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REPORT OF TRAVEL

TO

SRI LANKA

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Technical Report

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I. BACKGROUND, GENERAL INFORMATION

Sri Lanka is a pear shaped island off the southeastern coast of India. It is approximately 300 miles long and 150 miles wide at its widest point with approximately 1,100 miles of coastline. The population of Sri Lanka is approximately 15 million.

Sri Lanka's traditional exports have been tea, rubber, coconut, spices and gems. In recent years the government has encouraged the exportation of selected seafood products. The policy of the Ministry of Fisheries regarding the export of marine products is to monitor exports very carefully and to insure that increased exports are permitted only if they meet the following conditions:

A. They are high priced species which do not constitute a major portion of the domestic seafood supply.

B. The specific fishing is labor intensive and provides significant domestic employment.

C. There is no depletion of fish stocks or other adverse effects on the ecology.

D. The foreign exchange earnings from overseas sales are substantial.

Shrimp, prawns and lobster qualify under the above provisions whereas, many other commercial species do not. The current market price of prawns and shrimp averages U.S. $7.47 per kilogram on the Japanese market and approximately U.S. $6.76 per kilogram on the U.S. market. Selected species, size and style of pack commands a significantly higher price.

During 1984, 79.6% of the export earnings from Sri Lanka's seafood industry came from frozen prawns and shrimp. This amounted to approximately 2,600 metric tons valued at 19.6 million U.S. dollars. Lobster exports contributed 3.3% of the export earnings of the seafood industry. This amounted to approximately 123 metric tons[1] with an approximate value of 0.8 million U.S. dollars.

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[1] Source: Sri Lanka Export Development Board.

Approximately 95% of Sri Lanka's production of export quality shrimp, prawns and lobster are exported to Japan with the balance being shipped to the United States, the Netherlands and lesser amounts to other countries.

Even though most of Sri Lanka's seafood exports are shipped to Japan, this amounts to only approximately 1% of the shrimp and prawns that Japan imports each year. Sri Lankan exporters realize that this is a relatively insignificant percentage of Japan's needs and further understand that if their product does not meet Japanese standards and requirements, their shipments could be terminated by the Japanese with very little impact on the Japanese market. The Sri Lankan exporters have also learned that there is a market in Japan and the United States for very high quality seafoods which command higher than average prices. It is this market that these exporters are striving to capture. Because of the economic importance of shrimp, prawns and lobsters, the seafood exporters are dedicated to maintaining high quality export products which will insure their continued acceptance in the marketplace of the world.

The primary government agency responsible for inspecting the seafood processing factories and for issuing registration certificates to qualified firms is the Sri Lanka Standards Institution (SLSI). They are assisted in making registration inspections by representatives of the National Aquatic Research Agency, the Department of Labor and the Department of Commerce.

The Sri Lanka Standards Institution's authority is based on Export Control Notice No. 4/74 which designates the Ceylon Standards (now SLSI) to be responsible for inspecting seafood factories prior to registration of the individual firms. The basis of registration of processing establishments by the Sri Lanka Standards Institution is the Sri Lanka Standard 208:1981 "Code of Hygienic Practices for the Processing of Frozen Lobsters and Prawns, (First Revision).

II. PURPOSE OF VISIT

As a follow-up to a four-week assignment to Sri Lanka in 1983, the Sri Lanka Standards Institution made a request through the United Nations Industrial Development Organization (UNIDO) that I return to Sri Lanka for a three month assignment. The U.S. Food and Drug Administration approved a 4-5 week appointment which was

satisfactory to the UNIDO. After several delays due to domestic disturbances in Sri Lanka, I was officially assigned to serve as an Advisor on Organoleptic Assessment of Marine Products to the Sri Lanka Standards Institution for a 4-5 week consultancy.

During this consultancy I was attached to the Sri Lanka Standards Institution (SLSI). I worked on a daily basis with SLSI officers, but also worked in close cooperation with other government and industry organizations concerned with quality control of seafood products. This included the Export Development Board (EDB), the National Aquatic Research Agency (NARA), and the Marine Products Exporters Association of Sri Lanka.

The purpose of the consultancy was three fold and is described as follows:

A. To train SLSI officers in the inspectional techniques to be used in inspecting fresh, frozen and canned seafood processors. This included lectures, demonstrations, discussions and in-plant inspections in which the SLSI officers conducted inspections and rated six different seafood factories.

B. To train SLSI officers in the organoleptic assessment of seafood products and to assist in organizing training courses on organoleptic assessment procedures in order to enable SLSI officers to present sensory evaluation workshops on a periodic basis to industry and government sponsored organizations.

C. To study the Registration Scheme currently administered by the SLSI for processing establishments of marine products and to make recommendations to strengthen and streamline these activities. This entailed numerous meetings with various governmental and industry groups to obtain information and feedback concerning problems associated with inspections, registration procedures and export procedures.

III. INITIAL INTRODUCTIONS AND MEETINGS

During the first weekend in Sri Lanka, I met individually with several government and industry officials. [Dr. N.R. DeSilva, Director General for the Sri Lanka Standards Institution (SLSI), Mr. Srilal DeSilva, Assistant Director of the SLSI and Mr. Mervyn Andriesz, President of the Seafood Processors Export Association.]

They individually briefed me on a proposed schedule which had been prepared and discussed what they hoped would be accomplished during the consultancy. They also discussed some of the problems (principally administrative) in the industry as perceived by the SLSI on one hand, and by the Exporters Association on the other.

On Monday, January 13, I again met with Dr. N.R. DeSilva, Srilal DeSilva, and met Mr. Ranjit Jayawardene, Acting Deputy Director General, SLSI and Mrs. Chandra Wijeyesinghe, Director SLSI who discussed the finalized agenda that I would follow during this assignment (see Attachment A).

I also went to the United Nations Industrial Development Organization complex (UNIDO) where I met Mr. Theo Schroll, UNIDO Senior Industrial Development Advisor for Sri Lanka, Maldives and Nepal. He introduced me to his assistant, Mr. Stefan Ericsson.

We discussed my appointment and what was expected to be accomplished. Mr. Schroll made arrangements for me to meet other UNIDO officials and on January 15, I met first with Ms. Gloria Douglas, UNIDO Representative and Mr. Wiese Aheha, Assistant Representative for Administration who briefed me on administrative matters and gave me instructions to follow in case a domestic disturbance arose while I was on this detail. I also had the opportunity to meet Mr. Kahana, Deputy Representative to the United Nations Development Program (UNDP). Mr. Kamp who is the senior representative in Sri Lanka was out of the country at the time. Mr. Kahana appeared to be very knowledgeable and interested in this assignment and indicated he would be interested to learn of the progress made in solving some of the problems facing the Sri Lanka seafood industry.

I also stopped by the U.S. Embassy in Colombo to inform the Agricultural Attache of my visit. I met with Mr. Stephen Pattison who is a consular at the embassy. I informed him of my schedule and the reasons for this appointment to Sri Lanka. After we discussed the assignment, Mr. Pattison indicated he would be happy to assist me in any way he could during my stay in Sri Lanka.

IV. DISCUSSION

Although described in more detail in section 2, the purpose of this consultancy is briefly re-stated as follows:

A. Train SLSI officers in inspectional techniques and procedures.

B. Train SLSI officers in the organoleptic assessment of seafood products.

C. Study the registration scheme for processing establishments and make recommendations on how to strengthen and streamline the registration procedure.

A. Train SLSI Officers in Inspectional Techniques and Procedures

SLSI management officials and members of the Exporters Association both expressed concern that many of the junior SLSI officers were inexperienced seafood inspectors and were not adequately trained. Industry officials were particularly concerned about inexperienced officers making inaccurate judgements during an inspection which would adversely effect a firm's credibility and/or registration certification. Numerous examples were cited by members of the Exporters Association. Typical of these concerns was the inexperienced officer who during an inspection reported a freezer temperature to be higher than it should have been, when in fact, the freezer was in a cycling phase which was not an indication of the temperature of the frozen product in the freezer. It was pointed out that if the inspector had checked the internal temperature of the freezer or checked the thermometer reading an hour later, they would have seen that the temperature was down where it should have been.

Another complaint expressed by the exporters concerned the attire worn by some of the inexperienced inspectors during an inspection. They indicated that some SLSI officers attempted to make inspections without proper foot wear, protective clothing, or hair covering. They objected to receiving an adverse

report concerning the dress of an employee of the firm when the inspector was less appropriately dressed. In some cases it was reported that an inspector was denied permission to enter a factory when improperly dressed.

Prior to conducting an inspection during this training, two days of lectures, demonstrations, slide presentations and discussions were presented to approximately 15 SLSI officers. These presentations covered Current Good Manufacturing Practices, basic inspectional techniques, proper procedures for seafood handling and stressed the importance of time/temperature relationships in maintaining seafood quality.

