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Seafood Products for Military Use

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This paper is intended to provide an insight into the mechanism by which the Armed Forces procure fish and seafood and the subsequent use of these products in the major military feeding systems. From the standpoint of military procurement and subsequent storage and handling, fish and seafood fall into two main classes: perishable and non-perishable. With no important exceptions, perishable marine products are procured and distributed to installations in the frozen state. Historically, non-perishable foods were synonymous with canned items. As a result of relatively recent research and development, this non-perishable class now includes dehydrated products, notably freeze dried shrimp and freeze dried fish squares. Table 1 illustrates the weight and dollar value of these items as purchased during the past year. In interpreting the weight figures it should be recognized that one pound of freeze dried fish squares is equivalent to approximately 5 pounds of raw, frozen fish fillets and a pound of freeze dried cooked shrimp corresponds to about 3½ pounds of cooked, ready-to-eat shrimp.

Table I. Procurement of dehydrated fish and seafood during 1966

Freeze dried shrimp	
	150,000 pounds
	$2,000,000
Freeze dried fish squares	
	300,000 pounds
	$2,000,000

The procurement of food for the Armed Forces is handled through 10 Subsistence Regional Headquarters under the coordination of the Defense Personnel Supply Center in Philadelphia. In procurement of fish and seafood recognition is given to the fact that geography affords certain Regional Headquarters close ties to specific products; as a result such Headquarters have been assigned primary responsibility for purchasing specific products. Thus the Headquarters at New Orleans buys most of the perishable shrimp which last year amounted to about 9 million pounds and cost approximately 5 million dollars. This includes all types of perishable shrimp, raw, cooked, molded and breaded. The Seattle Headquarters is assigned the responsibility for procuring canned salmon which last year amounted to 6 million pounds valued at 4 million dollars. The Los Angeles Headquarters has responsibility for buying canned tuna which last year also amounted to 6 million pounds but valued at 3 million dollars. The New York Headquarters with buyers at major centers along the New England coast, is responsible for purchasing virtually all types of frozen fillets. Table 2 provides an insight into the magnitude of the Boston operation during the calendar year 1965. Other Regional Headquarters are assigned the procurement of items which present specialized problems. Thus the Chicago Headquarters handles the procurement of all

Table 2. Frozen fish and seafood procured through Boston office, 1965

	Pounds
Perch	2,801,000
Haddock	1,500,000
Flounder	2,460,000
Fish Portions	1,780,000
Cod	400,000
Scallops	1,821,000
Misc.	414,000
TOTAL	11,176,000

freeze dried products and all canned items for assembly into packaged rations.

It is emphasized by DPSC that the preceding assignments are by no means inflexible. DPSC seeks to promote maximum consumption of fish and at the same time to encourage the procuring agencies to be alert and responsive to local situations which may provide price advantages.

Figure 1 illustrates diagrammatically the primary operations involved in a procurement of frozen fish. The stimulus or activation for procurement comes from the using services shown as "installations". These installations normally order perishable fish once a month for an anticipated delivery 45 days hence. In Fig. 1 orders are shown as coming from a number of installations and converging on a Subsistence Regional Headquarters. Here they are combined and transmitted to a buyer. The buyer prepares a Notice of Intent to Purchase (NIP) which is circularized to potential suppliers. The NIP carries all pertinent information required by a bidder such as the amount and type of product sought, citations to relevant specifications, packaging and packing requirements, place and date for delivery, and instructions for bidding. After evaluating bids, the buyer notifies the supplier of his impending award of contract

