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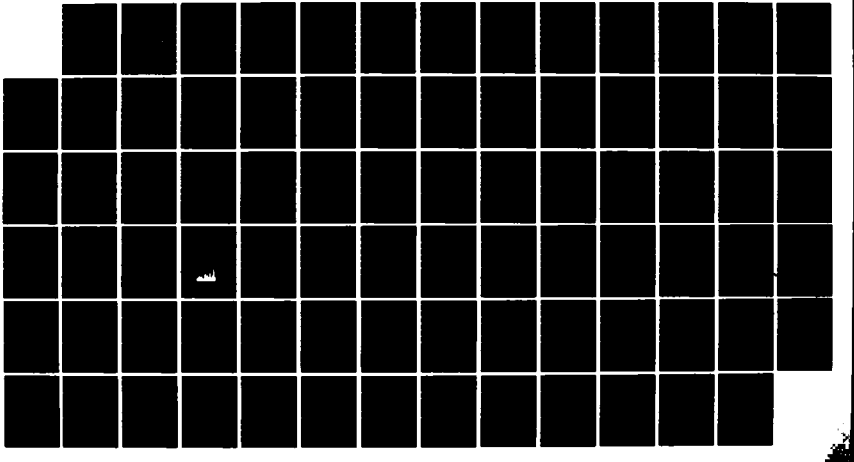

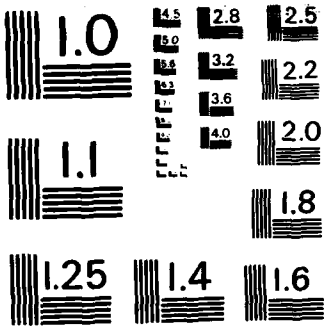

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THESIS

THE MILITARILY USEFUL CLEAN PRODUCT TANKER:
SEALIFT COMPONENT OF THE DOD
PETROLEUM DISTRIBUTION SYSTEM

by

Suzanne Roberts

December 1983

Thesis Advisor: D. C. Boger

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The Department of Defense petroleum distribution system utilizes Military Sealift Command controlled clean product tankers as its primary element of sealift transport. Relying upon the commercial tanker fleet for the majority of its fleet requirements, MSC is presently facing the decline of that industry due to strong economic and political factors. The reaction and behavior of both DOD and MSC to this changing resource scenario has generated considerable attention and debate. This thesis attempts to

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The Militarily Useful Clean Product Tanker: Sealift Component of the DOD Petroleum Distribution System

by

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Submitted in partial fulfillment of the requirements for the degree of

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ABSTRACT

The Department of Defense petroleum distribution system utilizes Military Sealift Command controlled clean product tankers as its primary element of sealift transport. Relying upon the commercial tanker fleet for the majority of its fleet requirements, MSC is presently facing the decline of that industry due to strong economic and political factors. The reaction and behavior of both DOD and MSC to this changing resource scenario has generated considerable attention and debate. This thesis attempts to depict the overall structure of the DOD petroleum distribution system, MSC's product tanker role in that system, and potential alternative behaviors with regard to the apparent inevitable decline of the product tanker industry.

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I. INTRODUCTION

"The Department of Defense is the single largest energy consumer in the United States" [Ref. 1]. Although the federal government accounts for only about two percent of the nation's total energy use, DOD is the largest government consumer representing approximately 81 percent of that total. The majority of DOD energy is in the form of petroleum, oil and lubricants (POL) with annual consumption equating to 250 million barrels of oil. With over five percent of the DOD budget devoted to energy expenditures, it is reasonable to expect a fairly intricate and well-planned strategy dedicated to the management of energy resources [Ref. 2].

DOD's primary concern is not only to acquire the necessary energy (and in the form required), but to transport that energy to the place where it is needed in the timely and consistent fashion required in order for DOD to perform its operational mission. Because of the supply and price disruptions of the past decade, DOD must also be vitally concerned with achieving both secure and assured sources of energy. In spite of the difficulties of the aforementioned tasks at the outset, DOD nonetheless levies an additional requirement that all these actions be performed for the least cost. The latter represents a duality of purpose (cost efficiency vs. readiness), which pervades the entire system of DOD petroleum acquisition and distribution.

Of particular interest in this thesis is the sealift component of POL logistics, the clean product tanker. Prime representative of the Merchant Marine in this area of support, and generally believed to be an important element of strategic planning, the clean product tanker fleet is

currently in the depths of a serious depression. In addition, this specialized fleet is facing potentially harmful legislation which threatens to diminish its size such that it will be incapable of providing the support required by DOD.

The impact of this potentially changing environment for POL sealift on both the DOD petroleum distribution system in general, and on the Military Sealift Command in particular, is a current focus of attention for both logisticians and strategic planners. It is considered pertinent, therefore, to examine the economic and legislative factors involved in the future of the clean product tanker fleet, and to attempt to reach some conclusions regarding its future viability as a DOD asset in POL sealift considerations.

To that end, Chapters II and III will discuss the DOD petroleum distribution system in general, and the role of the Military Sealift Command within that system specifically. Chapter IV will examine the supply and demand forces which impact on the tanker fleet, and will be followed in Chapter V by a discussion of the specific legislative factors involved in tanker forecasting. Chapter VI will attempt to pull this information together in a general summary of the current clean product tanker fleet status in order to draw general conclusions for Military Sealift Command behavior in this potentially changing environment.

II. BACKGROUND

In order to fully appreciate the role of the Military Sealift Command (MSC) and the clean product tanker in POL logistics, it is necessary to understand the generalities of DOD petroleum consumption and the basic workings and key players involved in the distribution system. This chapter is, therefore, devoted to establishing a framework of general information to assist the reader in placing later discussions in the proper perspective.

A. DOD PETROLEUM CONSUMPTION

Because of the very nature of the DOD business, the use of petroleum represents yet another duality of purpose which impacts heavily on distribution concerns. DOD faces two general requirements in this area: 1) to acquire and distribute sufficient petroleum and petroleum products to meet peacetime day-to-day operations, and 2) to acquire/distribute/store POL to meet war and contingency needs.

The former, labeled the Peacetime Operating Stock (POS), represents the annual turnover of DOD petroleum acquisitions. POS requirements are developed by the individual military services on the basis of geographic location, resupply logistics and anticipated requirements.

War Reserve Materiel Requirements (WRMR) are defined as the "quantity of POL required to equip and support the military forces in hostilities until resupply can be established" [Ref. 3]. WRMR requirements are also developed by each military service, with input concerning formula components and recommended areas of consideration from the Department of Energy in the Office of the Deputy Assistant

Secretary of Defense (Logistics and Materiel Management). These anticipated requirements ultimately become JCS recommendations, and finally Defense Guidance objectives. As the first major DOD budget document, the Defense Guidance essentially finalizes the service recommendations into required amounts of petroleum for a strategically determined number of days of supply to be maintained.

At least a portion of the driving force behind POL logistics lies in the way in which these two general requirements are treated. Figure 2-1 illustrates that, if both requirements were stored in a single tank, the WRMR would theoretically float on the POS volume. The total amount of fuel in the tank and the amount of POS decreases as fuel is used, but the amount of WRMR would remain inviolate. Thus, logisticians must be concerned with two separate but related tasks: meeting war reserve required amounts for storage, as well as constant upkeep of POS so as to allow the war reserve to remain untouched.

There is considerable concern regarding this aspect of POL logistics, based upon recent experience during the oil embargo of the 1970's. During that time, sufficient POS requirements could not be met, and DOD found itself dipping into war reserves in order to maintain its peacetime operating forces [Ref. 4]. The potential impact of such a practice in the event of hostilities is significantly detrimental to the carrying out of strategic planning. Thus, the heavy emphasis placed upon the separateness of the two POL requirements is being very closely enforced and monitored at this time. The burden of this policy falls upon the acquisition and distribution system to maintain POL levels for both requirements.

Although Figure 2-1 depicts both POS and WRMR in a single storage unit, this is not necessarily the case.

Considerable funding and planning directed toward acquiring necessary storage facilities worldwide for WRMR. Although POS is best stored in close proximity to users, WRMR planning dictates that storage facilities be located not only close to users, but in anticipated areas of need. The impact upon the distribution system may be a broadening of structure to meet diverse geographic supply areas, or (as is more often the case) a limiting effect as other geographically available modes of transport are found. The latter aspect will be discussed more fully in a later chapter.

The importance of the planning phase of DOD petroleum consumption lies not only in the intricacies and strategies of its operation, but in the impact it has on shaping the structure of the organization to whom it assigns action for carrying out these plans. By necessity, DOD must utilize the considerable military assets at its disposal to carry out its POL logistics, yet meld them into such an organization that accepts dedication to DOD requirements above and beyond individual service loyalties. The key player in this DOD network of POL logistics is the Defense Logistics Agency's Defense Fuel Supply Center, located at Cameron Station in Alexandria, Virginia.

B. DEFENSE FUEL SUPPLY CENTER (DFSC)

Until 1973, each military service handled its own POL distribution and funding activities, with DFSC acting primarily as a fuel procurement activity. In that year, however, DFSC was designated the "Integrated Materiel Manager" for bulk petroleum products. With that designation came the responsibility for procurement, ownership, accountability and distribution of POL used by all components of DOD. DFSC also buys crude oil stocks for the Strategic Petroleum Reserve and fuels for specified federal agencies [Ref. 5].

The Defense Logistics Agency acts as the parent organization and overseer of DFSC activities, reporting to the Office of the Secretary of Defense as needed.

DFSC's initial responsibility is the collection of POL data from the military services, which is then used in the composition of the Inventory Management Plan (IMP).

> "The IMP is a two-volume publication that provides data on storage availability and product inventory which is to be positioned geographically in support of peacetime operations and pre-positioned war reserve materiel requirements" [Ref. 6].

The IMP is the most important planning document in DFSC activities, since it entails the amounts of fuel and the areas in which it will be needed during the upcoming fiscal year. Published annually with regular quarterly changes, it is also updated on a constant daily basis to reflect changes in requirements or military force structure changes. Much of the information that is collected for this document is reflected in the Defense Guidance budgeting proposal.

The collection of the data for the IMP is accomplished through the work of DFSC Defense Fuel Region (DFR) offices and Joint Petroleum Offices (JPO), which are established by the overseas Unified Commands. These two field agents provide liaison with DOD customers and traffic management for deliveries within their areas worldwide. In addition, these offices maintain constant contact with customers concerning future deliveries and submit monthly "slates" of updated information to DFSC regarding requirements for the type of product, quantity and date of the month required. Based upon the IMP and the monthly slates, DFSC schedules its acquisitions and distribution of petroleum products.

Beyond the collection and consolidation of POL requirements, DFSC is also responsible for ensuring that sufficient storage exists to maintain required inventories worldwide.

To this end, they are authorized to contract for additional facilities through commercial operators when existing military service or DLA owned tankage is insufficient. They are also involved in planning for tankage construction utilizing military construction funding within the continental United States.

All POL acquisitions are considered owned by DFSC until delivered to the ultimate user. Acquisitions are made utilizing the Defense Fuel Stock Fund, which is replenished by DOD user payments for POL received. In the event that the military user is unable to store the requested POL, DFSC stores the excess within DLA owned tankage until such time as it can be delivered to the ultimate user [Ref. 7]. DFSC is also responsible for advising the military services of recommended storage programs and additional construction of storage facilities when applicable.

The final major step in the DFSC chain of responsibility is the selection and utilization of POL transportation. Because of the commercial nature of DFSC operations and the DOD requirement to run a break-even business with regard to the Defense Fuel Stock Fund, the selection of transportation modes is not limited to militarily available facilities. DFSC is billed for all transportation costs associated with the movement of its POL, including per diem, demurrage, deadfreight and diversions when appropriate. Transportation costs are the most easily manipulated for potential savings. As POL prices continue to rise, DFSC is more and more concerned with cutting costs in the area of transportation. DFSC is now utilizing a growing number of alternative commercial modes for POL movement which represent cost savings. In the overseas area, where pipelines and refineries are relatively abundant, DFSC has shifted emphasis to the acquisition of local POL and distribution by pipeline and tug-barge combinations to meet its overseas needs.

There are, however, two specific military organizations dedicated to the support of DFSC POL transportation.

In accordance with DOD directives, the Military Traffic Management Command is designated as the DOD single manager responsible for providing DFSC the requirements for the movement of bulk petroleum using land transportation within the continental United States. Land transportation in this instance includes water movements only within the Great Lakes, inland waterways, and the inter and intra coastal waterways.

DOD directives also define the Secretary of the Navy as the "single manager for ocean transportation", with the Military Sealift Command designated as his agent for "providing transportation support to DFSC for the movement of bulk petroleum products utilizing tankers and/or ocean going barges" [Ref. 8].