During these classroom sessions the students collectively prepared a simple, but quite complete inspection checklist (see Attachment 6 C-1) which was to be used during subsequent inspections during the training course.

This checklist consisted of items suggested by the students, from provisions of the current good manufacturing regulations and from the Sri Lanka Code of Hygienic Practices for Processing of Quick Frozen Lobsters and Prawns (208:1981). The Seafood Factory Compliance Checklist included such items as:

1. Condition of buildings and premises
2. Water supply
3. Temperature of product at various points in processing line
4. Lavatory accomodations
5. Equipment, containers and utensils
6. Cleaning and sanitizing procedures
7. Sanitation controls
8. Control of insects, birds and animals
9. Raw materials
10. Personal cleanliness
11. Cooling and refrigeration facilities

A unique feature about this checklist was the provision which required the inspector to discuss the inspectional findings at the conclusion of the inspection with the factory manager and to inform him of any discrepancies noted during the inspection. A space on the form is also provided for comments by and signature of the factory manager.

During the classroom sessions the importance of time/temperature relationship was emphasized. A chart showing the generation time of spoilage organisms (Table #1) was given to each participant along with a Relative Fish Spoilage Rate Chart (Table #2) which are reproduced here to aid in the explanation of their use.

Table #1

BACTERIA DOUBLE

$0^{\circ}C$ - every 20 hours

$5^{\circ}C$ - every 6 hours

$10^{\circ}C$ - every 3 hours

$15^{\circ}C$ - every 2 hours

$20^{\circ}C$ - every 1 hour

$30^{\circ}C$ - every 1/2 hour

Table #2

RELATIVE FISH SPOILAGE RATES
(TIME IN HOURS)

TEMP	2	4	6	8	18	24
$0^{\circ}C$	.1	.2	.3	.3	.8	1.0
$4.5^{\circ}C$	.2	.4	.6	.7	1.7	2.2
$10^{\circ}C$	.3	.7	1.0	1.3	3.0	4.0
$15.5^{\circ}C$	.6	1.2	1.7	2.3	5.2	6.9
$21^{\circ}C$	.7	1.4	2.0	2.7	6.1	8.1

(Equivalent days at $0^{\circ}C$)

Table #1 shows the generation time of bacteria at various temperatures. It becomes readily apparent that seafood products held at $20^{\circ}C$ will deteriorate almost 20 times as fast as seafoods held at $0^{\circ}C$. Likewise, Table #2 shows how temperature abuse effect the shelf-life of a product. For example, a seafood product held at $0^{\circ}C$ for 24 hours is equivalent to 1 day at $0^{\circ}C$, wheras, the same product held at $21^{\circ}C$ for 24 hours is equivalent to a product held at $0^{\circ}C$ for 8.1 days.

It was stressed to the SLSI officers that it is easy to use these examples when instructing factory workers who soon begin to realize that seafood products held for even 1 or 2 hours at elevated temperatures adversely effects the quality and shelf-life of the product. Several examples and exercises were used to show where temperature abuse may occur from time of catch to consumption by the consumer (See Attachment 6 C-2).

During the ensuing several days, the SLSI officers made inspections of five freezer facilities and one canned factory (see Attachment 6B, Photos #1-3). At the conclusion of each inspection the officers met with the factory management and discussed their inspectional findings.

While the SLSI officers were making their inspection of a firm, I took numerous photographs of both good and poor manufacturing practices that I observed during the inspection. I used a special polaroid slide film which I could develop each evening in my hotel room. Every morning before we began another inspection, I would project these slides and we would again discuss the previous days inspection.

Participants were asked to rate each factory on a 1-10 scale with scores of 1-2 indicating unsatisfactory conditions observed, ranging up to 9-10 which indicated an excellent operation. As a result of the inspection checklist, the frequent discussions both during and at the conclusion of the inspection, the SLSI officers rated the factories very similarly. Results of the inspections of the five freezer factories were as follows:

		FACTORY				
RATING SCORE	RATING	A	B	C	D	E
9-10	Excellent	7		3	[illegible]	[illegible]
7-8	Very Good		6	3	[illegible]	[illegible]
6	Good		1			
5	Average					
3-4	Poorer than Average					
1-2	Unsatisfactory					

Note that 7 of 7 inspectors rated factory A as Very Good, 6 of 7 rated factory B as Good, with one inspector rating it one step lower -- Average. The above ratings show that with proper guidelines, detailed instructions, and experience, the SLSI officers can make consistent, uniform ratings. This also indicates that with proper training and experience, essentially the same rating would be made at any given factory, irregardless of which inspector made the inspection.

During the actual inspections of the factories, the SLSI officers were divided into two groups in order to restrict the number of inspectors in a factory at one time.

A word of thanks should be expressed on behalf of the factory owners and managers who allowed from 8-15 SLSI officers and instructors to inspect their firms at one time. Without their cooperation it would have been impossible to accomplish as much training as we did in a relatively short period of time.

B. Train SLSI Officers in the Organoleptic Assessment of Seafood Products

The second objective of this consultancy was to train SLSI officers in the sensory or organoleptic evaluation of seafood products. In preparation for this portion of the training, Mr. Srilal DeSilva, Assistant Director of the Standards Institution and I spent several days preparing an authentic decompostion pack. We did this by purchasing very fresh seafood products and allowing them to deteriorate over a period of time under controlled conditions.

In order to prepare such a pack, it is important to do this at a location that is typical of natural occurring conditions. Fortunately, one of the shrimp factories allowed us to prepare the pack in their facility. We began by freezing a portion of the very fresh shrimp and for the next 2-3 days we froze successive increments as evidence of deterioration became evident. Increments were removed 2-3 times daily until by increment #8, advanced decomposition was present. Samples of White and Flower headless, in-shell shrimp, peeled and deveined White and Flower shrimp and cooked and peeled White shrimp were prepared for the sensory training sessions.

As with the inspectional techniques training, the sensory training began with one day of lectures, slide presentations and demonstrations of organoleptic procedures.

Instructional material explaining the organoleptic analysis of food products, organoleptic classifications of decomposition, methods of examination, typical seafood spoilage curves, charts which describe the stages in spoilage of seafood products were explained, discussed and made available to all SLSI officers. (See Attachment 6 C-3 for several of the instructional handouts used during this training session.)

During the training session each participant was assigned several demonstration packs in which the various stages of decomposition were described and examined. They were also assigned several unknown samples which were examined for evidence of decomposition and then rated according to the guidelines that had been previously discussed and demonstrated.

The participants were also required to independently grade several samples which were examined for a total of 9 defects which included dehydration, black spot, uniformity of size, damaged or broken units, pieces, loose shell and decomposition. For each of the factors they were instructed to assign points for varying degrees of defects from 0-4 with 0 indicating very good quality and 4 indicating a serious defect (see Attachment 6 C-4).

On one sample which was prepared to show various defects, the six participants in one session independently examined and rated separate, individual samples containing 50 shrimp. The results on this sample (one of the last in the session) showed very close agreement with individual scores being 15, 14, 16, 15, 13, 14.

By the end of the training session, essentially all of the participants were in close agreement as to what they would rate as acceptable quality and what they would classify as decomposed or unacceptable. See Attachment 6B Photographs #4-8 for pictures of SLSI officers examining products during the sensory evaluation sessions.

C. Study the Registration Scheme for Processing Establishments and Make Recommendations on How to Strengthen and Streamline the Registration Procedure

This phase of the consultancy required numerous meetings to discuss the problems with the registration scheme as perceived by various interested industry and government groups. In an attempt to resolve some of the problems, numerous meetings with Sri Lanka Standards Institution officials (SLSI), industry representatives associated with the Marine Products Exporters Association, and the National Aquatic Research Agency officials (NARA) were held to discuss and resolve problems perceived by the various groups.

From the SLSI management's viewpoint the major concerns were as follows:

1. SLSI officials acknowledged that some officers lack training and experience in the procedures of conducting a complete and meaningful inspection. They also pointed out that two of the three objectives of this consultancy were aimed at addressing and correcting this shortcoming.

2. There was a general feeling that proposals submitted by SLSI to improve or insure the continued high quality of exported products is met with resistance and suspicion from some members of the Export Association.

3. SLSI officials expressed concern about the practice in which the Export Development Board occasionally allows a firm to continue exporting seafood products even though the SLSI has revoked or denied a registration certificate to a firm when major violations of the Sri Lanka Code of Hygienic Practices has been observed.

4. SLSI officials believe that in order to accurately assess the day-to-day conditions in a factory, routine unannounced inspections should be conducted at all lobster and shrimp factories. Those factories with a problem or a poor record would be inspected more frequently than those with good performance records.