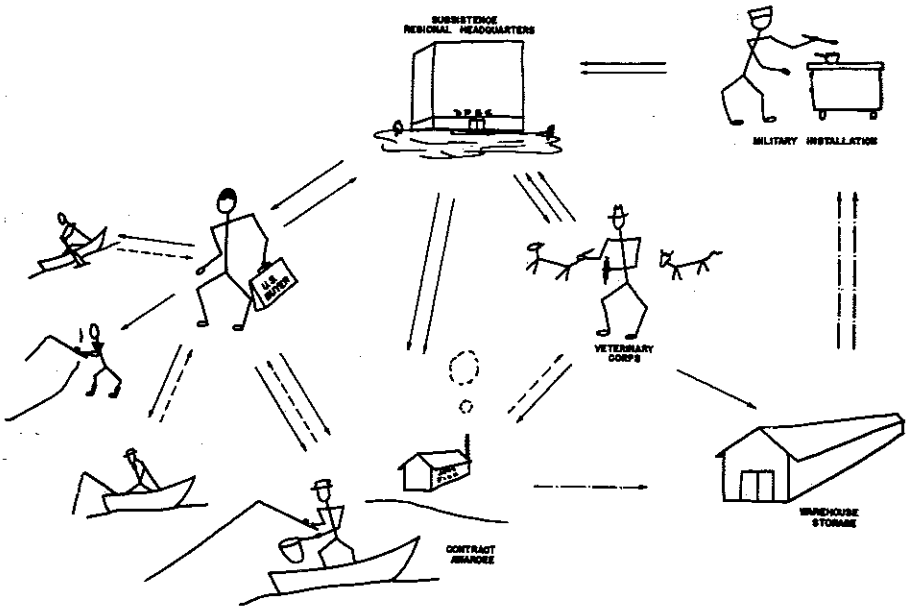

Figure 1. Points of major action and participants in procurement of fish and seafood.

and transmits relevant information to the contracting officer. Within a few days the contracting office submits the actual contract to the supplier, with a copy to the cognizant inspection office. This serves to alert the inspector for subsequent action.

A supplier of frozen fish fillets ordinarily has about three weeks to deliver. A day before an inspector is needed, the supplier notifies the inspection agency. The supplier's product is inspected lot by lot in accordance with the requirements and acceptable quality limits established by the specification. If the lot is in conformance, the inspector notifies the contracting office of acceptance. The supplier is then free to start delivery. On arrival at destination each lot is again inspected, usually for temperature, count and condition. Figure 1 fails to show that most contracts call for delivery to several storage warehouses, often in widely separated parts of the country. Several large installations have facilities for accepting a shipment of frozen fillets.

Upon receipt of the contractor's invoice and the inspector's favorable receiving report, the contracting office requests the finance department to pay the supplier.

Now that the products are procured and under the control of a miltiary installation, what becomes of them? Tables 3 and 4 are based on the Annual Food Plan for 1966 of the Army and Air Force which applies to installations within the continental U.S. Table 3 shows the use of perishable products which are delivered frozen. According to this plan, fried fish fillets are served as an entree 23 times a year and at each serving 30 pounds of frozen fillets are allotted to each 100 men. A seafood platter is served 12 times a year for which is allocated 15 pounds of frozen fillets and either 15 pounds of frozen scallops or 10 pounds of frozen shrimp per 100 men. Likewise, fried scallops are used as an entree three times a year with 32 pounds of frozen scallops for 100 men. Fried breaded fish portions are the entree 10 times a year and fried oysters are served twice a year.

Table 3. Scheduled serving of perishable fish & seafood*

Item	*Times per Year*	*Pounds per 100 Men*
Fish fillets		
As entree	23	30
With seafood platter	12	15
Scallops		
As entree	3	32
With seafood platter	7	15
Shrimp		
As entree	3	20
With seafood platter	5	10
As cocktail	2	12
Fish portions		
As entree	10	25
Oysters, fried		
As entree	2	18

* From Annual Food Plan for 1966 of the Army and Air Force.

The utilization of non-perishable

Table 4. Scheduled serving of non-perishable fish & seafood*

Item	*Times per Year*	*Pounds per 100 Men*
Salmon		
Croquettes	5	20
Tuna		
Croquettes	5	19
With noodles	2	19
Sardines		
As snack	12	2

* From Annual Food Plan for 1966 of the Army and Air Force.

or canned items is shown in Table 4. Salmon croquettes, tuna croquettes and tuna with noodles are served as entrees for a total of 12 meals. Canned sardines are used on 12 occasions, usually with cold cuts and snacks which frequently are served at installations on Sunday evening.

