂᓕᕆᓂᕐᒧᑦ ᐃᓅᓯᓕᕆᓂᕐᒧᓗ ᐱᒍᑦᔨᓂᕐᒧᑦ
Kativik Regional Council of Health and Social Services
Conseil régional Kativik de la Santé et des Services sociaux
P.O. Box 900, Kuujjuaq (Québec) J0M 1C0
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ᑖᓐᓇ ᖃᐅᔨᓴᕐᓂᐅᔪᖅ ᐱᓇᓱᐊᕐᑕᖅ ᒫᓐᓇᐅᔪᖅ ᐊᑑᑎᖏᕐᑕᐅᓱᓂ ᐅᑯᓂᖓ ᐊᐱᖅᑯᑎᖃᕐᑐᖅ:

ᑕᒪ ᑖᓐᓇ ᐱᓇᓱᐊᕐᑕᐅᔪᖅ ᓄᓇᓕᒻᒧᑦ ᐱᔪᒍᓐᓇᓱᐋᖅᑲ ᐋᖅᑭᑕᐅᓯᒪᓂᖓ ᑕᑯᓐᓇᓱᒍ?

ᐱᓇᓱᐊᕐᓯᒎ ᐱᔭᕆᐊᑐᓗᐊᖅᑲ?

ᐱᒋᐅᕐᓴᑕᐅᓂᖔᑦ ᐆᒪᔫᕐᓯᐅᑏᑦ ᐊᒻᒪᓗ ᖃᐅᔨᓴᕐᑎᐅᑉ ᓈᒻᒪᓱᐊᖅᑲ?

ᓄᓇᓕᐅᑉ ᑐᓴᕐᑎᓯᕕᖓᑦ ᐊᒻᒪᓗ ᓴᐳᑦᔨᓂᖓᑦ ᓈᒻᒪᓱᐊᖅᑲ?

ᑕᒪ ᐱᓇᓱᐊᕐᓂᖏᑦ ᐊᒻᒪᓗ ᐃᓱᒫᓘᑎᖃᕐᓂᖏᑦ ᑕᒪᒃᑯᐊ ᐃᓚᒌᑦᑑᔪᑦ ᐃᓚᐅᑦᓱᑎᒃ ᑐᑭᓯᓇᕐᓯᐊᖃᑦ ᐊᒻᒪᓗ ᑐᕋᕐᓂᖃᑦᓯᐊᖃᑦ ᐱᓇᓱᐊᕐᑕᒥᒃ?

ᑖᓐᓇ ᖃᐅᔨᓴᕐᓂᐅᔪᖅ ᐱᒋᐊᓪᓚᑐᑦᓴᐅᕙ ᐊᕐᕋᒍᕐᐸᑦ?

ᕆᐊᓪᓚᑐᑦᓴᐅᑐᐊᕐᐸᑦ ᓱᓇᐃᑦ ᐋᖅᑭᐊᕈᑎᑦᓴᐃᑦ ᐃᓱᒪᒋᔭᐅᒋᐊᖃᕐᐸᑦ ᐊᒻᒪᓗ ᑭᓇᒃᑯᑦ ᑕᖃᕐᑎᓯᔪᑦᓴᐅᕙᑦ ᑐᑭᒧᐊᕐᑎᓯᓂᕐᒥᒃ ᐊᒻᒪᓗ ᑮᓇᐅᔭᖃᕐᑎᓯᓂᕐᒥᒃ?

ᑕᒪᒃᑯᐊ ᐅᖃᓕᒪᐅᑎᒋᒋᐊᓖᑦ ᐱᑦᓗᒋᑦ, ᑲᑎᙵᓂᑦᓴᐅᔪᖅ ᐋᖅᑭᑕᐅᓯᒪᓂᖃᕐᑐᖅ ᓴᑦᓗᓂ ᐆᑦᑐᐱᕆ 29-ᖑᓕᕐᐸᑦ ᑕᓪᓚᓂ ᐊᕐᕈᒧᒋ ᐃᓚᐅᓛᕐᑎᓗᒋᑦ ᑕᒪᒃᑯᐊ ᐅᖃᕐᑕᐅᖃᑦᑕᑲᐃᓐᓇᑐᑦ ᐃᓚᒌᑦᑐᑦ.