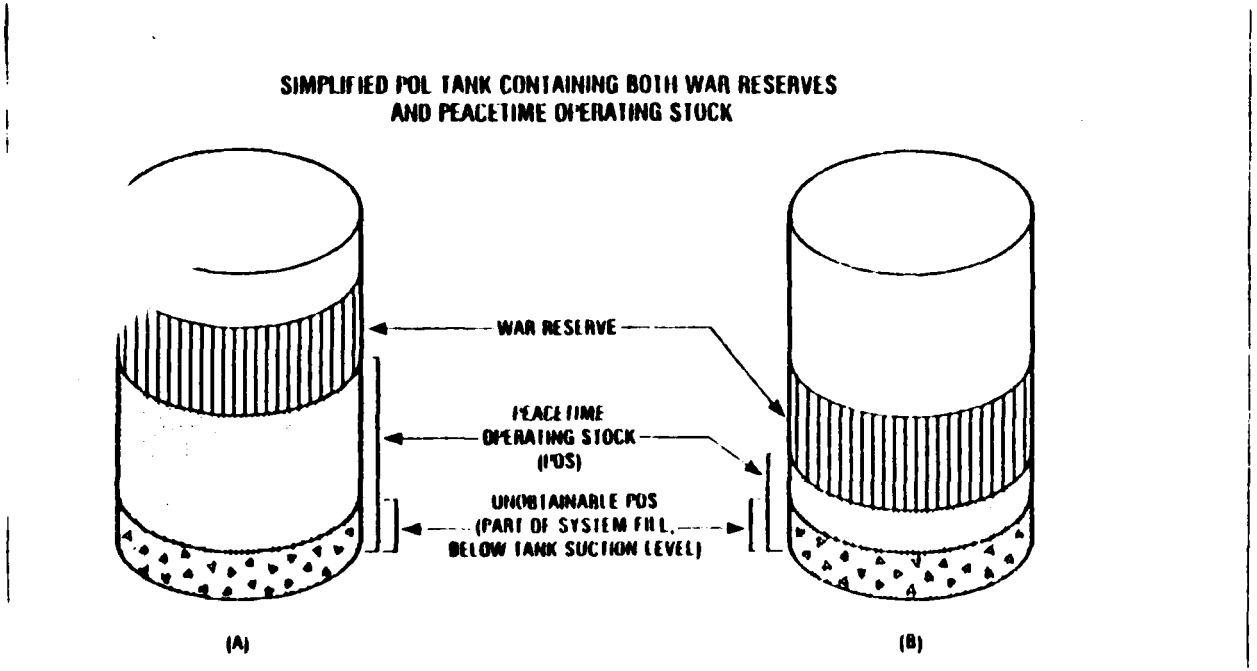
Because of the subject area of this paper, the Military Traffic Management Command and its POL distribution will not be further discussed. The Military Sealift Command will be examined in the succeeding chapter.

In conclusion, although the entire DOD petroleum planning and management network is highly intricate and widely dispersed among government and military components, the actual acquisition and distribution system in general involves only three levels of coordination: the users (military and selected government organizations), DFSC, and the MTMC-MSC-pipeline transportation system. These levels and the corresponding flow of information between them (from an MSC viewpoint) is depicted in Figure 2-2. It is important to note that, although the key players in the POL distribution system are all assigned or belong to specific departments of DOD or the military, the actual coordination tends to reflect a lateral or horizontal system within the vertical organizations involved. Specialists representing

all departments work together on a lateral basis to assure POL levels and distribution requirements are met efficiently and effectively. A considerable portion of the communication is handled by direct phone contact between coordinating parties, with backup paperwork submitted in large part after the fact (particularly insofar as actual schedules change).

While all players in the system must report to their specific departments, there is a strongly emphasized horizontal responsibility for personal contact and coordination within the distribution, revolving primarily around DFSC. One might almost contend that these key players must answer to two masters: the military and DOD departmental structure, and the DOD petroleum distribution system.

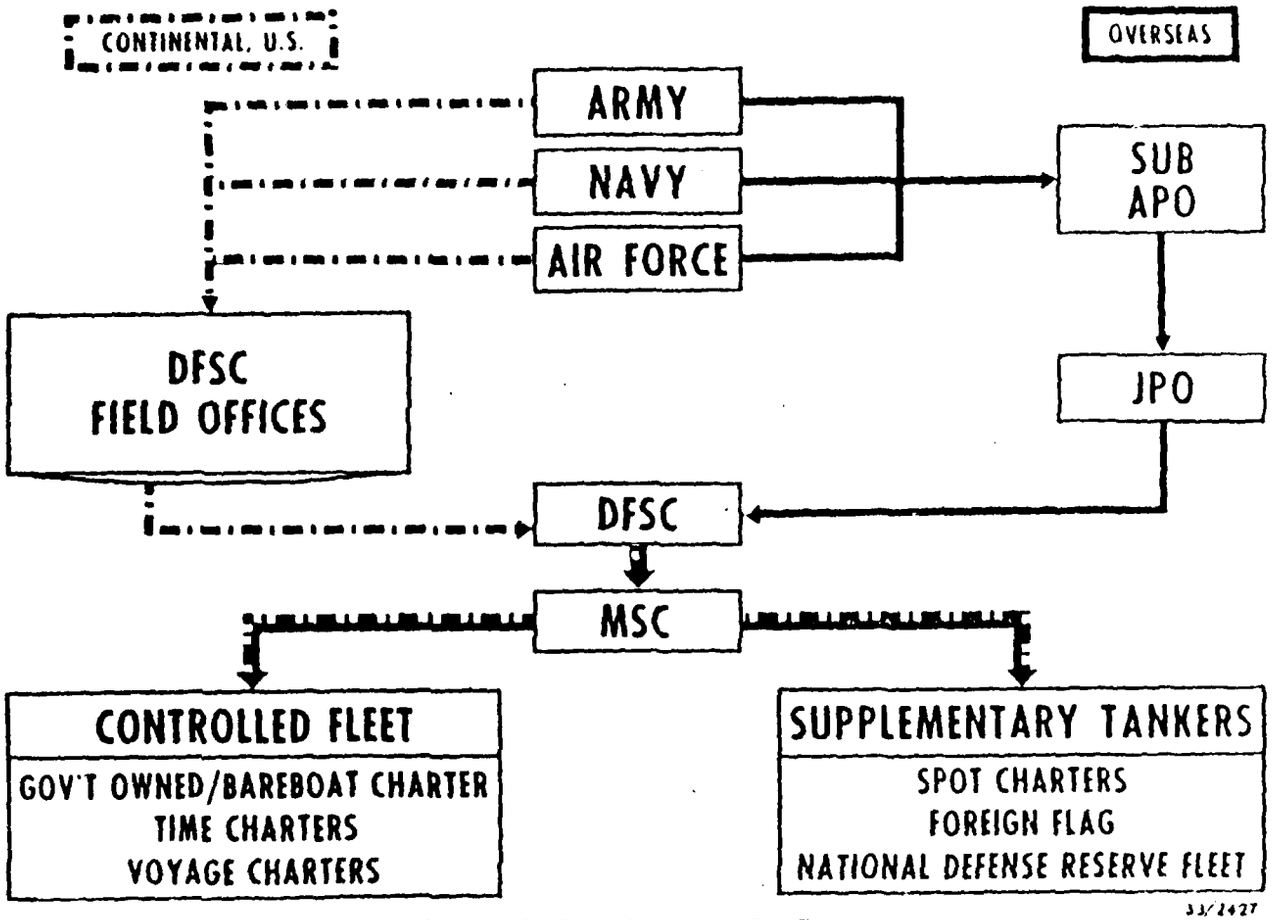
FIGURE 2-1



Source: DOD MANUAL 4140 25-M, 20 December 1978

Figure 2-2

FLOW OF PETROLEUM REQUIREMENTS



Source: Military Sealift Command, Washington, D. C.

III. DOD PETROLEUM SEALIFT

The sealift component of the DOD petroleum distribution system is the clean product tanker fleet, which is controlled and operated by the Military Sealift Command in Washington D.C. A special branch within MSC, the Tanker Division, is specifically charged with the day-to-day operational responsibilities of maintaining and operating the MSC tanker fleet. This chapter is devoted to a description of those specific responsibilities, and the part the clean product tanker plays in MSC POL operations.

A. MISSION AND STRUCTURE

As MSC's representative in the distribution network, the Tanker Division specifically defines its POL mission as follows:

> "...to operate the MSC nucleus tanker fleet and other bulk POL carriers acquired by MSC to meet bulk POL lift requirements; and to arrange for commercial shipping to meet DOD and DOD sponsored bulk petroleum lift requirements with maximum efficiency and economy" [Ref. 9].

The Tanker Division fleet is primarily involved in point-to-point delivery of refined petroleum products to military installations, limited (but increasing) numbers of deliveries to Navy ships at sea, and the transportation of crude oil in support of the Strategic Petroleum Reserve (DOD's crude war reserves).

The division is divided into two branches: the Tanker Operations Branch and the Tanker Management Support Branch. The Tanker Operations Branch is responsible for exercising direct operational control over all tankers assigned to or

chartered by MSC [Ref. 10]. In addition, this branch is the primary contact with DFSC, and conducts direct and daily liaison with that office concerning all changes in either operations or lift requirements. The Tanker Operations Branch prepares monthly estimates of tanker fleet capability, and accordingly initiates requests for additional charters or release actions to reduce capability where required. It is also responsible for preparing and initiating all administrative paperwork for tanker operations including schedules, routing instructions and sailing orders. Because of the close liaison required with DFSC, all tanker operations are controlled from this branch in Washington D.C. Representative assistance is provided, however, by on-location MSC offices as well as DFR and JPO personnel overseas. The Tanker Operations Branch is also particularly concerned with Quality Assurance Inspections, which are conducted on each tanker prior to POL loading. Failure to achieve a required rating for the type of fuel to be loaded results in costly delays and schedule adjustments. Therefore, all prospective charter tankers are inspected prior to final agreement, and require approval of this branch before contract signature. This is particularly important because product tankers are, theoretically, capable of switching from crude to refined product loads, and many do so on the basis of shifting demand.

The Tanker Management Support Branch is primarily responsible for:

> "developing, coordinating and integrating long and short-range operational plans, policies and procedures for the worldwide movement of petroleum products; monitoring and ensuring the accurate preparation of operational data upon which the monthly MSC POL billings are based; and developing and preparing the division overhead budget submission for the operating and planning budgets" [Ref. 11].

B. MSC FLEET SIZING PROCEDURES

The actual tanker fleet maintained by MSC and the Tanker Division is based upon requirements and predictions dictated by DFSC. Initial planning requirements provide the earliest indication of the number of tankers needed, and are submitted to MSC by DFSC approximately 15 to 18 months prior to the fiscal year. These are the same requirements used in the previously mentioned Inventory Management Plan, which is used in the presidential budget submission. A second set of data, the operating requirements, is submitted by DFSC about 6 months prior to the fiscal year, and represent a more accurate presentation of the types and amounts of fuel to be moved. This set of data is used by MSC to develop an appropriations budget for fiscal year operations.

Utilizing these two sets of data from DFSC (which in total reflect a detailed listing of requirements including the number of barrels to be shipped, the area of origin, destination port, product type and the month in which the movement is to occur), MSC conducts a detailed step-by-step procedure to convert these requirements into Handy Size Tanker (HST) equivalents. The rational behind this procedure is based upon the fact that this particular size tanker represents the most efficient and capable transport of the generally small amounts of DOD petroleum and petroleum products to be shipped. A perfect HST is defined by MSC as a 25,293 DWT clean product tanker with a speed of 16 kts. Utilizing these limits, the MSC tanker fleet is then converted into HST equivalents, and the resulting HST requirements and HST fleet is compared (after certain manual adjustments for "real world conditions") to ascertain the capability of the MSC fleet to meet DFSC requirements [Ref. 12].

Based on this determination of the number of MST tanker equivalents necessary to fulfill POL requirements for the fiscal year, the Tanker Division then determines the number of charter tankers needed to meet the task.

MSC has four primary sources from which to obtain additional charter tankers: the Merchant Marine fleet (U. S. flag), the National Defense Reserve Fleet, the Ready Reserve Fleet, and the foreign flag fleet (which includes both the Effective U. S. Controlled vessels and foreign owned vessels). The NDRF and RRF vessels are principally maintained for emergency purposes, although they are available for use by MSC if required. The tankers in these fleets are, however, generally very old and would require extensive preparations to make them sufficiently seaworthy. The Effective U. S. Controlled tankers are those operating under flags of convenience (Liberia, Panama, Honduras) which are owned by U. S. interests. These tankers are available for requisitioning in an emergency situation only and, since they are crewed by sailors from around the world, represent some concern to MSC as to the actual willingness and availability they offer. Foreign flag tankers are available to MSC only by voluntary contractual agreements or nation-to-nation agreements. Therefore, in peacetime or limited contingency situations, the only tankers that are realistically available for MSC charter are those within the U. S. Merchant Marine.

There are four types of charter agreements utilized by MSC in expanding the nucleus fleet. Bareboat charters involve a long term charter during which the tanker is manned and operated by MSC government personnel. Nine new tankers within the nucleus fleet were obtained through "build and charter" agreements, which were based upon bareboat type charter practices. A second type of charter is the time charter, which may involve a time period from a few

weeks to several years, but requires that the ship owner provide crew and ship management for the term of the charter. Under this agreement, the ship owner pays all costs except fuel, port charges and canal tolls. As in bareboat charters, time charterer's pay a hire fee which may be based on either DWT per month or dollars per day. The third type of charter is the voyage charter, which may be expressed in either consecutive or single voyage format. The single voyage charter (or "spot charter") is the one most often used by MSC to meet emergency lift requirements. This agreement provides for one shipment only, and remuneration is based upon the amount of freight carried (i.e., set amount per ton of cargo). The last type of charter agreement is the Contract of Affreightment, which specifies an amount of cargo to be carried in an agreed upon trade and time period, but does not require the owner to commit specific ships. The owner is required only to meet the requirements spelled out in the contract regarding tank coatings and size of tanker, and is paid based upon a rate per ton of cargo.