While the above pattern represents a good generalization for the type, frequency and amount of marine products served at military installations within the continental U.S., it must be reemphasized that there is considerable flexibility within an installation both as to the frequency of various entrees and to the way they are prepared.

In the preceding comments consideration has been focused on the feeding of large groups of soldiers in established mess halls having adequate facilities for food preparation and related functions including refrigeration and a staff of trained food service personnel. As the soldier moves away from fixed installations the absence of dependable refrigeration requires that perishable foods be rendered non-perishable, as previously noted, either by dehydration or by canning. Such items are used in the B-ration which assumes adequate field cooking facilities and trained food service personnel. Two products of marine origin are currently included in the B-ration, canned tuna and freeze-dried cooked shrimp. According to the present menu schedule, each of these items is served once during a 15 day meal cycle. Tuna and shrimp are the main components of casserole type dishes, such as tuna baked with macaroni which requires approximately 13 pounds of canned tuna per 100 men, and scalloped shrimp with peas which utilizes approximately 3¼ pounds of dehydrated shrimp per 100 men.

Canned tuna intended for direct consumption from the can is also one of the 10 meat entrees currently included in the individual, in-flight food packet.

It is expected that freeze dried fish squares which have recently been procured in relatively large amounts will soon be incorporated into the B-ration. After rehydration and frying, fish squares closely resemble fish fillets and when breaded, are interchangeable with breaded fish portions. Freeze dried shrimp and freeze dried fish sticks or squares have been used for the preparation of shrimp creole and fish creole. These items have a favorable record for stability and acceptability as precooked, dehydrated casserole items.

In July 1966 a Military Specification for cooked, freeze dried fish patties and balls was approved. Within 15 seconds after addition of hot water these patties are fully hydrated, hot, and ready for consumption. Figure 2 shows these patties before and after hydration. Based on experience this item is highly acceptable. The specification has been tested by two suppliers and found fully workable. Incorporation of freeze dried fish patties into individual combat rations or packets has been delayed pending the development of measures to reduce excessive fragmentation during handling.

The marine products most recently developed by the Food Division of Natick Laboratories are

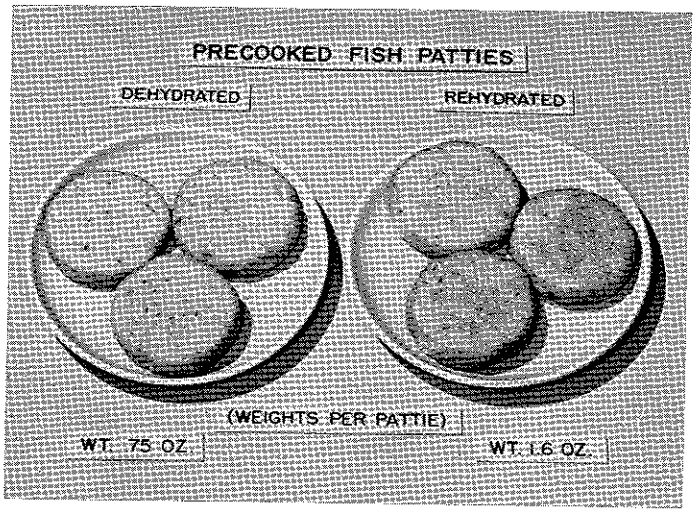

Figure 2. Cooked, freeze dried fish patties, before and after rehydration.

freeze dried tuna and salmon salads. These items are prepared from commercially canned tuna or salmon, mayonnaise, a small amount of corn meal and appropriate seasonings. These salads represent a new area of freeze drying since previously it was deemed impossible to dry and reconstitute a fat emulsion such as mayonnaise. Even though these items have been incompletely tested for operational rations both have been accepted and qualified for the Gemini and Apollo missions. In addition to being highly acceptable, these salads provide a high caloric level per unit of weight owing to their mayonnaise content. No specification is yet available for these dehydrated salads; their formulation and preparation, however, are described under a Space Food Prototype Production Guide No. 16A, dated 15 July 1965.