5. SLSI officials believe that periodic sampling of in-line samples, finished products, water samples, etc. should be collected for microbiological analyses in order to monitor for potential problems.

6. SLSI officials believe that Export Control Notice No. 4-74 clearly assigns the SLSI as the agency responsible for making inspections and issuing registration certificates, and as such it is their responsibility to monitor and register all prawn and lobster factories.

The Marine Products Exporters Asscciation's major concerns were as follows:

1. They believe that most SLSI inspectors are not knowledgeable or experienced in many of the aspects of the seafood industry. As a result, many processors feel that this lack of experience adversely effects their credibility.

2. In general, the Exporter Association is opposed to microbiological or chemical testing of their products.

3. They also oppose the use of microbiological standards as the criteria to be used in accepting or rejecting a lot of frozen prawns or lobsters.

4. They oppose pre-shipment examination of products on a lot-by-lot basis prior to exportation. They believe this would cause undue delays and additional unnecessary expense.

5. They oppose unannounced inspections because they want to have a factory offical present whenever an inspection is made in order to learn immediately of any shortcomings in the factories operations. They pointed out that in some cases the SLSI's report to factory management may not be received for up to a month or more after the actual inspection.

6. The Export Association frequently pointed to their excellent record for the past several years in which virtually no shipments of Sri Lankan prawns or lobster have been rejected by an importing country. It was mentioned that this outstanding

record is mainly the result of the exporters themselves and they would like to see the SLSI as more of a partner in maintaining high quality instead of assuming the role of an adversary.

7. The Export Association recommends that only one government agency make inspection visits, collect samples, or data at their firms. They believe that there should only be one agency to report to, or to obtain information from, etc. In the past with several agencies involved, it became confusing as to what areas and involvement each agency was responsible for. They also believe that this recommendation would prevent a duplication of efforts by two or more agencies.

The National Aquatic Research Agency (NARA) concerns were as follows:

1. NARA officials would prefer to collect their own research samples. They believe that it is necessary to obtain the history of samples collected, observe the quality of samples at the time of collection, ask questions about unusual circumstances noted in connection with the samples, that perhaps a routine sample collector would not be aware of. They also feel strongly that the results they obtain on research samples should not be used for regulatory purposes and that the results of individual processors should not be given to other government agencies or to other industry groups. NARA would periodically publish the results, but individual processors would not be identified.

2. NARA also prefers to retain one position on the registration inspection panel as it has in the past. They believe that they have very well trained and experienced personnel that can contribute significantly to the registration process.

As a result of numerous meetings and discussions with industry and government representatives, a number of recommendations are submitted which it is believed if implemented will result in closer cooperation between the SLSI and the Exporters Association. It will also assure that high quality seafood products are consistently produced by processors in Sri Lanka. See Section V. (Recommendations).

V. RECOMMENDATIONS

A. SLSI Inspectional Training

The following items are recommended to insure that SLSI officers are well trained, experienced and maintain their investigational expertise.

1. A cadre of SLSI officers has been trained in basic investigational techniques. The junior officers are now prepared to begin making inspections with an experienced officer. The junior SLSI officers should accompany a senior officer to observe proper investigational techniques and procedures. As the junior officers become more confident and proficient, then they should become the "lead inspector" with the more experienced inspector acting only as an observer. At the conclusion of each inspection the senior inspector should point out areas in which the junior inspector could improve his/her investigational approach or technique in order to perform a more thorough inspection. After acting as the lead inspector on a number of inspections the inspectors should be able to make consistent, meaningful inspections on their own. Occasionally the supervisory inspector should accompany all of the inspectors in his section to insure that proper inspectional techniques and procedures are being followed by all SLSI officers.

2. Another way in which a supervisory inspector can ascertain the effectiveness of his inspectors is to prepare a "mock inspection" in which all inspectors are given hypothetical factory conditions in a classroom situation and are asked to rate and judge the conditions "observed." After all inspectors have reached their own independent conclusions, the supervisory inspector will explain and discuss the "schools solution." This type of training not only emphasizes what is considered to be relevant to the inspection but also promotes uniformity and consistency among all inspectors.

3. Inspectors should be trained to be observant of improvements that have been made in seafood factories since the last inspection. These changes should be mentioned to factory management during a discussion with management session at the conclusion of the inspection and should also be included in the factory inspection report.

4. At the conclusion of an inspection there should be a meeting with management in which conditions observed during the inspection are discussed. The results of the inspection should also be included in a factory inspection report which is prepared by the inspector and should describe in detail any discrepancies noted during the course of the inspection. It should also include any factory processing improvements which were noted since the last inspection. Prior to making an inspection, the SLSI officer should review the factory file to acquaint themselves with the history of the firm and to alert them to potential problems that they may encounter at the factory during the inspection.

5. A good, competent inspector doesn't have to "find things wrong" during an inspection. If a firm is doing a good job, the inspector should not hesitate to mention this to management and also in the factory inspection report. Pointing out insignificant discrepancies in order to justify an inspection frequently does more harm than good in regards to working relations between the inspector and factory management.

6. It should be mandatory that all inspectors conduct themselves and dress in a professional manner. All SLSI officers should be adequately dressed before entering a factory. This means wearing proper footwear such as boots, proper outer wear such as coveralls, smocks or laboratory coats, proper hair covering such as hats, caps, hair nets, etc. If the saris worn by many Sri Lankan women are not judged to be appropriate attire during seafood factory inspections, then they should not be worn. Very few, if any female factory workers were observed wearing saris while in the processing areas.

B. <u>SLSI Officers Organoleptic Training</u>

The sensory evaluation workshops presented to the SLSI confirmed that the SLSI has a cadre of trained organoleptic examiners. With proper guidelines, training, instruction and experience, the SLSI officers were able to demonstrate their ability and uniformity of judgement in this area.

In order to maintain and to improve on this expertise it is essential to have frequent reinforcement of these skills. This can be accomplished as follows:

1. SLSI supervisors should prepare frequent quality assurance samples in which all SLSI officers are assigned unknown test packs of various seafood products which have been prepared to contain near guideline levels of decomposition. SLSI officers should rate each unit individually and make a judgement as to whether the sample is passable in regards to decomposition or not. After the decision has been made and reported to the supervisor, the supervisor should also evaluate the unknown pack. Any discrepancies should be pointed out and discussed.

2. Authentic packs should also periodically be prepared which contain various defects such as loose shell, black spot, extraneous material, etc. Inspectors should be instructed to grade the shrimp according to accepted Sri Lanka standards. As with decomposition packs, the supervisor should also grade the pack and any discrepancies should be discussed. The above authentic packs insure uniformity of grading among the SLSI officers and also give SLSI management a good insight as to which of the SLSI officers are the most consistent and accurate in their assessment of seafood quality.

3. Supervisory SLSI officers should frequently accompany SLSI officers during assigned inspections of seafood factories in order to evaluate the inspectors ability to judge quality and correctly grade the seafood products being processed by the various seafood factories. This also gives the supervisor the chance to observe the officers professional appearance and ability to deal with factory management and personnel under various conditions.

4. SLSI officers should be encouraged to present organoleptic training and grading procedures seminars to the quality control departments of the seafood processors which they are routinely inspecting. This will establish credibility of the SLSI officers and promote uniformity of grading and classification of seafood products throughout Sri Lanka.

C. Registration Scheme

The registration inspection of the seafood factories is the most important inspection of the year for the exporters because the results of the inspection dictate whether a firm is certified to export their products or not. Since this one inspection is so critical to the factories the following recommendations are proposed:

1. It is essential that registration inspection panel members be well qualified, experienced personnel who have considerable knowledge of the operations and procedures used at the factories they will be inspecting. The panel should consist of three members who are designated by their respective agencies and who will be made available to make the inspections at all of the firms who apply for registration.

   The panel will be composed of an officer from the SLSI who will be the senior member of the panel, a NARA officer and one other qualified member from the Department of Health or the Department of Commerce.

2. The registration inspections will be conducted during November and December of each year so that by the first of January all qualified firms will be registered for the ensuing year. Firms should receive the SLSI application forms in early October of each year and inspections can be scheduled by the panel as applications from the seafood factories are received.

3. The processors will be notified at least three working days prior to the registration inspection in order that the firm's top management officials can be present during the inspection if they elect to be.

4. A list of critical inspection factors will be prepared from the Sri Lanka Code of Hygienic Practices (208:1981) and be available to all processors. If during the course of the registration inspection one or more critical items are found to be deficient, the factory will be denied certification until the deficiencies are

corrected. There should be no exceptions to this rule. It would not only jeopardize the safety and quality of the seafood product to allow a firm to operate while in violation of one or more critical factors, but it is also unfair to the other seafood processors who may have spent considerable time and money to install equipment or safeguards to meet the requirements of the same critical factor.