MSC utilizes the Navy Industrial Fund for operational expenses. This revolving fund is generally available to provide working capital for industrial or commercial type activities of the Navy which provide goods or services to agencies of DOD [Ref. 13]. This fund is not dependent upon congressional approval since MSC charges customers in a manner comparable to private business which is intended to constantly replenish the fund. The objective for MSC tanker operations, based upon both the type of funding and the DOD emphasis on cost effectiveness, is to break even rather than return a profit. In actuality, MSC appears rarely to achieve this goal. In fiscal year 1982, MSC operations produced a total loss of $38.5 million. Petroleum operations were the only commercial cost category to show an

actual cost decrease in that year (down $43.7 million), primarily based upon a reduced necessity in that time frame for spot chartered tankers [Ref. 14].

MSC billing rates are designed to apply uniformly to all shippers, with petroleum rates based upon the size of MSC controlled tankers and the number of loading and discharge stops on a particular voyage [Ref. 15]. The NIF is considered a particularly effective mechanism for "controlling the cost of services provided and for providing a method of financing, budgeting and accounting for operations" [Ref. 16]. It is especially useful for MSC because it permits immediate financing for peak periods as well as controlled retrenchment during slack periods.

C. THE CURRENT MSC CLEAN PRODUCT TANKER FLEET

MSC's Tanker Division presently operates a fleet of 28 ships representing 793,000 DWT. (See Figure 3-1) Figure 3-2 illustrates the reduction in the MSC tanker fleet over the past decade, particularly with regard to their HSF equivalent capability. Three factors appear to have direct influence on fleet sizing methodology which reflects this reduction. The first of these factors is a reduction in lift requirements. Based partly on the steady decrease in petroleum imports (to be discussed in a later chapter), this factor also reflects DFSC policy to extend its use of pipeline networks to deliver petroleum products. Recently DFSC advised MSC that it intends to utilize pipelines to deliver approximately 14 million barrels of POL to U. S. east coast locations that have been traditionally served by MSC tankers. MSC anticipates that this change alone will reduce their fleet of product tankers by four in the very near future. MSC also faces the loss of an additional tanker to pipeline and tug-barge

operations on the west coast.

involving approximately 5.5 million barrels of petroleum products [Ref. 17].

A second factor impacting on MSC fleet sizing involves the increasing number of restricted missions of MSC tankers, which limit the number of tankers available for scheduling and thereby reduce flexibility within the fleet. These missions are defined as priority missions from which tankers cannot be diverted to meet other requirements, and include long range scheduling for carrier group support and special ice capable tankers involved in Alaskan support operations.

A third factor is the increase in tanker size. In order to achieve economies of scale and to take advantage of lower crude prices, tankers built within the past few years have tended to be larger than the MST type tankers utilized by MSC. This equates to fewer tankers carrying a fixed amount of cargo in terms of MSC, and again reduces both flexibility and fleet size.

The MSC Tanker Division generally configures its fleet to handle about 85 percent of the anticipated annual requirements forecasted by DFSC, and relies largely upon spot charters to meet additional emergency lift requirements during the fiscal year. If requirements during the year are less than expected, MSC has the option of placing controlled tankers in the fleet into a ready reserve status for limited periods of time in order to match requirements and capability, and thus achieve desired cost efficiency levels.

D. THE MILITARILY USEFUL CLEAN PRODUCT TANKER

Because of the relatively delicate characteristics of DOD petroleum products, as well as the tendency toward building larger product carriers, the Military Sealift Command has made an effort to distinguish between those tankers considered useful to DOD requirements and those

believed to be unable to meet military specifications. In the commercial tanker business, any tanker which meets the minimum technical requirements to carry either clean or dirty products may be called a "product carrier". In many instances, this equates to a crude carrier that has the capability of carrying one or two grades of dirty fuel on occasion. For DOD, however, the primary emphasis is on considerably more sophisticated tankers which meet the requirements for carrying aviation quality fuel. On that basis, MSC defines the militarily useful clean product tanker as a "vessel that is appropriately coiled, coated and compartmentalized to enable it to carry several grades of petroleum products without contaminating or mixing with other cargoes" [Ref. 18]. In addition, because the majority of clean fuel storage and refining facilities utilized by DOD are geared to smaller tankers, lightering and off-shore pipeline discharge facilities for clean product are very limited. Thus, MSC adds to the description the size limitation of between 10,000 and 50,000 DWT, which allows use in the limited draft areas of DOD POL load and discharge. These two basic requirements, multi-product capable (which is characteristic of the small clean product tanker) and between 10,000 and 50,000 DWT, define MSC's vision of the militarily useful clean product tanker.

Although the current state of the clean product tanker industry represents an excess of capability and therefore ensures to some extent the availability to MSC of spot charter and long-term charter vessels through the mid-1980's, MSC is already attempting to identify other types of transport within the shipping trades which can be utilized in the event the product tanker market continues to decline. There are three alternatives which MSC has considered: tug-barge combinations, chemical carriers and large crude carriers.

Tug-barge combinations in the 20,000 to 50,000 DWT range appear to offer the best option in terms of draft and multi-cargo capability. Much of the tug-barge fleet represents relatively new construction (1970 and later) and offers advantages of recent technology and considerably lower overhead in terms of manning costs. A typical tug requires a crew of approximately ten, as compared with the average crew of twenty-five aboard a product tanker. The main disadvantage to the military is in the relative slow speed (average best speed about 10 kts) and limited range before requiring refueling. The latter has played a large part in confining the tug-barge to the coastal trade. Although transoceanic tug-barge combinations do exist, they do not presently represent a sufficiently large resource to adequately fill the product tanker role in DOD. In addition, based on the slow speed, MSC believes the tug-barge could not offer a one-to-one replacement of product tankers of equal size (general rule of thumb: 4 barges = 3 tankers) [Ref. 19].

There are currently only about 20 chemical carriers under U. S. flag which could meet the specifications for carrying DOD petroleum products. Although they offer advantages similar to the product tanker, there is a general feeling that such tankers would be primarily involved in, and essential to, the industrial effort, particularly in terms of a contingency or war situation. Thus the chemical carriers are not considered an available substitute for product tankers at this time [Ref. 20].

The largest category of available alternatives to the clean product tanker is the crude carrier in the 50,000 to 250,000 DWT range. These tankers offer a considerable capacity advantage in terms of crude oil lift. Since, however, most DOD POL shipments tend to be relatively small in size based upon the type of products utilized (i.e.,

aviation fuels), these tankers would represent excess capacity in DOD lift requirements. In addition, out of approximately 76 such tankers available at this time, only 49 are listed as having the coated tanks required. None of these 76 are carrying clean product at this time [Ref. 21]. Even for those tankers with coated tanks, serious concern is evidenced by MSC regarding the ability of owners to sufficiently clean the tanks (after many years of carrying crude) for successful adaptation to clean products.

E. CONCLUSION

In the final analysis, the MSC Tanker Division relies almost exclusively upon two entities for its business: the Defense Fuel Supply Center, which represents its only customer; and the U. S. Merchant Marine, which is its primary source of clean product tankers. Any changes in the business of these two entities is reflected in the Tanker Division business of POL lift. That DFSC is especially concerned with achieving cost savings in the transportation of petroleum is evidenced by its increasing use of pipelines and tug-barge combinations. While MSC must also be concerned with the cost efficiency of its operations, it faces the equally important and frequently conflicting requirement for fleet readiness to meet contingency and war situations. The latter requirement is particularly affected by the status of the U. S. Merchant Marine, which is generally recognized as the source from which support for war operations will be sought. In the case of MSC, a declining clean product tanker industry equates to a declining emergency response capability. An examination of the current state of this industry, and the forces acting on it, is therefore pertinent to an understanding of the potentially changing environment which both strategic planners and MSC operational personnel must face.

FIGURE 3-1

MSC TANKER FLEET
AS OF
20 JULY 1983

NO.	CATEGORY	DWT (000)	HST EQUIVALENT
3	MSC OPERATED:		
	3 T-1	14	0.3
18	CONTRACT OPERATED):		
	4 COLUMBIA	149	5.4
	5 T-5	133	5.0
	9 SEALIFT	245	9.0
7	TIME CHARTER:		
	7 LONG TERM	252	9.0
28		793	28.7

Source: Military Sealift Command, Washington D.C.

Figure 3-2

MSC TANKER FLEET

BY FISCAL YEAR

	NUMBER OF SHIPS	HST EQUIVALENTS
FY 1975	36	36.7
FY 1976	32	30.0
FY 1977	28	23.9
FY 1978	28	23.1
FY 1979	28	23.5
FY 1980	31	27.8
FY 1981	34	27.3
FY 1982	32	25.2
FY 1983	28	21.5
FY 1984	26	20.3

Source: Military Sealift Command, Washington, D. C.

3/3711/221182/008Q004

IV. STATE OF THE TANKER INDUSTRY

The tanker industry in general has suffered from increasingly depressed business trends in the past several years, resulting in a worldwide state of excess capacity heretofore unequaled in the history of the industry. In spite of certain advantages created by legislation and government subsidies (specifically the Jones Act and Construction and Operation Differential Subsidies), the United States tanker industry is also experiencing declining business which is a direct reflection of world tanker market trends. In an effort to understand the current state of the industry, this chapter will focus on a discussion of the general supply and demand factors which impact on the tanker market, and on an overall picture of the industry as it now exists.

A. SUPPLY AND DEMAND IN THE TANKER INDUSTRY

Although the following discussion is sufficiently general in nature to have application to the tanker industry in general, an attempt is made to specifically relate the factors in supply and demand to the product tanker industry in particular.

1. Demand in the Product Tanker Market

The demand for tankers is essentially a derived demand based upon the worldwide demand for oil. Put simply, as the demand for oil rises, so does the demand for ways in which to transport oil from origin to market, so long as there is sufficient demand. This has traditionally meant an increase in demand for tankers, which have served as the

primary mode of ocean transport for oil resources. While competition from other modes of oil transport have diluted, to some extent, this primary factor in tanker demand, it remains nonetheless as the single most important overall factor in the tanker market.

The worldwide demand for oil may then be divided into three general subfactors which directly impact on the size and composition of the tanker fleet demanded. These subfactors include the geographic, economic and political considerations of the world and U. S. petroleum markets. It is the petroleum market which, necessarily, provides the primary impetus for product tankers specifically designed to carry refined products, and which are the focus of this thesis.

Geographically, the initial consideration lies in the location of crude oil resources in relation to the refined product market. Theoretically, as long as oceans separate crude oil suppliers from petroleum markets, tankers will be in demand. In terms of product tankers, however, this theory has lost significant impact in recent years. Refineries located close to the crude oil source once represented the major origin for product tanker voyages, thereby involving frequently long and costly routes and transportation costs. The past decade has seen an increase in the building of refineries in established and emerging economies close to the market source. These localized refineries allow petroleum markets to take advantage of economies of scale by transporting larger quantities of crude to the market area, thereby reducing transportation costs as well as enabling the use of other transportation modes (i.e., pipelines). Indeed, the localization of refineries effectively encourages the construction and use of pipeline distribution, which results in a reduction in need for the product tanker.

An additional aspect of the geographic factor of tanker demand concerns the depth of water at refinery port facilities. In past decades, refineries at crude oil resource points worldwide were limited in draft capability, which made the relatively shallow draft product tankers especially suited for the pickup of refined products.

> "Economically, a large ship in clean trade would lose money. It's service would be limited to ports large enough to accomodate it. It would spend excessive time in port, loading and discharging, because the throughput of most refineries and storage areas is still geared to the small clean product tanker" [Ref. 22].

In spite of the draft restrictions which seem to enhance the use of clean product tankers, "the demand for seaborne delivery of clean product has been steadily dropping for twenty years" [Ref. 23]. This is again primarily the result of an increase in both localized refineries and pipeline distribution. Although only a relative few of the deep water ports and off-shore platforms allow large amounts of crude to be off-loaded to refineries, more and more developing and major industrialized nations are depending on a system of pipelines to distribute crude to, and clean product from, local refineries.

The economic factor in tanker demand is essentially a function of the relationship between crude and product consumption and the growth in a nation's GNP and real income. "Economic decline and recession will result in a decline in oil demand and precipitate a decline in tanker demand" [Ref. 24]. In addition to recessionary impacts, the push toward oil conservation and reduction of dependence upon foreign oil sources (particularly in the U. S.) must also be considered in current decreased consumption rates. Figure 4-1 indicates the decrease in United States petroleum imports during the past decade. Although an increasing

dependence upon, and availability of, Alaskan North Slope oil must be considered a part of this decline, it is nonetheless an indication of current tanker surplus (which reflects an established fleet carrying less and less imported oil).