All fish and seafood products mentioned as procured for troop issue at military installations or as components of the B-ration or in-flight food packets are the subject of either a Military or Federal Specification. An examination of the *Index of Specifications for Military Subsistence* as is available through the office of the R & D Associates, reveals 18 Federal and Military Specifications are used for the procurement of fish and seafood for troop issue. These documents have been identified in Tables 5, 6 and 7.

Table 5 lists the specifications for perishable items in alphabetic

Table 5. Specifications for perishable fish and seafood

Clams, Raw, Shucked, Fresh (Chilled and Frozen). Federal Specification. PP-C-401a.

Crab Meat, Cooked, Chilled and Frozen. Federal Specification. PP-C-656a.

Fish Portions, Frozen, Raw, Breaded. Military Specification. MIL-F-43276.

Oysters, Raw (Shucked, Fresh or Frozen). Federal Specification. PP-0-956c.

Scallops, Fresh (Chilled) and Frozen, Sea. Military Specification. MIL-S-3642A.

Shrimp, Frozen, Raw, Breaded. Federal Specification. PP-S-315c.

Shrimp, Frozen, Raw, Lightly Breaded (Ready to Cook). Military Specification. MIL-S-43269.

Shrimp, Raw and Cooked, Chilled or Frozen. Federal Specification. PP-S-316a.

order. Clams and crab meat are not scheduled for use in military installations but this does not preclude local use. The Federal Specification for Fish, Chilled and Frozen is the basic procurement document for frozen fillets which are the major fish item in the military supply system. This specification covers fillets from halibut, cod, rockfish, haddock, whiting, ocean perch, Pacific ocean perch, flounder, and other species less commonly procured for the Armed Forces. The breaded fish portion also listed in this table ranks high in importance among the fish items consumed at military installations throughout the U.S. This product is cut from frozen fish blocks into portions of precise size and weight and then breaded to a prescribed level. Table 5 also identifies the specifications for raw oysters, scallops and shrimp to be served as indicated in Table 3.

Of the canned items listed in Table 6, only salmon, tuna, and sardines are items scheduled for troop issue. Table 7 identifies specifications for three products prepared by freeze drying. As noted in Table 1, two of these products have already become items of considerable importance for the feeding of our Armed Forces.

Table 6. Specifications for non-perishable (canned) fish and seafood

Clams, Canned. Federal Specification. PP-C-400a.
Crab Meat, Canned. Federal Specification. PP-C-651a.
Sardines, Canned. Federal Specification. PP-S-51g.
Salmon, Canned. Federal Specification. PP-S-31c.
Shrimp, Canned. Federal Specification. PP-S-31c.
Tuna Fish, Canned. Federal Specification. PP-T-771b.

Table 7. Specifications for non-perishable (dehydrated) fish and seafood

Fish Patties and Balls, Dehydrated, Cooked. Military Specification. MIL-F-43445.
Fish Sticks and Squares, Dehydrated, Raw. Military Specification. MIL-F-43142.
Shrimp, Dehydrated, Raw and Cooked. Military Specification. MIL-S-43145.

Military menu planning reflects the food likes and dislikes of our male population. These likes and dislikes must be translated into actual meals which, in addition to being acceptable, must provide adequate calories together with all dietary elements needed for conformance with the highest nutritional standards. Such requirements must be integrated into procurement actions which recognize product availability and the cost allowance prescribed for a soldier's daily food. The marked increase during the past few years in the use of shrimp is clear evidence that a relatively high-priced food can be incorporated into the feeding system in ever-increasing amounts. The stimulus for this increase stems from the attitude of the men in the Armed Forces.

This paper reports research undertaken at the U.S. Army Natick (Mass.) Laboratories and has been assigned No. TP. 190 in the series of papers approved for publication. The findings in this report are not to be construed as an official Department of the Army position.