5. Each member of the inspection panel will independently inspect and rate the factory using the checklist provided in SL 208:1981. At the conclusion of the inspection the panel members will meet to discuss their findings and then as a group will discuss the results of the inspection with factory management. Minor, major and critical factors, if observed during the inspection should be discussed. At the conclusion of the discussion, a copy of the panel's report will be presented to the senior factory employee present at the meeting.

   If the inspection has revealed a critical violation which will result in the denial of registration, this item should be discussed in detail and the firm should be granted a reasonable time to correct the deficiency before a follow-up inspection is scheduled. If this time period extends into the next calendar year, the firm will not be granted permission to export their products until the deficiency has been corrected and the panel has made a reinspection.

   A final written report signed by all members of the panel will be sent to each processor after any necessary laboratory work is completed (i.e., microbiological analyses of water samples or other laboratory analyses deemed necessary by the inspection panel. It is essential that laboratory analyses be conducted in a timely manner so as to not delay issuance of registration certification to qualified processors.

6. Throughout the year SLSI officers will make periodic inspections of all seafood processing factories. Some of these inspections may be pre-announced and others will be unannounced. The

frequency of these inspections should be dictated by the record of the firm. If a firm consistently operates in a marginal manner, frequent inspections should be conducted. If, however, the firm maintains an excellent record and is continually improving their operation, only occasional inspections will be required.

During the course of the SLSI inspection an inspection checklist similar to the one described in Attachment 6 C-1 should be completed and discussed with the senior factory representative present at the time of the inspection. A copy of the SLSI inspectional report should also be presented to the factory representative who should have the opportunity to make comments on the report and to sign the inspectional report.

If a routine inspection reveals a critical deficiency in the factories operation, this condition should immediately be reported to the registration panel who in turn should review the report or make a follow-up inspection. If their review confirms the SLSI inspectors findings, the registration certificate for this firm should be suspended until the deficiency has been corrected.

7. During the course of the routine inspection, water samples, in-line product samples and finished product samples may be collected for laboratory chemical and microbiological analysis. Routine samples of this nature should be paid for by the SLSI. When collecting finished product samples this may require collecting several 2-3 kilogram cartons. These should be maintained at a temperature which is at least as cold as the freezer from which it was removed until the analysis is begun in the laboratory. This may require purchase of a mobile freezer unit by the SLSI to insure that the temperature is maintained at or below the collection temperature.

9. The SLSI should maintain confidential records of the results of inspections made by SLSI officers and by the registration panel. In a relatively short time it will become apparent which factories have commendable operations. At that time it may be an incentive to award an SLSI seal of approval to those firms who meet very stringent requirements of product quality and factory operating conditions.

9. It is essential that the SLSI and the Exporters Association have a mutual respect and understanding of each other. (Respect that must be earned on both sides) and that they work together for the benefit of the industry and the country to solve common problems.

Sri Lanka seafood products have deservedly earned a fine reputation on the world market. It should be the common goal of both industry and government groups to not only maintain this quality, but to devise methods and procedures to continually improve the standards of quality in the seafood industry.

Harris R Throm

H. R. Throm, Organoleptic Specialist

Attachment "A"

1986-01-13

UNIDO CONSULTANCY PROJECT ON SEAFOOD INSPECTIONS

Consultant - Mr H R Throm

The proposed programme for the above project will be as follows :

13 January	-	Familiarization Discussion with SLSI Officers
15 January (morning)	-	Discussion with SLSI Officers
16 January	-	Visit Seafood Processing Factories - Wattala
17 January	-	Visit Seafood Processing Factories - Colombo
19 - 22 January	-	Visit Lobster Processing Centres - Galle, Tangalle & Tissamaharamaya
23 January (morning)	-	Discussion with the Officers of NARA
(afternoon)	-	Discussion with the representatives of Seafood Industry
24 January	-	Visit Seafood Processing Factories - Negombo
25 - 26 January	-	Preparation for the training programme for the SLSI Officers
27 January	-	Training of SLSI Officers - Meet with representatives of Seafood Industry.
29 January (morning)	-	Meeting with Chairman, Export Development Board
(afternoon)	-	Attend Advisory Committee Meeting on Seafood Quality Control
29 - 31 January	-	Training of SLSI Officers
3 February	-	Visit Seafood Processing Factory - Beruwela
5 February (morning)	-	Seminar
(afternoon)	-	Finalising of inspection programme
6 February	-	~~Free~~ Visit: Coconut Desication Factory.
7 February	-	~~Free~~ Meet with Export Development Board. Meet with SLSI OFFICERS.
9 February	-	Leave Sri Lanka.

L L S S K de Silva
Assistant Director (Marine Products & Projects).

Photo #1
SLSI officers prior to beginning an inspection of a shrimp processing factory.

PHOTO #2
SLSI officers determining temperature of shrimp on grading table.

Photo #3
SLSI officers observing shrimp packing operation and determining temperature of shrimp at this point in the processing line. Note: thermometer in pile of shrimp at far end of table.

Photo #4
SLSI officers examining shell-on white shrimp at sensory evaluation workshop.

PHOTO #5
SLSI officers evaluating quality of peeled flower shrimp at sensory evaluation workshop.

Photo #6
SLSI officers discussing quality of cooked and peeled shrimp with supervisor at sensory evaluation workshop.

Photo #7

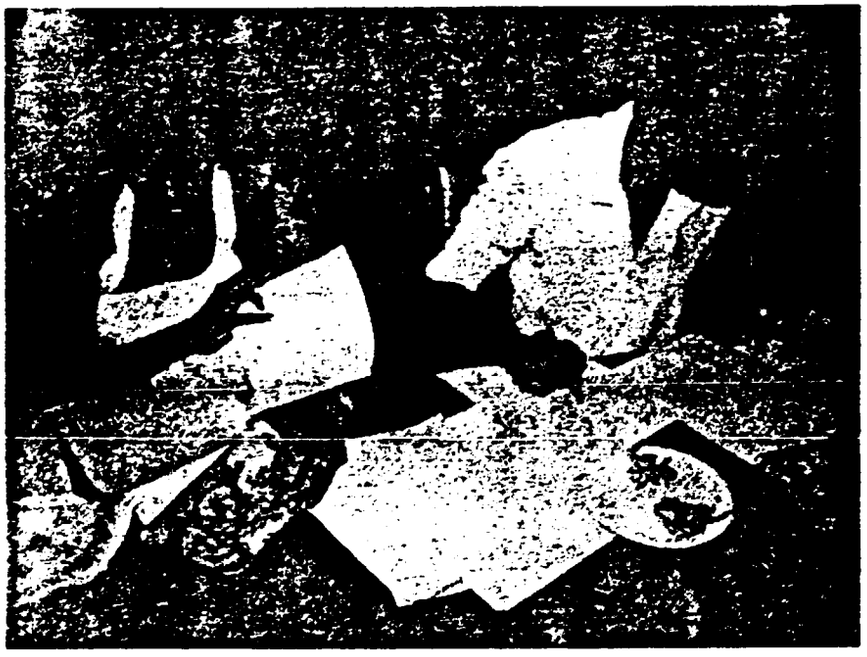


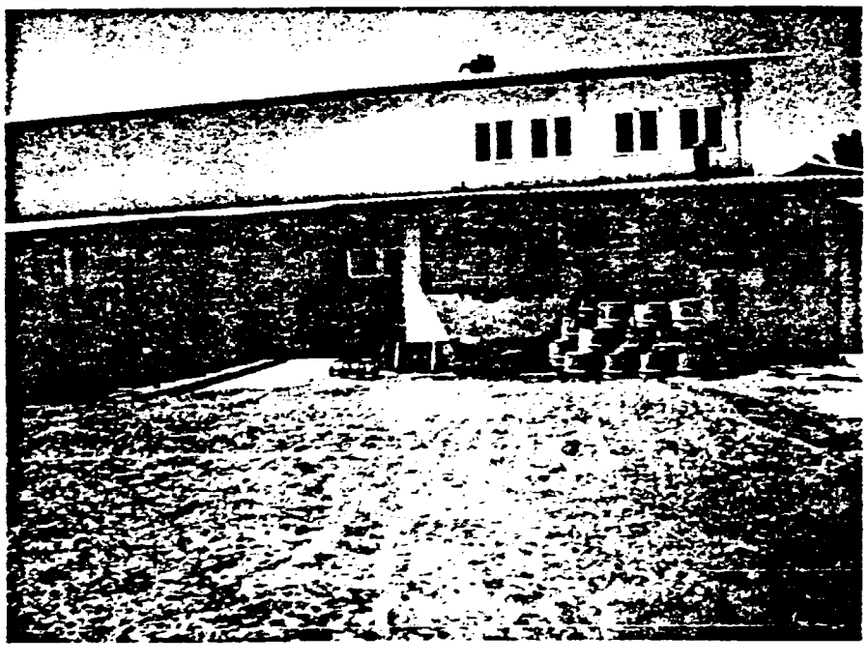
Photo #8

Photos #7 & #8

SLSI officers making individual quality assessments of unknown packs. This involved organoleptic evaluation, as well as grading assessment.