Overall, the general outlook for future oil consumption (and therefore tanker demand) tends to be bleak. Economic forecasts for worldwide economic growth range from 3 percent to 4 percent through the end of the century [Ref. 25]. Richard K. Orr (senior maritime advisor for Exxon Corporation) in a September 1982 speech to the Ship-Trans-Port symposium in Rotterdam, forecasted the following for world oil demand:

> "Energy demand should grow less (than 3 percent per year) -- reflecting substantial improvements in the efficient use of energy. Since sources other than oil are expected to supply most of the increase in energy demand, growth in oil demand should be limited to less than 1 percent per year. Moreover, growth in free-world oil demand will be concentrated in developing countries ... (which is) ... expected to double from just over 20 percent today to nearly 40 percent by the year 2000. But since some developing countries are also oil producing countries, oil demand growth in these areas will not necessarily add to tanker demand" [Ref. 26].

Any discussion of the economic factors in tanker demand must also include some reference to oil prices and oil availability. As oil prices continue to increase, competition to reduce overhead costs in the petroleum industry also increase. As has been mentioned previously, transportation costs are particularly vulnerable to efforts to cut costs. Technology and conservation inspired innovation have resulted in numerous cost savings, including pipeline utilization and new tug and barge combinations. Efforts to enhance the use of alternative fuels are ongoing in the worldwide struggle to acquire cheap energy.

Oil availability, currently considered to be in "glut" proportions, has the capacity to simultaneously reduce the need for extensive storage (both land-based and afloat) and to speed up fleet voyages. As concern shifts from oil availability and the need to "store oil upon the water", to a concern for the cost of capital, tankers are likely to operate faster on laden voyages than in times of limited availability [Ref. 27].

Finally, within the political arena, tanker demand is affected by both legislation and governmental dictums related to intracountry oil transportation. Import quotas and export prohibitions impact upon tanker fleet size and utilization. A current example involves the Alaskan North Slope source in the United States, which prohibits exports and therefore increases the demand for U. S. flag tankers for oil transport. Legislation regarding home country flag shipping can act as both deterrent and protector in tanker demand. Within the United States, the Jones Act protects the U. S. flag tanker fleet by restricting carriage between U. S. points to U. S. owned and operated ships. Most countries have similar home fleet protection laws, which prohibit to some extent foreign tanker demand within their ports.

In conclusion, the demand for tankers is generally predicated on how much oil needs to be moved and how far it has to be moved. Geographic, economic, and political factors further impact on tanker demand by specifying the type of tanker required and the size of the fleet needed to fulfill the market demand. Currently, these factors are impacting detrimentally on the product tanker fleet in particular, by increasing transportation cost consciousness and therefore making alternative modes especially attractive, and through a general reduction in oil consumption. Particular U. S. legislation which is viewed as potentially

threatening to the U. S. flag product tanker industry will be discussed in the next chapter.

2. Supply in the Tanker Industry

Tanker supply is a function of both the current available petroleum hauling business and future predictions for consumption. The oil boom of the 1960's, and the subsequent speculation that oil consumption would continue to increase at the same rate, encouraged the building of an abundance of tankers. In spite of the energy consciousness of the 1970's, worldwide oil consumption continued to increase through 1979. Figure 4-2 illustrates this general increasing trend, particularly among the centralized economies, where both oil production and consumption are expanding even into the present decade. Developing countries have also increased oil consumption from 14 percent in 1973 to 19 percent in 1982. Most forecasts indicate that this trend will continue but will have limited impact on product tanker usage due to extensive pipeline utilization and the home location of crude oil resources and refineries. Within the free world, the expansion of the oil economy appears to have ceased. Free world oil consumption dropped 12 percent from 1973 to 1982 as a percentage of total world consumption. This is perceived as a period of "consolidation and retrenchment" for free world oil consumption, which is likely to last through the 1980's and, potentially, well into the next decade [Ref. 28]. As oil consumption figures continue to decrease, excess refineries in the free world continue to be closed and pipeline facilities expanded to meet the new demand for cheap transportation of oil.

The large number of tankers built in the 1960's based upon the optimistic outlook for future oil consumption reflected a trend toward construction which continued through much of the next decade. Even in 1979, when extreme

oil price increases and related petroleum deficiencies changed the world's view toward the once easy resource, business for the product tanker fleet was extremely good. Indeed, there were scarcely enough tankers to meet the demand for the suddenly precious petroleum. Tankers were required to make numerous stops at refineries during a single voyage in order to fill their tanks, and the surge toward petroleum storage was at its height as nations struggled to acquire sufficient refined products to meet demand. Industrial nations (primarily Japan) utilized product tankers as well as crude tankers to maintain "huge floating stockpiles" of crude and refined products [Ref. 29].

This peak utilization of tankers did not, however, continue as predicted. As crude oil became more available and OPEC members endeavored to increase purchases by a chastened market by offering all manner of discount packages, the incentive to store large amounts of oil decreased. The emphasis changed to reducing transportation costs and utilizing localized facilities. The transport of large amounts of crude oil once again became viable and reflected the benefits of economies of scale in oil acquisition. Increased output by non-OPEC countries (i.e., Alaska North Slope, Mexico, Britain, Norway, and Denmark) also impacted on available business for tankers by reducing sailing distances and reducing emphasis on the Middle East [Ref. 30].

The tanker industry in the 1980's has found itself in a state of excess capacity because of the burgeoning business of the 1960's and 1970's, the optimistic forecasts during those decades for future oil consumption, and the resulting trend by tanker owners to build more and more tankers in order to take advantage of the market. In spite of the rather drastic change in those expectations in the early 1980's, many tanker owners (until fairly recently)

continued to retain surplus tankers in the belief that the market would still turn around in their favor. As the fallacy of that outlook became clear, tanker owners began to seek ways in which to reduce capacity and lower overhead costs. An examination of the tanker industry today must therefore include not only those tankers still in operation, but those tankers which have been "laid up" and those which have been scrapped. The fact that such a division of tanker resources must be made is ample indication that the industry is indeed suffering one of its worst business periods in memory.

B. THE WORLDWIDE AND U. S. TANKER INDUSTRY TODAY

The current state of the worldwide tanker industry is, in a word, depressed. The 27 January 1983 issue of Fairplay explained the situation as follows:

> "So deep is the current oil charter market depression and so few are the prospects of any improvement in the foreseeable future that shipowners may be forgiven for questioning the viability of staying in the business. Shipowners efforts to halt and reverse the widening of the gap between tanker supply and demand resulted in a doubling of tonnage sold for scrap and a record volume of tonnage committed to lay-up. A simultaneous shrinkage of world oil demand, however, meant that all these extreme and commendable measures improved the trading scene not one jot" [Ref. 31].

Figure 4-3 illustrates the changing supply and demand for tankers worldwide during 1981 and 1982, and the resulting increase in tanker surplus. While the entire DWT figures for the oil carrier market have changed relatively little, the growth in inactive tankers and still operating surplus tankers is extreme. The continuing use of surplus tankers is an indication of tanker owner attempts to retain excess capacity in spite of decreasing demand. Part of this may be based upon some retained optimism, but a considerable portion is also based upon:

"...a fast declining level in the scrap value of shipping, a glut in the scrap steel industry in the Far East, and a marked lack of incentive for any demolition yards to improve their facilities or to increase their capacity" [Ref. 32].

The operating tanker surplus comprises slow-steaming, deadfreight, increased port time, excessive periods of off-hire and temporary lay-up. Slow-steaming, considered the largest component of tanker surplus, accounted for an estimated 73 million DWT (or 57 percent) of the total operating surplus of 1981 of 127 million DWT [Ref. 33]. Although at least part of the reason tanker owners resort to slow-steaming is based on the soaring price of bunkers over the last several years, it also represents an attempt to keep vessels out of lay-up. Deadfreight, or part-cargoing, is especially prevalent among medium-sized tankers, "where the structure of freight rates provides the incentive to accept part-cargoes and to enter into trades to restricted draft ports normally served by smaller tankers" [Ref. 34].

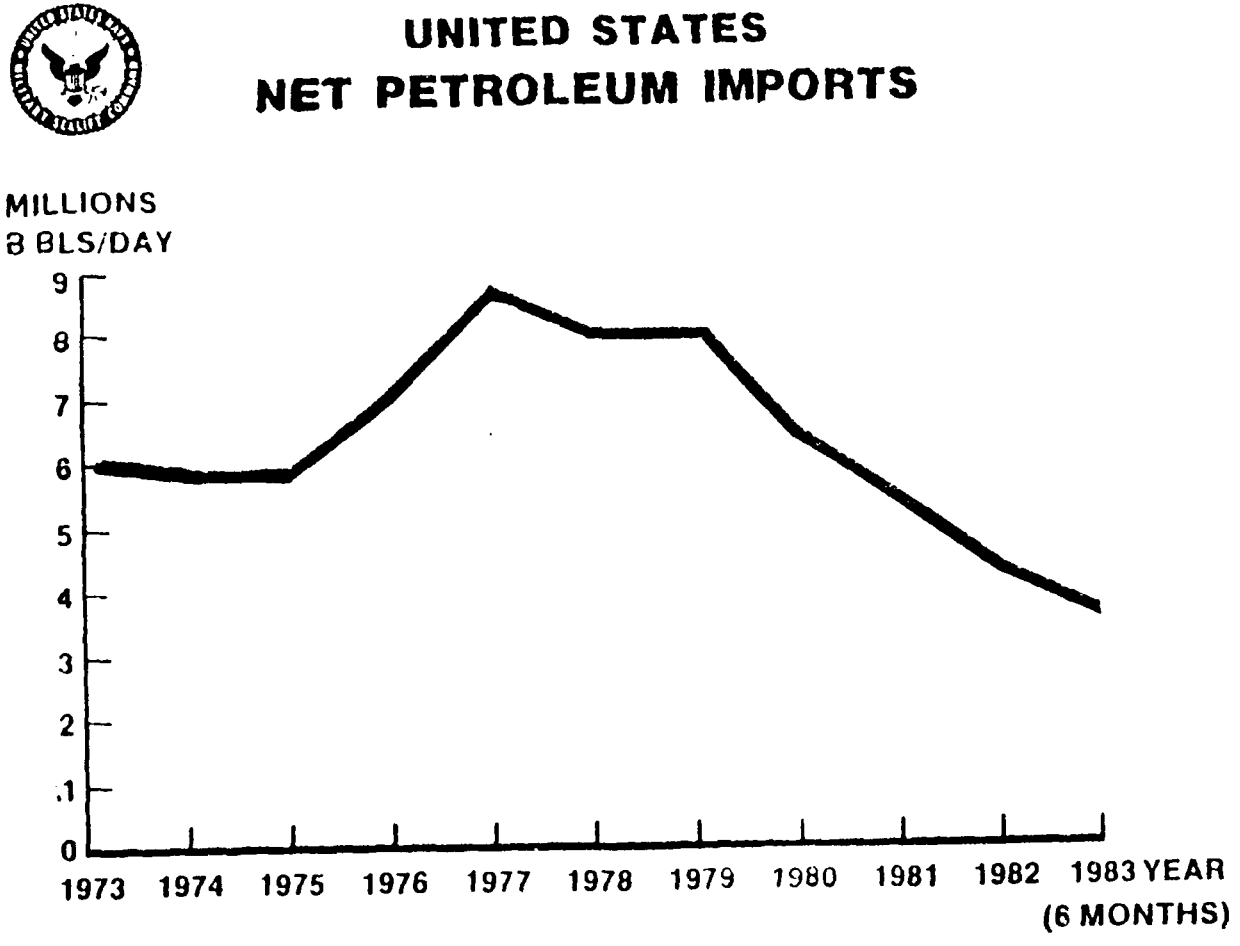
The inactive tankers represented in Figure 4-3 include those tankers which have been idle in port for two months or more, are laid-up, damaged, under repair or engaged in off-shore storage schemes [Ref. 35]. As can be noted, inactivity increased sharply during the two years depicted. Figure 4-4 illustrates total wordwide inactive tonnage through the third quarter of 1983, as well as reported sales to breakers (or scrappings) in the tanker fleet. As scrapping continues at these extreme rates, in spite of the steel industry recession and reduced world demand for scrap, the tanker fleet is "pruned" of some of its excess capacity. This is shown by the evident stabilization of inactive tonnage rates in Figure 4-4. Nonetheless, tanker surplus worldwide is still estimated to exceed 150 million DWT of total oil carrier supply at this time [Ref. 36].

The United States flag tanker fleet consisted of 101 vessels of 5000 DWT or more in both clean and crude trade as of 1 October 1983. Figure 4-5 illustrates the erosion of clean product tankers since 1978, which has resulted in an almost complete reversal of the ratio of clean to dirty (or crude) tankers during that period. Aside from the aforementioned economic factors, a considerable factor in this reversal involves the rush by small product tankers to the crude trade provided by the Alaskan North Slope. The effect is nonetheless severe, particularly in terms of the Military Sealift Command and the DOD petroleum distribution system. Figure 4-6 further delineates the breakdown of the current inventory of tankers into the clean and dirty trades, and indicates that only 60 clean tankers within the privately owned fleet are available for utilization. As of 1 October 1983, 35 vessels capable of carrying refined products had switched to the crude trade, as illustrated in Figure 4-7. An additional 32 tankers within the product tanker fleet are currently laid up indefinitely. The latter represents a reduction in lay-up of two vessels which were scrapped between 1 May and 1 October of this year.