ᒫᓐᓇᖅᑲᒻᒋᓗ ᐃᓚᖏᑦ ᓄᓇᓕᐅᔪᑦ ᐅᖃᕐᓯᒪᓕᕐᑐᑦ ᐃᒪᒃ ᐃᓛᐅᒍᒪᓂᖃᕐᓱᑎᒃ ᑲᔪᓯᑎᑦᓯᓂᕐᒧᑦ ᑕᐃᒪᐃᕐᑐᒋ ᓄᓇᓕᒻᒋᓂ ᑖᓐᓇ ᓯᕗᓪᓕᐸᐅᑦᓱᓂ ᖃᐅᔨᓴᕐᓂᕕᓂᐅᔪᖅ ᓴᑦᓗᓂ ᓚᑦᓯᐊᑐᕕᓂᐅᑐᐊᕐᐸᑦ.

ᐃᓄᓕᒫᓂ ᑐᓴᕐᑎᓯᓂᐅᔪᖅ ᑕᒪᒃᑯᓂᖓ ᖃᓄᐃᓕᖕᒐᓂᐅᔪᓂ ᐱᔭᐅᓂᖅᑲᖑᓯᑦᑐᖅ ᑕᒡᒍᓇ ᐊᑐᕐᓗᓂ ᑕᕐᕿᒋᐅᑦ ᓂᐱᖕᒫᒃᑯᖕᒋᓐᓂᒃ ᑕᕐᕿᓕᔾᔪᕐᓗᒋᑦ ᓴᓇᔭᐅᓯᒪᓗᑎᒃ ᐊᒻᒪᓗ ᐊᓪᓚᓯᒪᔭᕐᑎᒍᑦ ᖃᐅᔨᓴᕐᓂᕕᓂᐅᑉ ᑐᓴᕐᑎᓯᐅᑎᒋᒻᒋᔾᔪᖕᒋᑦ. ᑕᐃᒪᐃᑦᓴᒪᑦ ᑕᒪᒃᑯᐊ ᓄᓇᓖᑦ ᑲᔭᓯᒍᒪᓯᒪᔭᑦ ᖃᐅᔨᓴᕐᓂᓂ ᓯᕗᓪᓕᐅᔪᐅᓗᑎᒃ ᑐᓴᕐᑎᑕᐅᔪᕆᐊᓖᑦ ᐃᒫᒃ ᐱᕈᓪᓕᐊᓂᑦᓴᖕᒪᓂᒃ ᐊᒻᒪᓗ ᑲᔭᓯᑎᑕᐅᓂᑦᓴᖕᒪᓂ ᑕᒪᑦᓯᒪ ᖃᐅᔨᓴᕐᓂᐅᒐᔭᕐᑐᑦ, ᑕᒪ ᖃᐃᖁᔨᓂᖅ ᓄᓇᓕᐅᑉ ᑭᒡᒐᖅᑐᕐᑎᓴᖕᒪᓂ ᐱᓯᒪᓕᕐᑐᖅ ᑖᒍᖕᒪ ᑲᑎᙵᓂᑦᓴᐅᔪᒧ ᓴᓪᓗᓄᑦ ᐃᒫᒃ ᑑᓴᕆᐊᕐᑐᓗᓂ ᐊᒻᒪᓗ ᕿᒋᕐᕈᑎᐅᒋᐊᕐᑐᓗᓂ. ᑭᓯᐊᓂᐅᒐᓗᐊᖅ ᑕᒪᓐᓇ ᖃᖕᒐᑦᑕᐅᔫᓂᐅᒐᔭᕐᑐᖅ ᑭᒡᒐᖅᑐᕐᑎᒐᓕᓐᓂ ᐱᑕᖃᕐᓯᐊᖕᒋᒪᒪᑦ ᑮᓇᐅᔭᑎᒍᑦ. ᑕᒪ ᓄᓇᓕᖕᒐᑦᑕ ᑖᑦᓯᒪ ᐊᐃᒋᐊᖃᒐᔭᕐᑐᖅ ᑲᑎᙵᓂᑦᓴᒧᑦ ᑐᑭᑖᒋᐊᖃᒐᔭᕐᑐᖅ ᖃᖕᒐᑦᑕᐅᔫᓗᓂᓘᓐᓂᑦ ᑕᑦᓯᒋᖓ ᑭᒡᒐᖅᑐᕐᑎᐅᔪᒋᒃ ᑲᑎᙵᒋᐊᕐᑐᒋᒃ.