Photo #9

PHOTO #10



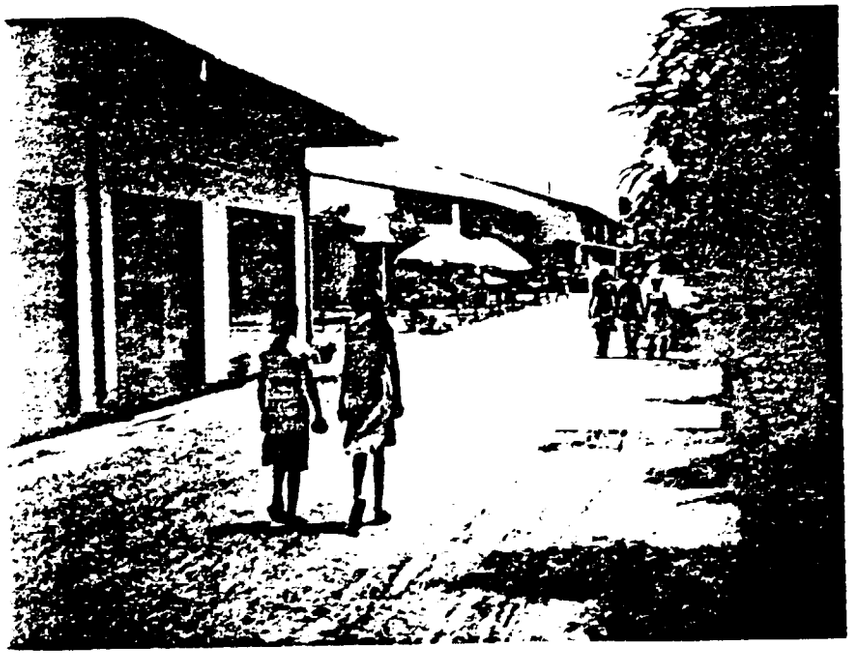


Photo #11

Photos 9, 10, & 11 show front entrance, rear view and the side of 3 modern seafood factories in Sri Lanka. Note the absence of litter, weeds, equipment and other debris around factories. All doors are closed, windows have screens and buildings are well maintained. All 3 firms are surrounded by 6-8' walls to prevent the entrance of animals and

Photo #12
Photos #12 & #13 show wicker baskets used at some landing sites and in some factories. These baskets are almost impossible to sanitize between use.

Photo #14
Insulated metal boxes used for transporting fresh shrimp and lobster. Box keeps product cold and is easy to sanitize.

Photo #15
Covered plastic tubs at receiving room of shrimp factory. These tubs are easy to sanitize, contain adequate ice and the lids prevent contamination.

Photo #16
Plastic tubs used at most seafood factories in Sri Lanka.

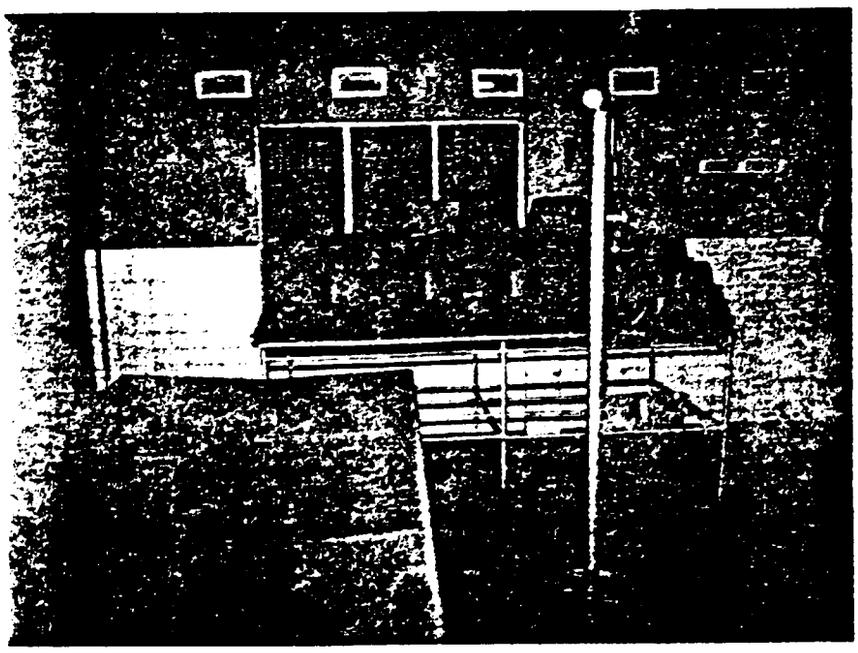


Photo #17
Plastic tubs after use can be easily cleaned and sanitized. Note how this firm inverts the tubs to allow them to drain and dry and to prevent contamination.

Photo #18
Plastic tubs of product on floor which are later transferred to the contact surfaces of the table tops. This practice could result in contamination of the product.

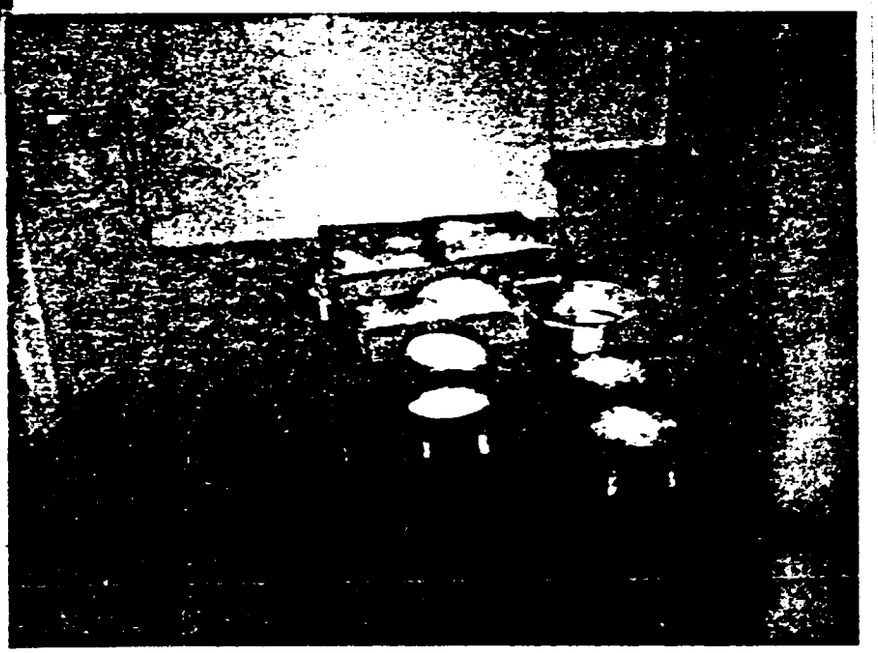


PHOTO #19
Photos 19 and 20 shows how metal racks and stands are used to place pans of product on until it is needed on process line. This practice keeps the tubs and pans off of the floor and prevents possible contamination.

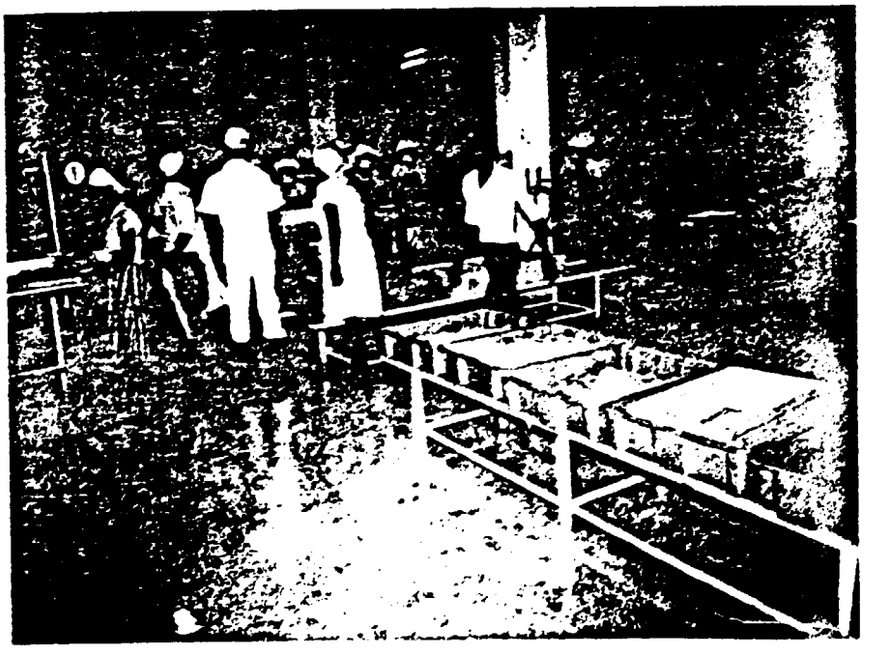


Photo #20

Photo #21
Shows insectocuter near finished product line. An insect could fly into insectocuter and be stunned and fall into the finished product.