Based upon market forces alone, the trend appears to be strongly in the direction of decreased demand and a continued decrease in the number of U. S. flag tankers available. The Military Sealift Command, in an attempt to forecast future availability and construct its fleet suitably, has estimated that market forces alone will further decimate the product tanker fleet by 20 vessels by 1986. (See Figure 4-8) This potential reduction in excess capacity and tanker surplus (primarily through scrapping) may enhance the U. S. flag tanker business through sheer survival of the fittest, but will simultaneously undermine the capability of MSC to meet DOD petroleum hauling requirements with the product tanker in both peacetime and contingency situations.

Market forces, however, are not the only factors expected to impact on the future product tanker fleet within this country. Current legislation is also threatening to further diminish this struggling industry. These legislative factors and anticipated impacts represent a vital concern to both tanker owners and military planners, and will therefore be discussed at some length in the following chapter.

Figure 4-1



Source: Military Sealift Command
Washington, D. C.

3T2X/3122/041083/01

Figure 4-2

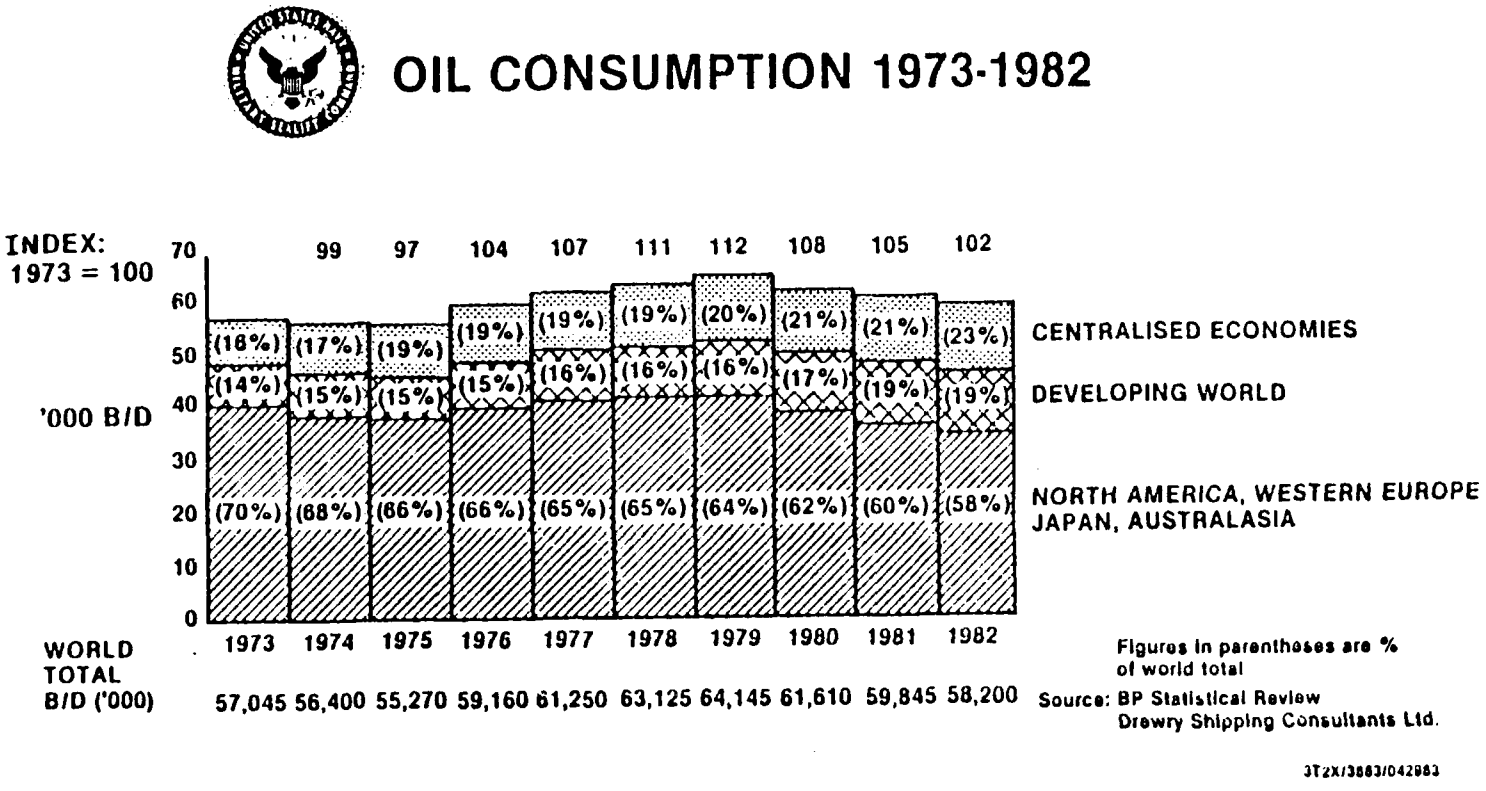
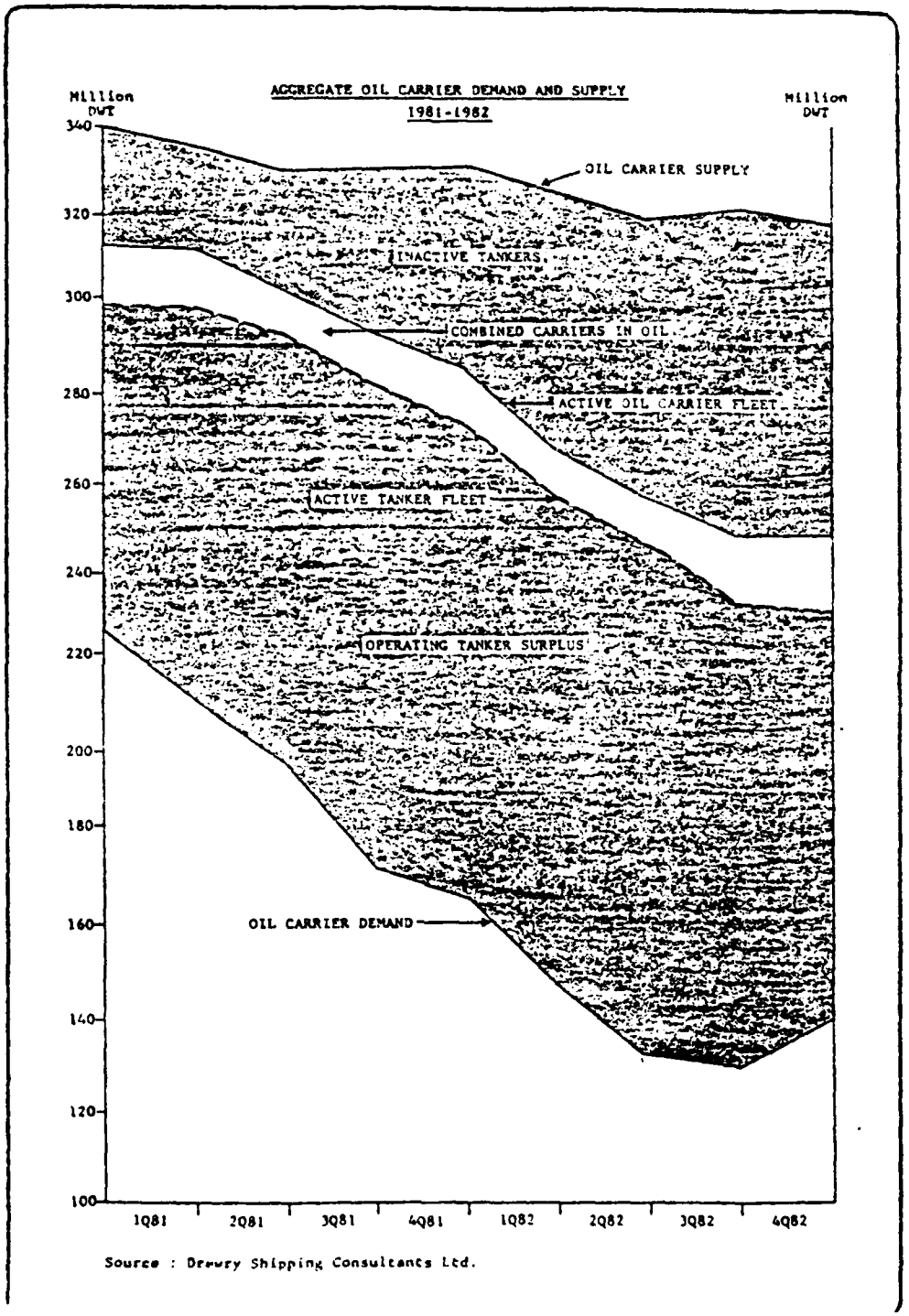
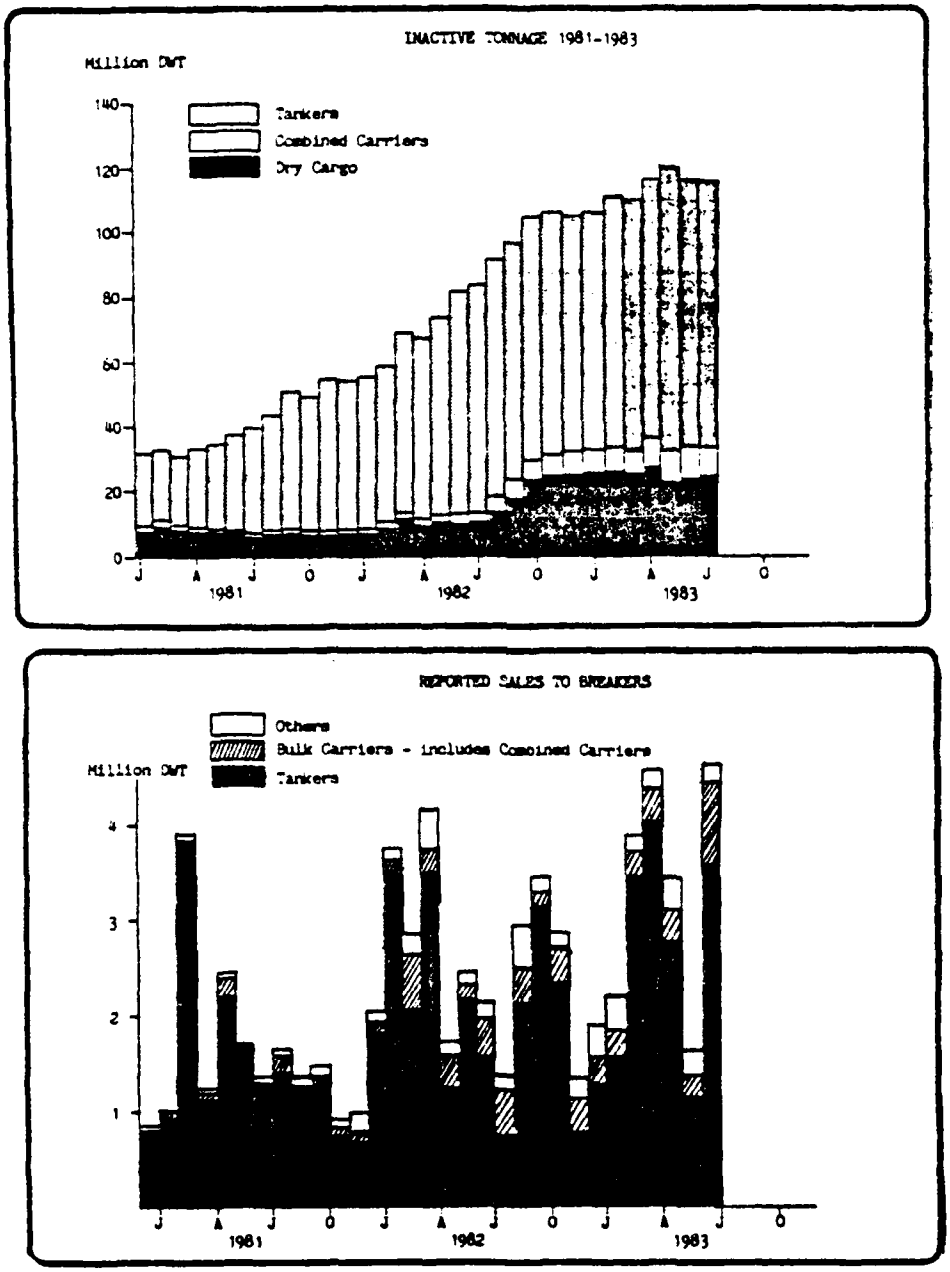

OIL CONSUMPTION 1973-1982
INDEX: 1973 = 100
'000 B/D
70
60
50
40
30
20
10
0
99 97 104 107 111 112 108 105 102
(18%) (17%) (19%) (19%) (19%) (19%) (20%) (21%) (21%) (23%)
(14%) (15%) (15%) (15%) (16%) (16%) (16%) (17%) (19%) (19%)
(70%) (68%) (66%) (66%) (65%) (65%) (64%) (62%) (60%) (58%)
CENTRALISED ECONOMIES
DEVELOPING WORLD
NORTH AMERICA, WESTERN EUROPE
JAPAN, AUSTRALASIA
1973 1974 1975 1976 1977 1978 1979 1980 1981 1982
WORLD TOTAL B/D ('000)
57,045 56,400 55,270 59,160 61,250 63,125 64,145 61,610 59,845 58,200
Figures in parentheses are % of world total
Source: BP Statistical Review
Drewry Shipping Consultants Ltd.
3T2X/3883/042983

Figure 4-3



Source : Drewry Shipping Consultants Ltd.