ᐋᖅᑭᒋᐊᕈᑎᑦᓴᐅᔪᑦ ᐱᔭᐅᔭᕆᐊᖃᕐᐸᑕ ᑖᑦᓯᒧᖕᒐ ᑭᒡᒐᖅᑐᕐᑎᐅᔪᒧᑦ ᖃᐅᔨᓴᕆᐊᕐᑐᑐᒧᑦ ᐱᑦᔪᑎᒋᓗᒍ ᑖᓐᓇ ᓯᕗᓪᓕᐅᒍᑎᐅᑦᓱᓂ ᖃᐅᔨᓴᕐᓂᕕᓂᐅᔪᖅ ᐊᐃᕕᕐᓂᒃ ᓴᓪᓗᓂ, ᑕᒪ ᖃᐅᔨᓴᕐᑎᐅᔪᑦ ᑖᒃᑯᒪ ᐊᐃᓯᒪᔪᐃᑦ ᑭᒡᒐᖅᑐᕐᑏᑦ ᐊᐱᖅᑯᑎᖕᒋᓐᓂ ᑭᐅᒍᓐᓇᖅᑲᑦᑕᖁᔭᕐᑐᑦ ᐅᓐᓄᓴᒃᑯᑦ ᑲᑎᙵᓂᖃᓕᕐᐸᑕ. ᐃᒫᒃ ᐱᒐᓱᐊᕐᓂᖃᑦᔭᖕᒋᑦᑐᖅ ᑕᒪᑦᓯᒪ ᒋᑦᓴᓄᑦ, ᑐᑭᑖᕐᑎᓯᒐᓱᐊᑦᔭᖕᒋᑦᑐᖅ ᓯᕗᓂᑦᑕ ᐱᓇᓱᐊᕐᑕᐅᓂᑦᓴᖕᒋᓐᓂᒃ ᐊᓯᖕᒋᓐᓂ ᓄᓇᓕᐅᔪᓂ ᑭᓯᐊᓂ ᐱᑦᓯᐊᑐᒋ ᐱᑕᖃᕐᑎᓯᒐᓱᐊᕐᓂᒧᑦ ᑐᑭᓯᒪᑎᑦᓯᓂᒃᑯᑦ ᑕᒪᑦᓯᒪ ᖁᐱᕐᕉᐸ ᒋᑦᓴᓄᑦ ᐊᒻᒪᓗ ᓄᖅᑲᖕᒋᑎᑦᓯᒐᓱᒋᑦᓴᐃᑦ ᐊᑐᕐᑕᐅᒐᔭᕐᑐᑦ ᑐᑭᓯᑎᑦᓯᒍᑎᐅᒐᔭᕐᓯᑎᒃ ᐅᑎᕐᐸᑦ ᑭᒡᒐᖅᑐᕐᑎ ᓄᓇᓕᖕᒋᑎᒋᓄᑦ ᑖᒃᑯᓂᖓ ᐊᖕᒐᔪᖅᑲᒋᓂᒃ. ᖃᓄᐃᓪᓗᐊᓂᖕᒋᑦ ᑭᓯᐊᓂ ᑲᒪᒋᓗᒍ ᐊᒻᒪᓗ ᐊᐃᔭᐃᑦ ᐃᓚᐅᒋᐊᕐᑐᑐᐃᓪᓗ ᐱᑦᓴᐸᑕ ᓄᓇᓕᓐᓂ ᐱᓯᒪᔭᑦ ᑲᑎᙵᒋᐊᕐᑐᑐᐃᑦ, ᑕᒪ ᐊᓯᒋᐊᓪᓚᖕᒐ ᑲᑎᙵᓂᑦᓴᖅ ᐋᖅᑭᑕᐅᒋᐊᓪᓚᒋᐊᖃᒐᔭᕐᑐᖅ ᓯᐊᑉᐱᓂᑦᓴᐅᓕᕐᐸᑦ