Photo #22
Shows insectocuter directly over processing line. In this case, a fairly wide tray has been placed beneath the insectocuter which would catch most of the stunned insects.

Photo #23
Insectocuter is placed some distance from process line shown on the left side of picture.

Photo #24
Hand wash and foot dip station. All employees had to walk through foot bath (on other side of door) in order to get into processing area of factory. Note also the close proximity of sinks, soap, sanitizing agent and disposable tissue.

Photo #25
Hand wash, had dip and foot bath station at firm showing that employees must pass through this in order to get from one room of firm to another.

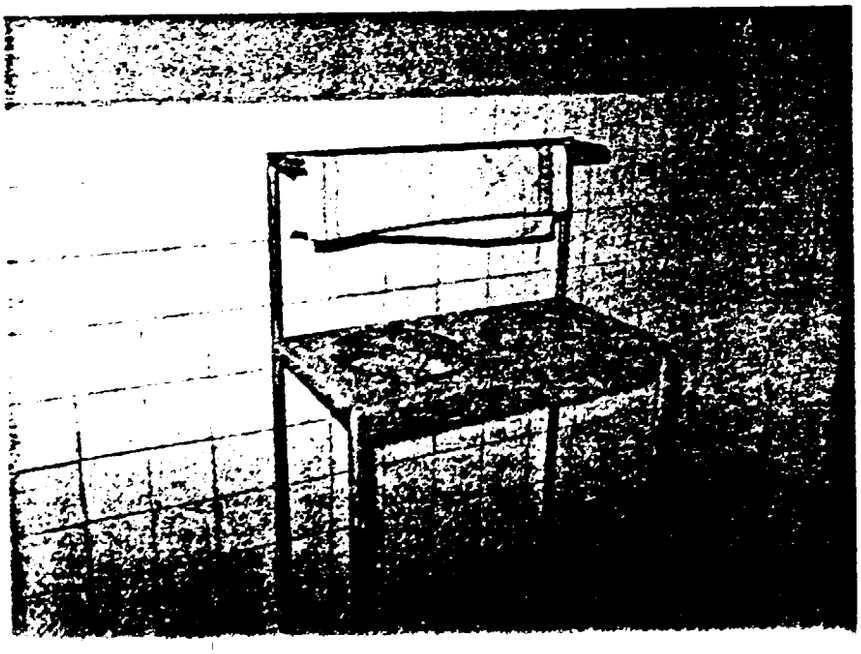


Photo #26
Small hand dip station placed some distance from commonly used employee access routes. Size of dip pans are too small and clean towel indicates few if any employees go out of their way to use hand dip station.

Photo #27
Photo shows adequately dressed employees with hair covering, face masks and aprons. Note also that only the amount of shrimp that can be peeled in a short time is placed on table.

PHOTO #28
Shows adequately dressed employees with hair covering, face masks and aprons. Note that each employee has clean wash pan for rinsing finished product. Also note how well all pans of shrimp are iced.

Photo #29
Shows processing factory where most employees were not wearing hair covering, face masks or aprons. Note also that some employees are wearing necklaces and jewelry.

SRI LANKA STANDARDS INSTITUTION WORKSHOP

JAN. 29-31, 1986

Grading Classification of Prawns

	Points Assigned		
	Minor	Major	Serious
1. Dehydration			
2. Uniformity ratio of weight			
3. Black spot			
4. Pieces			
5. Damaged & broken			
6. Legs, loose shell, etc.			
7. Impropercy peeled/ Inadvertently peeled			
8. Texture			
9. Decomposition (Deterioration)			

Points Assigned:

Minor - 1 point
Major - 2 points
Serious - 4 points

	Minor	Major	Serious
9. Deterioration (decomposition) low Quality (aged, seasoned, off odour) low levels of decomposition detected.		2	

10% class 2 decomposition (by weight) — Reject lot

2.5% class 3 decomposition (by weight) — Reject lot

Percentage of weight of shrimp containing class 2 decomposition plus 4 times the percentage of class 3 decomposition equals 10% of weight of shrimp in sample unit. — Reject lot

Grading of Shrimp using Defect Table.

Combined minor & major defects	Serious Defects
Sri Lanka Grade A up to & including 5 points	None
Sri Lanka Grade B up to and inclusing 9 points	None
Sri Lanka Grade C over 9 points up to and including 13 points	Up to 4 points
Sri Lanka Sub Standard over 13 points	Above 4 points.

Attachment "C-4"

SRI LANKA STANDARDS INSTITUTION TRAINING WORKSHOP

Ascertaining the GRADE OF SHRIMP

CLASSIFICATION OF DEFECTS

Defect	Points Assigned		
	Minor	Major	Serious
1. Dehydration			
Slight	1		
Moderate		2	
Severe			4
2. Uniformity ratio of weight			
1.75 to 1.99	1		
2.00 to 2.25		2	
Over 2.25			4
3. Black spot and Improperly cleaned ends			
1% - 4% (by weight)	1		
4% - 6% (by weight)		2	
More than 6% (by weight)			4
4. Pieces			
1 to 2% (by weight)	1		
2 to 3% (by weight)		2	
More than 3% (by weight)			4

	Minor	Major	Severe
5. Damaged & Broken			
2% - 4% (by weight)	1		
4% - 10% (by weight)		2	
More than 10% (by weight)			4
6. Legs, Loose shell, autennae flipper, extraneous heads			
1% - 2% (by weight)	1		
2% - 3% (by weight)		2	
More than 3%			4
7. Improperly peeled inadventently peeled, improperly deveined			
1% - 6% (by weight)	1		
6% - 10% (by weight)		2	
More than 10% (by weight)			4
8. Texture (toughness, dryness, mushiness) cooked shrimp			
Slight	1		
Moderate		2	
Severe.			4

contd.....3/-

ORGANOLEPTIC DETECTION OF DECOMPOSITION IN SHRIMP

SCORE SHEET

Sample Code:_____

Date :_____

Examined By:_____

Group Number:_____

Results:

Total Count_____

Number Passable_____

Number Class 2 decomposition_____

Number Class 3 decomposition_____

Assuming th[illegible] the quality of shrimp in this sample is representative of entire lot, I would:

a) Pass entire lot_____

b) Reject entire lot_____

c) Ask for resample_____

STAGES IN FISH SPOILAGE

Storage Time	Degree of Firmness of Muscle and Belly	Flesh Odors	APPEARANCE		
			Eyes	Gills	Skin
0-5 days in ice	Rigor mortis apparent. Firm and resilient, resists finger pressure.	Fresh and mild.	Bright, clear, full, protruding. Jet black pupils.	Clear pink to a bright, bloody red. Free from slime.	Normal luster. Clear and bright. Clinging scales. Fresh slime.
5-10 days in ice	Rigor is gone. Belly loses fullness. Texture begins to soften. Somewhat firm but no elasticity.	Odor neutral to slightly fishy. Some ammonia odors may be noticeable. Moderate belly burn.	Color begins to dull. Changes to brown or reddish.	Color faded to pale red or brown red.	Color fades to dull.
10-14 days in ice	Texture is soft. Carcass limp. Dished in belly.	Stale, sour, fishy, strong ammonia odor. Distinct belly burn. Rib bones very loose.	Sunken. Brown to red color. Smashed.	Discolored & slimy. Brown-yellow brown. Greenish.	Bleached. Most color and luster gone.
Over 14 days in ice	Texture very soft and mushy. Proteolysis begins. H_2S formed.	Offensive. Putrid.	Opaque. Sunken. Missing.	Slimy. Bleached or greenish.	Very slimy. Discolored.