Figure 4-4



Source: Drewry Shipping Consultants, Ltd.

Figure 4-5

U.S. FLAG TANKER FLEET SERVICE*

YEAR	# IN CLEAN TRADE	# IN DIRTY TRADE	# IN COMBINED TRADE	TOTAL
1983	60	130	11	201
1982	72	138	16	226
1981	71	142	9	222
1980	87	136	—	223
1979	99	125	—	224
1978	132	91	—	223
1977	143	71	—	214
1976	145	62	—	207
1975	137	73	—	210

*As of May or June of each year

Source: Military Sealift Command, Washington, D. C.

Figure 4-6

INVENTORY OF PRIVATELY OWNED TANKER FLEET (DWT)*

5,000 DWT & OVER
1 OCTOBER 1983

5,000 to 29,999		30,000 to 49,999		50,000 & OVER		TOTAL		GRAND TOTAL
clean	dirty	clean	dirty	clean	dirty	clean	dirty	
28	16	32	50	0	75	60	141	201

EXCLUDES SPECIAL CHEMICAL TANKERS AND
USNS TANKERS UNDER BAREBOAT CHARTER

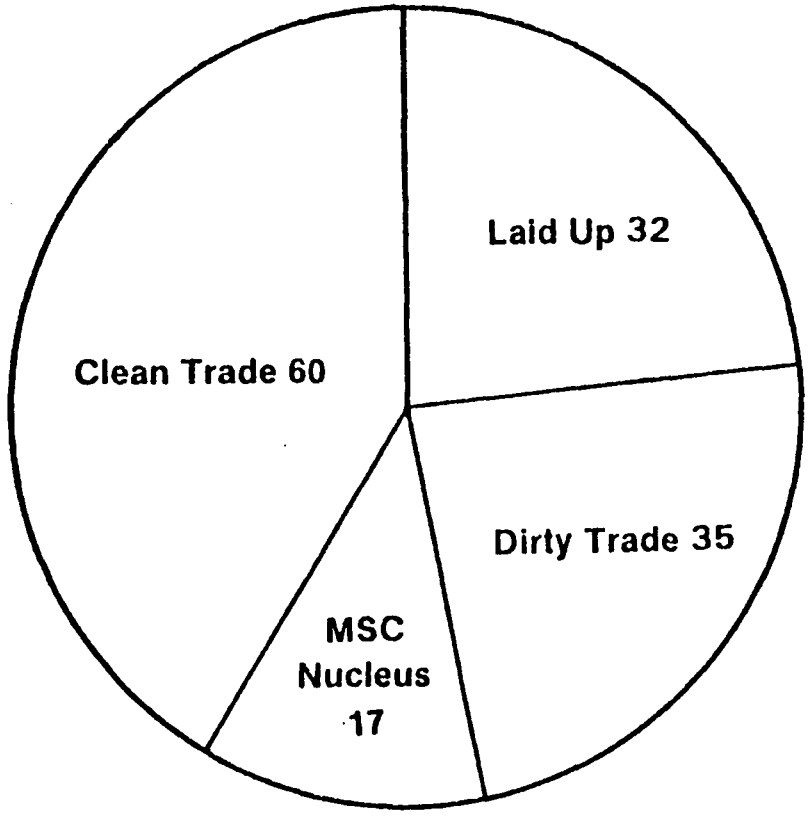
Source: Military Sealift Command, Washington, D. C.

3/3/09 131083/021

Figure 4-7

CURRENT PRODUCT TANKER EMPLOYMENT

AS OF 1 OCT 1983

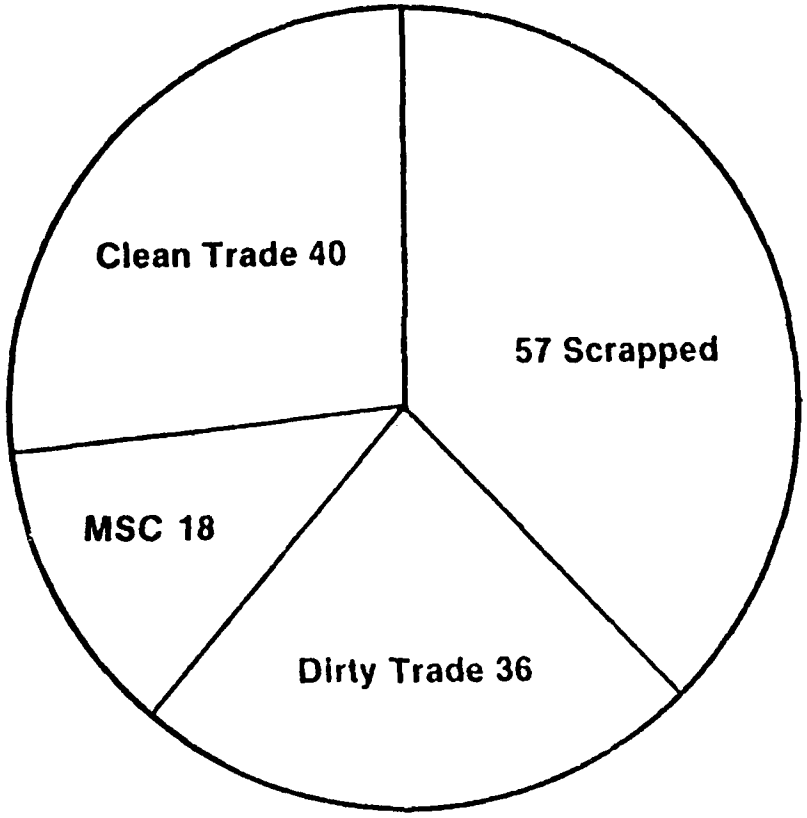


Source: Military Sealift Command, Washington, D. C.

3T2a/2171/100583/01

Figure 4-8

1986 PRODUCT TANKER FLEET EMPLOYMENT
MARKET FORCES



Source: Military Sealift Command, Washington, D. C.

3T2x/2174/100583/01

V. U. S. LEGISLATION: CURRENT AND PROPOSED

The United States government has evidenced considerable concern for the Merchant Marine fleet by adopting, directly or indirectly, subsidizing legislation in its behalf. This legislation has included the Jones Act, Construction and Operating Differential Subsidies, Title XI Federal Ship Mortgage Guarantees, Tax Deferred Ship Construction Funds, and Construction Reserve Funds. Whether these acts have been successful in nurturing a Merchant Marine relied upon by both commercial and military sources is a matter of some conjecture. It is safe to assume, however, that because of high construction and manning costs associated with shipping in this country, unsubsidized U. S. flag vessels would have extreme difficulty competing with the world fleet.

Within the U. S. flag tanker fleet, the Jones Act in particular has provided some relief to surplus conditions experienced in recent years. The opening of the Alaskan North Slope in 1977 with its associated restrictions on oil export offered some refuge to the growing list of idle tankers. At least a portion of the tanker surplus (including product tankers) was absorbed by this expanding Alaskan trade, based upon the Jones Act reservation of coastal shipping to U. S. flag vessels.

Current and proposed legislation, however, now threaten to offset the relief heretofore provided. Within the product tanker market in particular, there are three legislative issues which are viewed as having potentially detrimental impacts upon fleet survival. These issues include the Port and Tanker Safety Act of 1978, the Alaskan North Slope export proposal, and the DOT CDS repayment issue.

A. PORT AND TANKER SAFETY ACT OF 1978

The 1978 Protocol, sponsored by the Inter-Governmental Maritime Consultative Organization at the 1974 Safety of Life at Sea Convention (SOLAS), became effective on 18 May 1981. This Protocol introduced stringent new safety measures and pollution prevention factors for international shipping. The United States adopted these measures into the Port and Tanker Safety Act of 1978 for all ships calling at U. S. ports.

The most significant portion of the act in relation to tankers is the requirement for inert gas systems (IGS) and segregated ballast systems on existing product and crude tankers. Segregated ballast systems appear to be primarily pollution oriented, reserving certain tanks for ballast in order to deter out-pumping of contaminated gaseous mixtures from other tanks to make way for ballast. Inert gas systems, on the other hand, are safety motivated, requiring non-inflammatory inert gases rather than inflammatory oxygen combinations in tanker systems. The IGS deadline for existing product tankers in the 20,000 to 70,000 DWT range was 1 June 1983, although there is some evidence of a softening of attitude regarding those tankers operating between U. S. ports. All new product tankers contracted after 1 June 1979, or delivered after 1 June 1982, are required to have inert gas systems in use when delivered in order to carry any cargo. Segregated or dedicated clean ballast tanks are required on all clean product tankers in the 20,000 to 40,000 DWT range by 1 January 1986 (or when they reach 15 years of age, whichever comes first). Clean product tankers between 40,000 and 70,000 DWT were required to have segregated ballast systems installed by 1 June 1981 [Ref. 37].

This law adds millions to new construction costs of tankers, and is estimated to cost approximately $8 million for retrofitting on existing tankers [Ref. 38]. In addition, segregated ballast on existing vessels causes a "reduction in earning capacity because the vessel loses one-third of the cargo carrying capacity" [Ref. 39].

Figure 5-1 illustrates the IGS situation for U. S. flag tankers on 1 May 1983, one month before the installation deadline. Well over half the fleet in the 20,000 to 50,000 DWT range were not equipped with IGS, and only 13 ships reflected definite plans to install IGS to meet the new requirements. Within the product tanker fleet in particular, reluctance to invest in IGS installation is a reflection of the prohibitive cost, poor tanker market and the relative age of the fleet. Figure 5-2 illustrates that the U. S. flag product tanker fleet is represented in large part by ships constructed more than twenty years ago.

> "Many owners of older vessels, with little chance of securing worthwhile trading, are unable to justify the large expenditure associated with retrofitting and this was undoubtedly one of the reasons contributing to the higher level of scrapping during the year" [Ref. 40].

Segregated ballast tanks required in the 20,000 to 40,000 DWT range by 1 January 1986 are expected to further decrease the number of available U. S. flag product tankers currently in existence. New product tankers, with IGS and segregated ballast tanks included in original construction, are relatively few in number. These new construction additions are also expected to increase the size of new vessels to offset the loss of carrying capability and enhance economies of scale. Those new product tankers in construction tend to be in the 50,000 DWT range and beyond, precluding them from effective MSC utilization [Ref. 41]. Present tanker owners unwilling to invest in retrofitting face the

alternatives of scrapping vessels or moving into the foreign trade market. The latter does not necessarily represent a long-term option, however, as more and more nations ratify the 1978 Protocol into local law. The Port and Tanker Safety Act of 1978 in the United States, for instance, also applies to foreign flag tankers entering U. S. ports.

B. THE ALASKAN NORTH SLOPE EXPORT ISSUE

A second legislative issue, currently before the U. S. Congress, involves the potential approval of oil exports from the Alaskan North Slope reserve. Alaskan oil exports represent an extremely controversial issue which has been debated throughout the past decade. The Carter administration tried and failed twice in efforts to ease export restrictions in this area. At the time of this writing, the current renewed debate has not been decided, although the majority of opinion indicates that there is little chance of success in overturning current export restrictions. Regardless of the outcome of the present debate, the Alaskan oil export argument is likely to continue for many years to come. For that reason, it is pertinent to discuss the implications of this issue with regard to the U. S. flag product tanker fleet.

Alaskan crude oil export restrictions are incorporated in the Trans-Alaska Pipeline Authorization Act (TAPS) of 1973 and in the Export Administration Act (EAA). Although neither act bans exports outright, Congressional approval is required before exports can begin.

> "Foreign sales of Alaskan oil are now permitted only if several criteria are met to ensure that exports would be in the best interest of the United States. Thus, by definition, any attempts to gut the existing safeguards are themselves proof that the perpetrators do not have America's 'best interest' in mind" [Ref. 42].

The above quote from the Joint Maritime Congress serves to illustrate some of the vehemence involved in the struggle over Alaskan oil.

The principle lobbyist in favor of exports appears to be the State of Alaska. A report issued this year by the Alaska Statehood Commission argued that:

> "...the export ban keeps the oil from its "natural markets", namely Japan and the Orient. The law as it now stands forces the oil to be moved in expensive American tankers and depresses the price of the oil. If the law is changed, Alaska's oil revenue coul be increased by $500 to $800 million per year. (In addition) the export ban forces the sale of oil to the wrong markets such as the mainland west, Gulf and Atlantic coasts dictates long and expensive trips by U. S. flag carriers of some 13,000 miles via the Panama Canal" [Ref. 43].

The report further states that exporting Alaskan oil could help balance the trade deficit with Japan, reduce transportation costs (based on a resulting "triangle" trade with Mexican and Mideast oil to anticipated shortfalls on the Gulf and East coasts), and would increase U. S. windfall profits tax receipts [Ref. 44]. Their position in this issue has been strengthened somewhat by the appointment of Senator Murkowski (Rep., Alaska) as the new chairman of the Foreign Relations Sub-Committee on East Asian and Pacific Affairs, and by the Reagan administration's emphasis on international trade and anticipated energy security benefits to the Far East.