ᐅᖃᓕᒫᑦᓯᓚᓱᐊᖅᓄᑦ ᐊᒻᒪᓗ ᐱᓐᓂᐊᓚᓱᐊᖅᓄᑦ ᐊᑦᕕᒫᓚᑦᑕᖅᑦ ᐱᓂᐅᔪᓐ ᑲᑎᒪᓂᕐᓂ ᐱᔭᕇᓂᖅᓄᑦ.

ᖃᐅᕕᒪᑦᓱᐊᓪᓚᑦᓱ ᑭᓴᑐᑎᑎᕆᖃᖅᓂᒃ ᑐᖅᖁᓱᑦᓱᐊᑎᑦᓱᓚᕆᖅᑦᑕ ᓄᓇᓕᖅᓂ ᐱᓱᒪᔨᒥᐅ ᑕᒪᖅᓇ ᐱᓇᓱᐊᖅᓄᑐᒍ.

(ᓴᐃᓂᖅᓱᒪᔨᖅ)
ᓴᖅ-ᑲᖏᖅᓱᐊ ᐅᕕ, ᐋᖅᓂᐊᓱᐅᖅᑎᒪᓪᓚᐅᔨᖅ
ᓄᓇᓕᒻᒥ ᐋᖅᓂᐊᓂᓕᓪᓂᖅᓯᑦ ᑐᓴᖅᑎᓱᕕ

(ᓴᐃᓂᖅᓱᒪᔨᖅ)
ᐅᑐᓕ ᐸᐱᑲᖅᑐᖅ
ᓱᑲᓕᖅᑎᖏᑦ ᓴᖅᓄᒥᑦᑎᐅᑦ

APPENDIX 12

EVALUATION OF ANNUAL COSTS FOR THE OPERATION OF A LOCAL TRICHINOSIS PROTECTION PROGRAM

APPENDIX 12

EVALUATION OF ANNUAL COSTS FOR THE OPERATION OF A LOCAL TRICHINOSIS PROTECTION PROGRAM*

HUMAN RESOURCES; SALARY:			
-Local technician	12 days ($180.00/day)	$2,160.00	
-Local assistant	07 days ($150.00/day)	$1,050.00	
-Technical supervisor (Makivik Corp.?)	10 days ($250.00/day)	$2,500.00**	
-Local program coordinator (HSP ?)	20 days ($200.00/day)	$4,000.00**	
SUB-TOTAL:			$9,710.00

HUMAN RESOURCES; TRANSPORTATION AND ACCOMMODATION CHARGES:				
	Transportation	Accommodation	Total	
-Local coordinator	$ 800.00	$ 400.00	$1,200.00	
-Local technician	$ 800.00	$ 400.00	$1,200.00	
-Technical supervisor	$ 800.00	$ 520.00	$1,320.00	
SUB-TOTAL:			$3,720.00	$3,720.00

MATERIAL RESOURCES:		
-Sampling, tagging and analysis material	$ 500.00	
-Annual inspection of equipment	$ 500.00	
-Material transportation	$ 900.00	
-Phone-Fax charges	$ 250.00	
-Annual Report production	$ 200.00	
SUB-TOTAL:	$2,350.00	$2,350.00

TOTAL:	$15,780.00
-Unforeseen expenses: 5%	$ 789.0
GRAND TOTAL	$16,569.00***

* Purchase cost of Stomacher [R] Lab-Blender not included: $3,535.35

** Are included here the salary of the technical supervisor (who might be paid by the regional organization responsible for the program) and the salary of the local walrus meat monitoring program coordinator (who might be paid by the HSP).

*** If are excluded the salaries paid to the local coordinator and to the technical supervisor, the total annual budget would come down to $9,744.00