CHEC IST

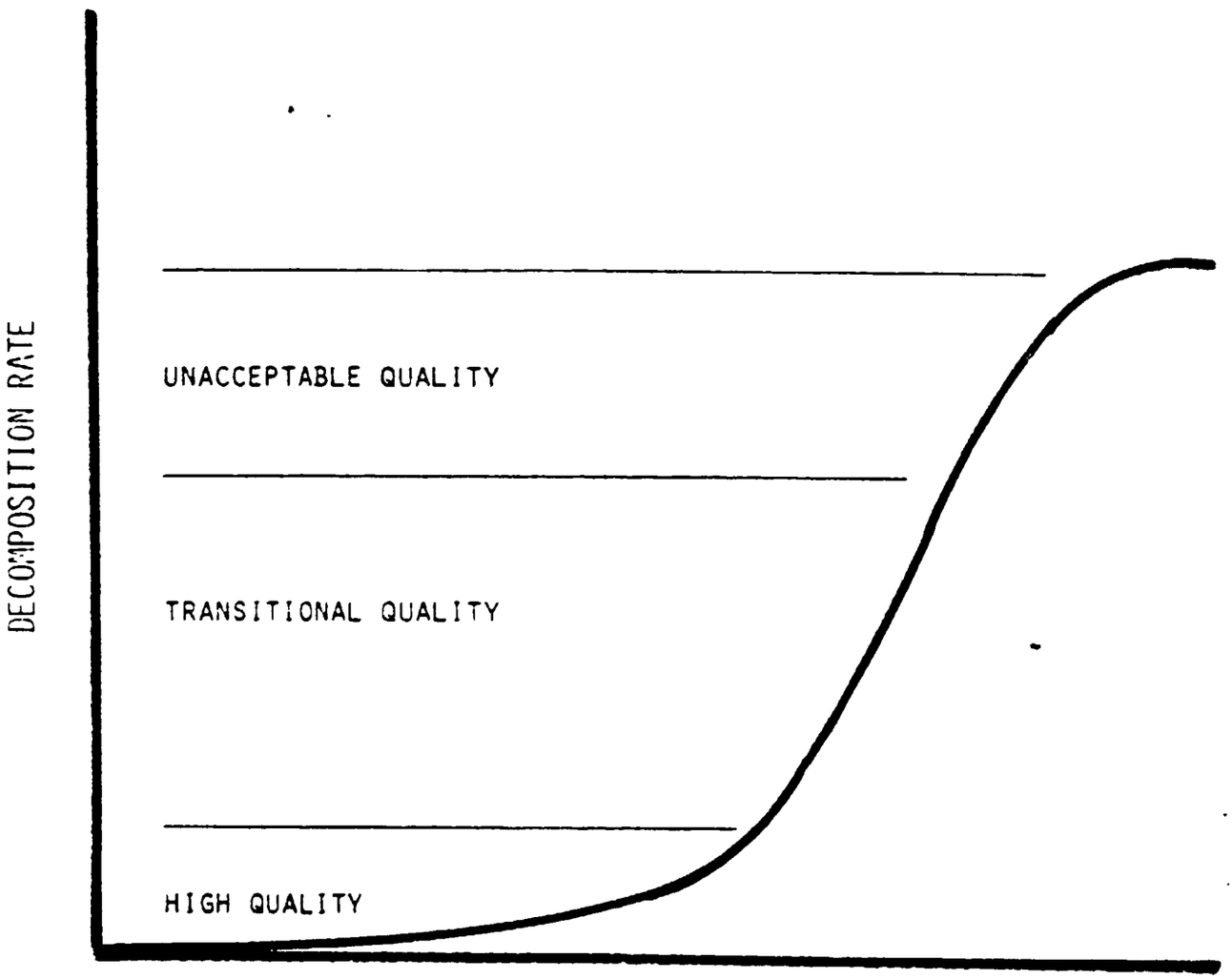
Fresh Fis, Quality Inspection

Supplier: _____ P.O.# _____ Time _____ Date _____

Species _____ Temperature _____ Inspector _____

	Top Quality	Good	Borderline	Unacceptable
ODOR	Fresh, mild, seaweedy, shellfishy	No odor, neutral odor to slightly fishy	Definite musty, mousy, bready, malty odor. Ammonia, fishy.	Acetic, fruity, sulphic. fecal, sour, offensive
GUT CAVITY	Glossy, brilliant, difficult to tear bones from flesh	Slightly dull, difficult to tear bones from flesh	Somewhat easy to tear bones from flesh	Bones separated or easily torn from flesh
GILLS	Clear pink to bright red translucent, free of slime	Color slightly faded, pink, mucus slightly opaque	Grey, bleached, mucuc opaque and thick	Brown bleached, mucus yellowish grey
EYES	Bright and clear; convex, black pupil; translucent cornea	Color begins to dull, flat, slightly opaque pupil	Brown to red color, slightly concave, grey pupil; opaque cornea	Completely sunken grey pupil; opaque, discolored cornea
SLIME	Transparent or water white	Slightly cloudy or milky	Yellowish grey, some clotting	Yellowish brown, very clotted and thick
SKIN	Bright, shining, iridescent	Wavy, slight dullness, slight loss of brightness	Dull, some bleaching or discoloration. Dry, wrinkles easily	Dull, marked bleaching or discoloration and shrinkage
FILLETS OR STEAKS	Moist, firm and elastic, bright color, fresh odor	Less elastic, slightly fishy odor, dull color	Soft, some discoloration and drying around edges	Very soft, strong odor, browning of edges

TYPICAL SEAFOOD SPOILAGE CURVE



ORGANOLEPTIC CLASSIFICATIONS OF DECOMPOSITION

CLASS 1 PASSABLE

THIS CATEGORY INCLUDES FISHERY PRODUCTS THAT RANGE FROM VERY FRESH TO THOSE THAT CONTAIN FISHY ODORS OR OTHER ODORS CHARACTERISTIC OF THE COMMERCIAL PRODUCT, NOT DEFINITELY IDENTIFIABLE AS DECOMPOSITION.

CLASS 2 DECOMPOSED (SLIGHT BUT DEFINITE)

THE FIRST STAGE OF DEFINITELY IDENTIFIABLE DECOMPOSITION. AN ODOR IS PRESENT THAT, WHILE NOT REALLY INTENSE, IS PERSISTENT AND READILY PERCEPTIBLE TO THE EXPERIENCED EXAMINER AS THAT OF DECOMPOSITION.

CLASS 3 DECOMPOSED (ADVANCED)

THE PRODUCT POSSESSES A STRONG ODOR OF DECOMPOSITION WHICH IS PERSISTENT, DISTINCT AND UNMISTAKABLE.

Attachment "C-1"

SEAFOOD FACTORY COMPLIANCE CHECK LIST

Name and address of factory inspected : .....
.....
.....
.....

Date inspected : .....

Name of responsible individual : .....

Name of Inspector : .....

Name(s) of persons accompanying inspection : .....
.....
.....

Types of Seafoods produced : .....
.....
.....

1) Management

Personnel designated responsible for

Sanitation Programme : .....

Quality Control Programme.....

2) Premises	YES	NO
a) Free from litter, waste, stored equipment, uncut weeds :	.....	.....
b) Proper care taken to exclude insect pests, rodents, animals, dust, etc. :	.....	.....

3) Buildings		
a) Ceilings over areas of in-line products, free of peeling paint or condensates :	.....	.....
b) Exterior openings where practical are equipped with screens to or other effective means to prevent entrance of insects, rodents or other animals :	.....	.....
c) Pland design allows for separation of food products with other products which may cause contamination with undesirable micro-organisms, chemicals, filth or other extreneous material :	.....	.....

4) Lights		
a) Lights in processing area are equipped with protective shields or covers :	.....	.....

	YES	NO NO
5) Water Supply		
a) Adequate supply of both hot & cold water :	.....	.....
b) Water supply is potable :	.....	.....
c) Water supply is free of cross connections with sewage disposal system or other contaminations :	.....	.....
6) Ice		
a) Ice is made from potable water :	.....	.....
b) Ice is stored and used in a sanitory manner :	.....	.....
7) Lavatory Accommodations		
a) Adequate employee toilets are available within reasonable distance :	.....	.....
b) Lavatories have toilets tissue, soap towels, hot and cold water :	.....	.....
8) Equipment, Containers, Utensils		
a) Product contact surfaces of all equipment containers and utensils constructed from suitable, smooth, imprevious, non-toxic corrosion resistant material :	.....	.....
b) equipment constructed or located so that all contact surfaces are accessible for cleaning, maintenance and inspection :	.....	.....
9) Cleaning and Sanitizing		
a) Cleaning methods designed to preclude contamination or adulteration :	.....	.....
b) Approved chemicals are used for cleaning and sanitizing :	.....	.....
10) Sanitation Controls		
a) Sanitation controls of raw materials sufficient to protect product :	.....	.....
b) Sanitation control of finished product sufficient to protect product :	.....	.....
11) Control of Insects, Birds and Animals		
a) Birds and animals excluded from factory :	.....	.....
b) Insect and Rodent controls are effective :	.....	.....
c) Insecticides or rodenticides are stored in a safe manner and handled and used in safe and approved manner :	.....	.....