Opponents include "the domestic maritime industry, owners of the Panama pipeline, various consumer advocate groups, and the major Alaskan North Slope (ANS) producers" [Ref. 45]. Primary emphasis by the opposition has focused on the potential effects on the tanker industry, increased reliance on foreign oil, and anticipated costs to the government. The American Institute of Merchant Shipping estimated (in a letter to President Reagan in March of 1983)

that approval of ANS exports would result in perhaps a 25 percent to 30 percent loss of active U. S. flag tankers, and more than 6,000 shipboard and shoreside jobs. The letter further states that additional revenues to the State of Alaska and windfall tax profits to the federal government will

> "... come directly from the shipping industry which will be economically devastated. The federal government will lose some $800 million to $1.5 billion in federally insured Title XI mortgage loan guarantees, as well as the loss of tax revenues estimated at $150-200 million from the vessel operators in the domestic trade who would be driven out of business and their employees who would be forced out of employment. The consumer will save nothing, and during an emergency the consumer and the nation will find themselves short of crude oil and without a Merchant Marine able to move crude oil or support overseas military deployment" [Ref. 46].

Although actual numbers differ from estimate to estimate, it appears generally accepted that the federal government would indeed lose money through defaulted loans by failing tanker businesses. Consumer groups contend that, although ANS exports will have little price impact on Gulf and East coast refineries, "those on the West coast will undoubtedly pay more for their crude" [Ref. 47]. This view is based upon the expectation that West coast refineries would be required to increase prices (so as to balance export commitments) in order to retain access to ANS supplies.

The three major ANS producers (Exxon, Arco and Sohio) appear equally unexcited about a short-term ANS export program, primarily because their own fleets are heavily involved in ANS shipments within the United States. Such a program would have the same devastating impact on these fleets as on the government owned fleet, and would represent serious short-term losses in investment unlikely to be offset by increased income [Ref. 48].

Of particular interest in this issue is the anticipated redistribution of U. S. oil movement caused by ANS exports. Currently almost 20 percent of subsidized tankers, and over half the unsubsidized fleet, is involved in ANS crude transport. However, neither the Jones Act nor subsidization will enable U. S. flag tankers to compete effectively with foreign flag tonnage if export restrictions are removed.

> "If exports were permitted, the West coast surplus would be absorbed in the Pacific Rim market, instead of being shipped to the East coast. Japan, with its policy of establishing a wide supply network, would be a major outlet, as would Singapore. On the East coast, crude oil imports would be substituted for ANS supplies. The most likely long term source is thought to be the Arabian Gulf, not South America or Mexico. (This) would have the uncommon effect of lengthening average voyage distances while reducing shipping costs as cheaper, foreign flag tonnage entered the trades" [Ref. 49].

The Military Sealift Command's appraisal of the impact of an ANS export policy is reflected in Figure 5-3. MSC believes that export under foreign flag of ANS crude may result in currently ANS employed large crude carriers in the U. S. flag fleet becoming excess capacity. Some of these large tankers may go to scrap, while others could replace the smaller U. S. flag tankers. In either case, MSC would anticipate the loss of approximately 20 tankers currently employed in ANS shipments. The range, however, runs as high as over 120 ships depending upon the amount of ANS oil allowed for export. Product tankers currently employed in ANS transport are likely to be the first to go based upon economies of scale and reduced transportation costs offered by foreign competition.

In spite of an expectation by the Department of Transportation that a removal of the ban on ANS exports would also include a provision guaranteeing carriage by U. S. flag ships, such an export policy remains a serious threat to the Merchant Marine fleet in general and the

product tanker fleet in particular [Ref. 50]. Whether the proposal achieves passage by Congress or is again defeated, the ANS export issue is likely to remain a battleground for several decades. While its defeat may not save the product tanker fleet from continued reductions, its success would certainly ensure a more rapid demise. Opposition by merchant shippers is likely to remain strong for the duration however. In the words of W. M. Benkert, President of the American Institute of Merchant Shipping:

> "We can ascertain no substantial benefit to the national interests of the United States from the export of Alaskan oil and ... see considerable negative and destructive impact. As a consequence, we are and must be strongly opposed to this proposal and hope the the Administration and Congress will not make such a mistaken policy change which may well benefit foreign interests but can only be nothing short of a monumental blunder with respect to all aspects of United States national interests" [Ref. 51].

C. CONSTRUCTION DIFFERENTIAL SUBSIDY PAYBACK

The third government issue with potential impact upon the U. S. flag tanker fleet involves a proposal by the Department of Transportation to allow "tankers of any size constructed with CDS funds and presently operating in the foreign trade to enter and operate in the Jones Act trade upon total repayment (with interest) of the unamortized CDS amount owing" [Ref. 52]. This issue is presently before the U. S. District Court for the District of Columbia, based upon charges by the Independent U. S. Tanker Owners Committee that DOT overstepped its authority in issuing such a policy. The case, however, actually began in the late 1970's.

The Construction Differential Subsidy is a program established by the Merchant Marine Act of 1936 in an effort to place the construction costs of ships built in the United States on a parity with foreign construction costs. CDS itself is generally defined as the difference in cost between U. S. shipyard construction and foreign shipyard construction. Either competitive bidding or negotiated contract prices may be utilized to arrive at CDS rates within established statutory ceilings.

In 1977, when the 225,000 DWT subsidy-built Stuyvesant couldn't find employment in foreign trades, her owners applied to the Maritime Administration to repay CDS and rejoin the domestic trade (where ANS oil was beginning to offer new employment for tankers). Subsequent interim rules established by the Maritime Administration permitted refunding only where "financial hardship was involved and then only for tankships in excess of 100,000 DWT" [Ref. 53]. In September of 1982, the U. S. Court of Appeals revoked these interim rules and directed that new, permanent rules be implemented. In January of 1983, the Department of Transportation issued its proposal to allow tankers of any size to repay CDS and re-enter the domestic trade, with the previous financial need requirement deleted.

It should be noted that the CDS repayment issue and the ANS export issue are intricately connected. Utilization of the CDS program prohibits a tanker from U. S. domestic trade. However, the primary rationale for re-entry into that trade at the present time rests upon the ANS domestic market. Should the ANS export policy be approved, CDS tankers would have little reason to desire re-entry into the domestic trade.

Since the Stuyvesant case which ultimately resulted in a directive requiring precise policy definitions of proposed CDS repayment issues, the Maritime Administration has

adopted a "meantime" policy of granting temporary waivers of domestic trade restrictions for large tankers built under the CDS program. The Maritime Administration has granted over 25 of these waivers for very large class carriers (VLCC) since 1978, the majority of which have been for periods of six months. In 1982 alone, these waivers added approximately 900,000 DWT of capacity to the Alaskan oil trade [Ref. 54].

The rationale behind DOT's proposed unlimited CDS repayment appears to rest on a belief that the U. S. flag fleet would be improved through a survival-of-the-fittest environment. Charles Swinburne, DOT Deputy Assistant for Policy and Program Development, indicated in testimony before the House Merchant Marine Subcommittee in March of this year that the proposal would create a "bumping process ... (whereby) the least efficient ships would pull out of the domestic trades" [Ref. 55]. He described these least efficient ships as the "smaller and older" tankers that would probably be out of the trade soon anyway, based on the current tanker market.

DOT estimates that there are currently 15 subsidized VLCC tankers with a total capacity of about 2.5 million DWT that would be eligible for CDS repayment and entry into the ANS trade. If all 15 took advantage of the proposal, the U. S. Treasury would receive an estimated $475 million (including $275 million in interest) in repayment [Ref. 56]. In reply to questions regarding the potentially devastating effect on current vessels in the trade, Mr. Swinburne countered:

> "... the very stiff financial cost for a CDS tanker to re-enter, a substantial capital investment akin to that of a new domestic vessel. Our analysis did not conclude (that) if all fifteen VLCC's enter the trade it is clear that some existing companies will be harmed, but there are relative degrees of harm ... devasted is an extreme degree of harm" [Ref. 57].

The Reagan administration thus far has been supportive of the DOT proposal in its continuing effort to curtail subsidy programs in general. No money has been budgeted for the CDS program in the past two years (as of April 1983), which reflects a substantial change from the $606.4 million per year subsidy program in effect when President Reagan took office [Ref. 58].

While DOT continues to insist that "the national economy will benefit because overall oil transportation costs would be brought down by the greater efficiency of the relatively new subsidized tankers", opponents of the proposal continue to protest what they view as yet another instance of government interference [Ref. 59]. The opposition's stand in this matter may be best illustrated by additional comments made at the House Merchant Marine Subcommittee hearing held in March of 1983.

Ran Hettena, appearing on behalf of the American Institute of Merchant Shipping, stated:

> "We never dreamed that the ground rules that firmly separated the two trades, and required ships built with subsidy to operate exclusively in foreign trade, would be subverted. Anyone could asses coastwise supply and demand in its own terms, and back his judgement with his own money, without fear that the conditions of the world market would be abruptly imported. Suddenly, however, the whole subsidized fleet is to be allowed to abandon its statutory and contractual commitments, and to flood into domestic trade, which will be destroyed. Is it not profoundly unjust that the government should talk of recovering its investment in subsidy, which it appears to think was a mistake, when that recovery can only take place at our expense" [Ref. 60].

Michael Klebanoff, President of the American Maritime Association (and of Ogden Marine), said:

> "The new proposal ... takes up the position that artificially forced competition, the creation of the government against the basic policy of the statute, is desirable in itself because it will eliminate "inefficient" ships in the domestic fleet -- meaning, it seems, smaller tonnage, the very tonnage, by the way, that the Navy tells us is essential for its wartime operations.

> The permanent introduction of 2.6 million DWT of the largest subsidized tonnage will drive all independent tonnage from the Pacific basin; according to our calculation, the Atlantic side of the Alaskan trade, which has already been much reduced by the Panama pipeline and other commercial conditions, will require under one million tons of non-proprietary shipping; against which, if only ten subsidized ships in the 90,000 DWT range should enter, there will then be over three million tons of modern shipping competing for the business. That is a formula for economic disaster" [Ref. 61].

Finally, Maritime Institute for Research and Industrial Development President Julian Singman stated:

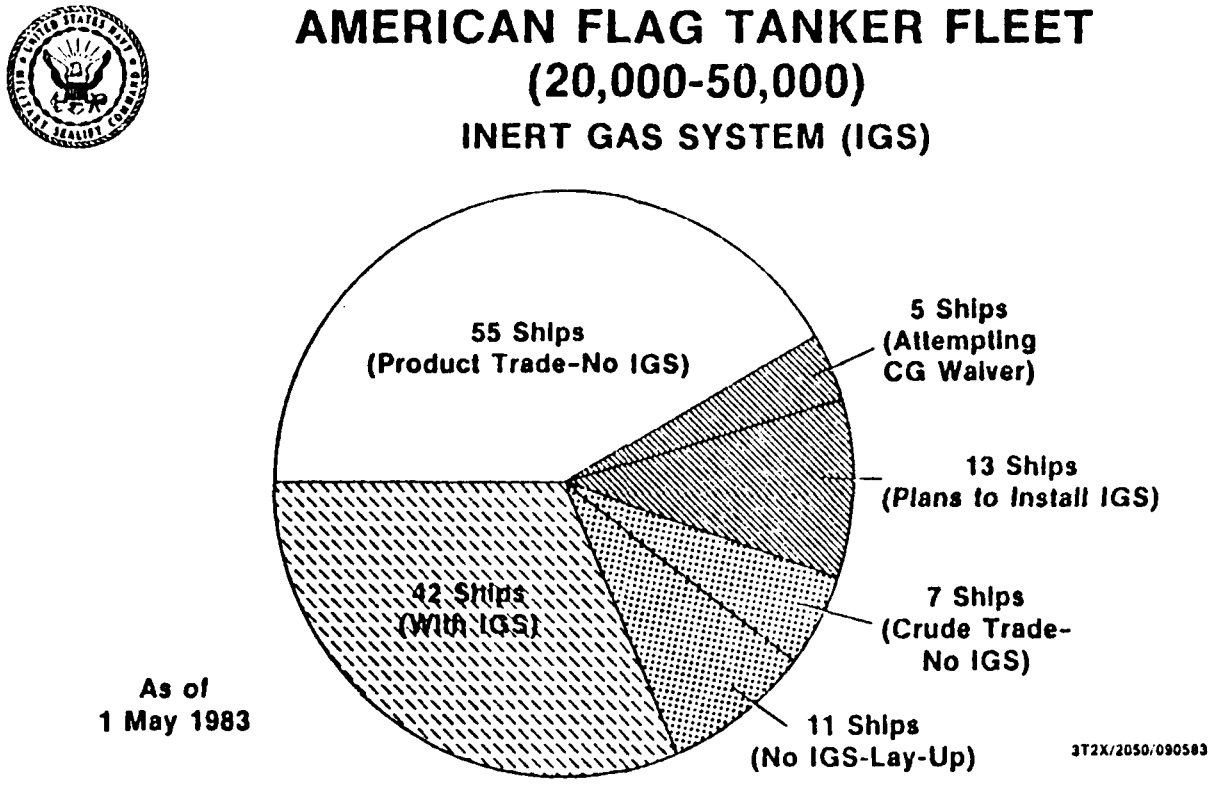
> "In our opinion, no proposed rule or regulation that we have seen in many years has been capable of making more mischief for the American merchant marine. The loss of tonnage, the loss of jobs and the loss of defense preparedness could be enormous" [Ref. 62].