	YES	NO
12) Raw Materials		
a) Raw materials free from adulteration (free from chemicals, cleaning solvents, fuel oil, petroleum products)	.....	.....
b) Raw materials free from extraneous materilas	.....	.....
c) Raw materials show no evidence of decomposition or deterioration	.....	.....
d) Raw materials are iced or kept cold	.....	.....
13) Methods		
a) Processing methods prevent contamination of product	.....	.....
b) Processing methods prevent deterioration of product	.....	.....
14) Cooling and Refrigeration Facilities		
a) Raw materials, in-line materials and finished products are maintained at a chilled temperature to inhibit deterioration	.....	.....
b) Freezer and Cold storage equipment designed with proper controls to ensure that products are held at proper temperatures	.....	.....
15) Personnel		
a) Personnel with contagious diseases are not allowed to work in areas where there is a reasonable possibility of contaminating food products or transmitting the disease to other individuals	.....	.....
b) Plant management requires that employees report illness or injury to supervisors	.....	.....
16) Personnel Cleanliness		
a) Personnel in direct contact with food processing products are wearing clean outer garments and maintain a high degree of personal cleanliness		
b) Personal are observed washing hands and using hand dip stations prior to starting work, or at other times when their hands may have become soiled or contaminated	.....	.....
c) Personnel are not wearing loose, insecure jewellery and when food is being handled by hand jewellery is removed from wrists and hands	.....	.....
d) Personnel in processing area are wearing hats, hair nets, masks or other effective hair restraints	.....	.....

17) **Education and Training**	YES	NO
a) Food handlers and Supervisors are properly trained in food-handling techniques and food protection principles	:	.....
b) Responsibility for assuring complinace of good manufacturing practices by all personnel is clearly assigned to specific supervisory personnel	:	.....

Remarks by Inspector (Use additional sheets as required)

.....

.....

.....

.....

.....

.....

Methodology (Briefly describe production methods - Use additional sheets as required)

.....

.....

.....

.....

.....

.....

Name of Inspector

.....

Signature of Inspector

.....

Name of Plant Manager OR Responsible Person

.....

Signature of Plant Manager

.....

EXAMPLE #1

Time of catch to processing plant
8 hrs @ 15.5°C = _____

Shrimp off loaded at landing site
2 hrs @ 15.5°C = _____

Delivery to processing plant
2 hrs. @ 21°C = _____

Shrimp top iced, then peeled, deveined at plant
6 hrs @ 10°C = _____

Shrimp prepared for freezing
2 hrs. @ 4.5°C = _____

Shrimp thawed at room temperature
24 hrs (average temp.)
@ 4.5°C = _____

Shrimp placed in display case
@ 10°C = _____

Consumer to residence
1 hr @ 15.5°C = _____

Shrimp refrigerated until use by consumer
24 hrs @ 4.5°C = _____

Lapsed time from fishing ground to consumption by consumer
hrs = _____

EQUIVALENT DAYS AT 0°C
= _____ days.

EXAMPLE #2

Time of catch to processing plant
8 hrs @ 4.5°C = _____

Shrimp off loaded at landing site
2 hrs @ 4.5°C = _____

Delivery to processing plant
2 hrs. @ 4.5°C = _____

Shrimp re-iced, peeled, deveined at plant
4 hrs @ 4.5°C = _____

Shrimp prepared for freezing
2 hrs. @ 4.5°C = _____

BACTERIA DOUBLE

$0^{\circ}C$ - every 20 hours

$5^{\circ}C$ - every 6 hours

$10^{\circ}C$ - every 3 hours

$15^{\circ}C$ - every 2 hours

$20^{\circ}C$ - every 1 hour

$30^{\circ}C$ - every 1/2 hour

RELATIVE FISH SPOILAGE RATES
(TIME IN HOURS)

TEMP	2	4	6	8	18	24
$0^{\circ}C$	.1	.2.	.3	.3	.8	1
$4.5^{\circ}C$	.2	.4.	.6	.7	1.7	2.2
$10^{\circ}C$	.3	.7	1.0	1.3	3.0	4.0
$15.5^{\circ}C$	.6	1.2	1.7	2.3	5.2	6.9
$21^{\circ}C$	.7	1.4	2.0	2.7	6.1	8.1

(Equivalent days at $0^{\circ}C$)

Attachment "C-3"

Organoleptic Analysis of Food Products

Organoleptic Analysis: Involves the employment of one or more of the physical senses (sight, touch, taste, smell) for subjective testing and rating of food products.

Physical Requirements of Organoleptic Examinations.

1. Work in an area that is free of distractions. Don't try to examine a product in a room where other types of analyses are being conducted.

2. Work in an area that is free of foreign odors.

   a. No smoking at any time.

   b. Cosmetic odors should be avoided.

   c. Don't attempt to smell something that is held in another person's hands.

3. A slight positive pressure should be maintained in the testing area so that extraneous odors cannot enter into the testing area. Proper ventilation also removes product odors.

4. Separate participants if possible.

   a. One person's reaction may affect anothers judgment.

5. Lighting should be uniform, as near natural light as possible and not influence the appearance of product being tested.

6. Product to be tested should be at room temperature or slightly above. (This can vary some depending on product.)

Other Considerations:

1. Be as knowledgeable as possible about the product being examined.

2. Examine only one species or fish product at a time.

3. Take periodic rest breaks during the examinations.

4. Conduct all determinations independently of other examiners and immediately record results.

H. Richard Throm
Food and Drug Administration
Seattle, Washington

The following classifications are used to judge each shrimp (or portion) examined:

Class 1 (Passable). This category includes fishery products that range from very fresh to those that contain fishy odors or other odors characteristic of the commercial product; but these odors are not definitely identifiable as those of decomposition.

Class 2 (Decomposed) - slight but definite. This is the first stage of definitely identifiable decomposition. An odor is present that is not really intense, but is persistent and readily perceptible to the experienced examiner as that of decomposition. Shrimp in this category are not acceptable for human consumption.

Class 3 (Advanced Decomposition). The product possesses a strong odor of decomposition which is persistent, distinct and unmistakable. Shrimp in this category are not acceptable for human consumption.

Each subdivision of the sample (package, carton or container) should be examined separately. Segregate the examined portion into various classes on the basis of odor. A sub shall be classified as decomposed: If five percent (5%) or more of the shrimp are class 3; or If twenty percent (20%) or more of the shrimp are class 2; or If the percentage of class 2 shrimp plus 4 times the percentage of class 3 shrimp equals or exceeds twenty percent (20%).

Percentages are to be reported on the basis of either count or weight when the shrimp are uniform in size, and on a weight basis when the shrimp are non-uniform in size.

METHOD OF EXAMINATION

H. R. Throm
Organoleptic Specialist
FDA, Seattle, WA

A. Fresh Shrimp - Examine a random representative portion of the lot to be evaluated.

B. Frozen Shrimp - A representative number of packages, units or subdivisions should be collected on a code by code basis for organoleptic evaluation.

1. Method of Thawing - In general, frozen shrimp should be thawed in a spray of cold, or cool (50° - 70°F) water. In-shell shrimp will thaw quite quickly in a spray of cold tap water. Some species of peeled shrimp containing soft tissue are sometimes damaged by this spray stream during the thawing cycle. These type shrimp are best thawed in a pan of water with a stream of running water constantly rinsing the shrimp. Unless it is absolutely necessary, do not allow shrimp product to thaw in the open air at room temperature.

2. When thawing commercially prepared packages of frozen shrimp, the analyst should always examine a minimum number of three units for net contents, using the procedure for net contents of frozen seafoods described in the Association of Official Analytical Chemists (AOAC) 12 ed. 18.001. If the analysis of three units indicates a weight shortage, additional units should be examined.

3. Method of Organoleptic Examination.

   a. Count or determine the number of individual units per container or package and record this number. In the case of very small units such as tiny shrimp (100 to 500 units per pound) it is permissable to count the number of shrimp per unit weight and calculate the number of shrimp per pound or package.

   b. Organoleptic Examination

      After the product is thawed, rinsed, and brought close to room temperature, it is ready for organoleptic analysis.

      (1) - For large shrimp (1-100/lb), the flesh of each shrimp to be examined is broken into with the thumb and forefinger, and the freshly exposed muscle tissue is brought closely to the nose where it is smelled for odors of decomposition, and an organoleptic classification is made.

      (2) - For small shrimp (100-500/lb) - small portions, usually 2-3 oz, are taken and rubbed between the hands for a short period of time, then brought close to the nose, smelled for odors of decomposition, and the portion classified. Two or more portions per pound found decomposed cause the entire sub to be classed decomposed.