The Military Sealift Command's analysis of CDS repayment impact upon the product tanker fleet predicts an immediate loss of 20 tankers in the 50,000 DWT and less range if such a proposal is enacted. Their forecast for 1986 includes only 74 product tankers in the militarily useful arena, and perhaps only 125 vessels in the entire U. S. flag tanker fleet (including crude carriers). Their predictions for the product tanker fleet by the year 1986, based upon an approved CDS repayment policy, are illustrated in Figure 5-4 by employment within the market [Ref. 63].

The three issues discussed in this chapter appear to reflect a change in attitude by government agencies toward the U. S. Merchant Marine. Regulation which has historically been protective in nature has given way to a trend toward deregulation, and a seeming reliance upon competition and market forces to upgrade and maintain an efficient fleet. Although the results of this changing attitude are based, at present, only on prediction, there appears to be sufficient grounds to expect that approval and enforcement of such policies would indeed change to some extent the

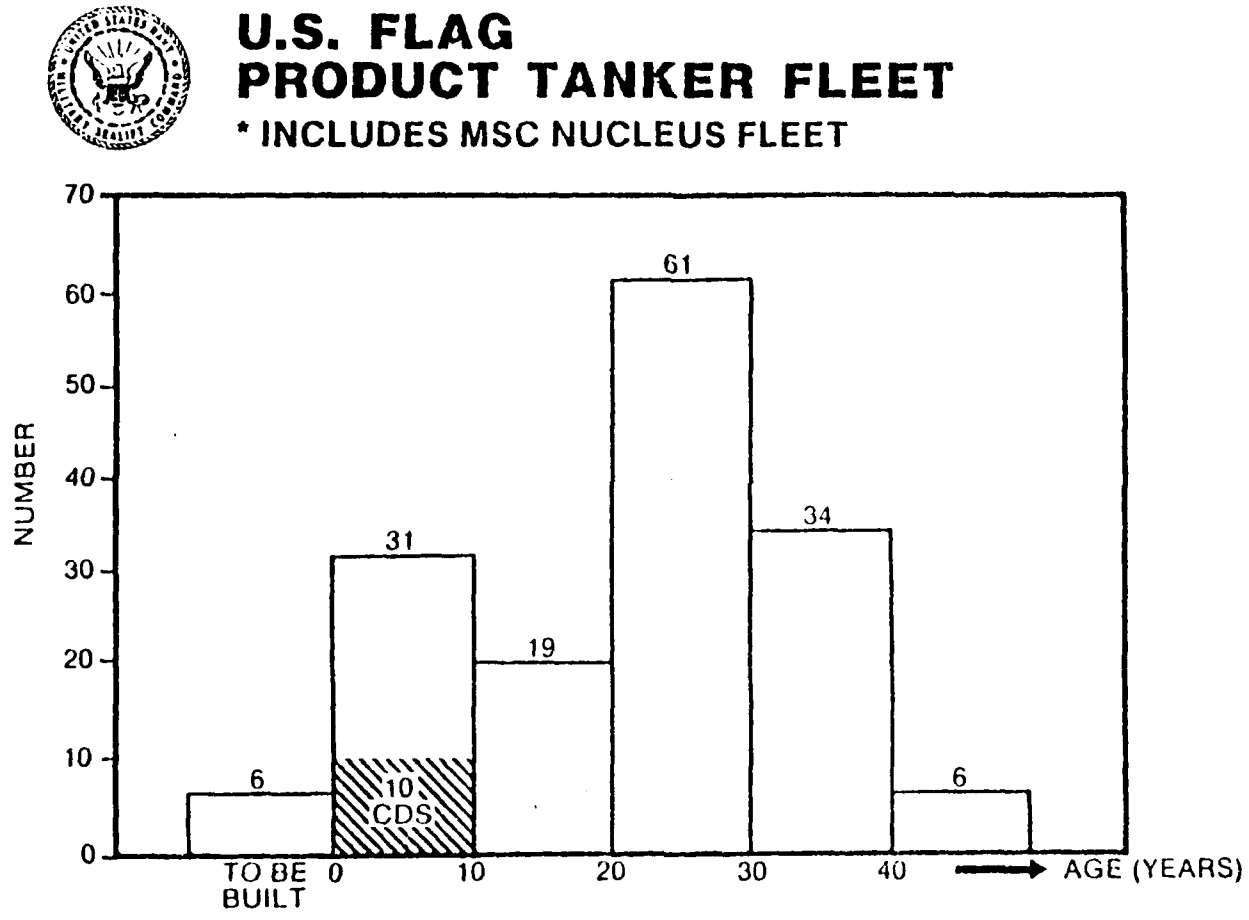
appearance of the U. S. flag tanker fleet. How the DOD petroleum distribution system, and the Military Sealift Command, will or should react to this changing resource environment is an issue causing serious debate and considerable soul-searching within the military community.

Figure 5-1



Source: Military Sealift Command, Washington, D. C.

Figure 5-2



Source: Military Sealift Command, Washington, D. C.

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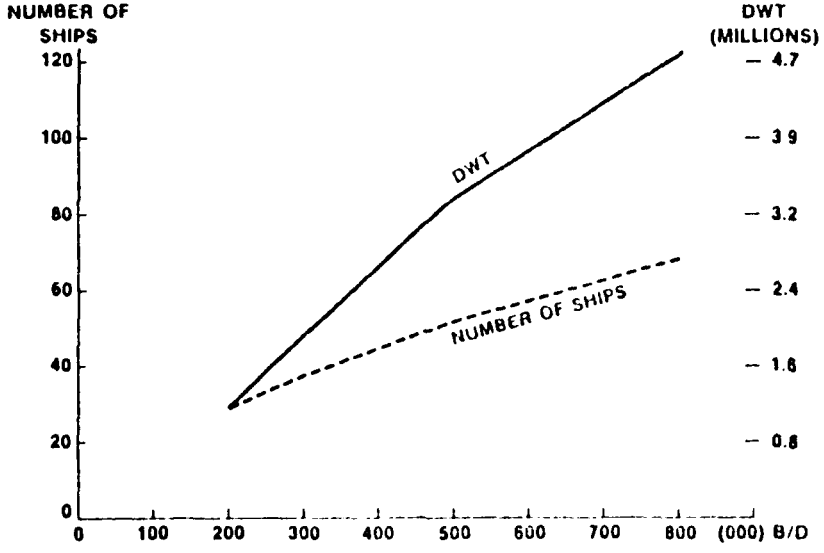
Figure 5-3

LOSS OF AMERICAN FLAG TANKERS DUE TO EXPORTING OF ALASKAN NORTH SLOPE CRUDE

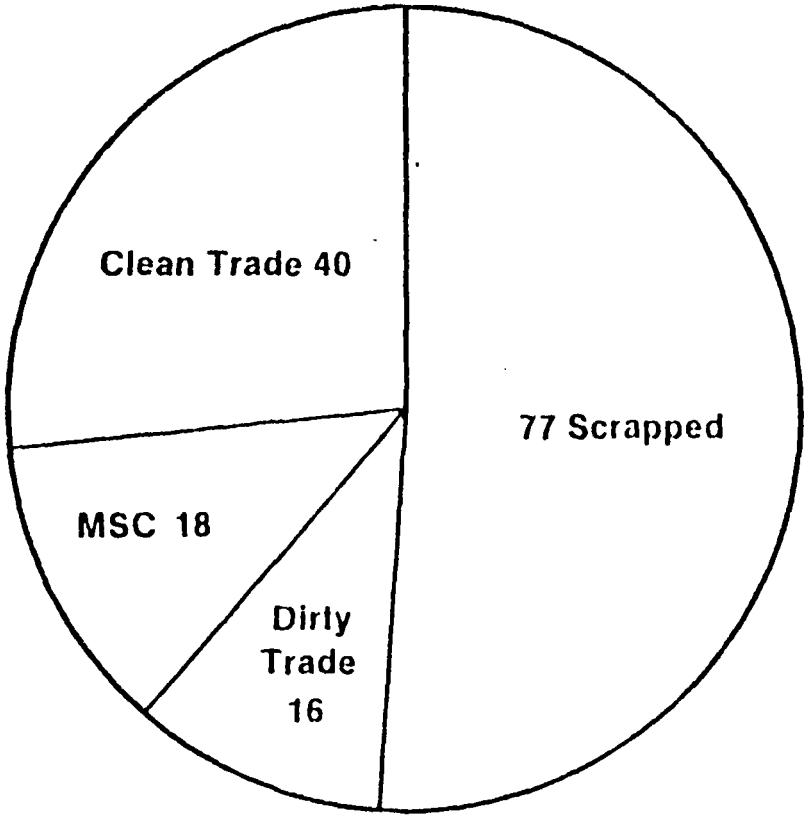


Source: Military Sealift Command
Washington, D. C.

Figure 5-4

1986 PRODUCT TANKER FLEET EMPLOYMENT

CDS EFFECTIVE



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Source: Military Sealift Command, Washington, D. C.

VI. SUMMARY AND CONCLUSIONS

A. SUMMARY

The preceding chapters have attempted to draw a picture of the system which controls acquisition and distribution of POL within the Department of Defense. It is an unquestionably important system in national defense ongoing activities and future planning, yet one which receives limited acknowledgement or publicity. In a reflection of their civilian counterparts, the majority of defense personnel appear to take fuel energy for granted. The system, however, requires precise coordination and knowledgeable manipulation. Without experts in every branch and organizational structure within DOD working closely together to coordinate requirements and distribution, the system would cease to function effectively.

This system is also, out of necessity, extensively commercial in nature. DOD owns no refineries, and insufficient tankers to conduct its POL business. It must rely, therefore, on commercial refineries and fleets to supply its needs. This strong reliance requires the system to conduct itself in a commercial manner in order to compete on an equal basis with other customers. Out of a requirement to maintain cost efficient operations, profit (or at least break-even) oriented goals and funding processes are utilized in a reflection of commercial enterprise. Revolving funds enable both DFSC and MSC to conduct the flexible and ever changing business of POL effectively. Only individual service fuel requirements are actually a part of the DOD budget, with DFSC/MSC acquisition and distribution expenditures refunded by service customers.

Within this commercial context, DFSC acts as DOD's "Exxon" (under exclusive contract) for POL procurement and routing, with data obtained from DFR/JPO agents regarding requirements. The MSC Tanker Division "shipping company" is one element of the transportation resources available to DFSC for POL movement. Essentially a tramp operation by definition, MSC tankers have no home port. Instead they travel continuously worldwide to perform pickup and delivery activities based on the dictates of DFSC scheduling.

Because of the nature of DOD POL requirements for primarily small loads of sensitive aviation type fuels, the clean product tanker has been the major focus of MSC utilization. This specialized product tanker has provided the necessary safe compartmentalization of a variety of POL products, relative speed and flexibility of operations deemed necessary by DOD.

Ten years ago the product tanker industry was a burgeoning business, expanding rapidly to meet surplus demand. Today it is in a state of collapse, with growing excess capacity and increasing scrap and lay-up activities. While DOD's emphasis on cost effectiveness has not changed, it has (along with the rest of the world) underlined that emphasis by actively seeking cheaper modes of POL transport, often seemingly without regard to readiness. The resulting increase in localized refinery/pipeline/tug and barge usage has played a major part in the decline of the product tanker industry.

Legislation within the United States promises to play an ever larger role in that decline, as the government evidences a changing attitude toward the Merchant Marine in general. Protective policies of past decades appear to be giving way to a reliance upon market forces and a disinclination for financial involvement in U. S. shipping.

Figure 6-1 illustrates the decline in militarily useful product tankers over the last three decades. A decline in need is not an unusual phenomenon subsequent to contingency and war situations, and the growing size of tankers is reflected in the much slower decline in dead weight tonnage. There has been, nonetheless, a very sharp drop in the past decade. Forecasts indicate that this decline is likely to be particularly steep for the remainder of the 1980's at least. Militarily useful product tankers are obviously a dying breed in a rapidly decaying industry.

The initial question raised by this gloomy outlook must be -- "so what?". How genuinely important is the militarily useful product tanker in the future DOD petroleum distribution system in both peacetime and contingency situations? What can this tanker do that no other mode can? What makes the decline of the clean product tanker fleet a matter of concern for DOD?

Obviously an extensive study could be built around these questions. Although there is research being done concerning POL transportation in general, very limited research exists concerning the actual value of the product tanker in particular to DOD. It is generally recognized, however, that the product tanker offers speed, flexibility and cargo characteristics (i.e., size and military POL compatibility) that are particularly adaptable to wartime and contingency scenarios. It has not necessarily been established that they are the only mode of transport offering such advantages. Nor is it certain that the present situation does not reflect a natural market pruning of an outdated and high cost commodity, with potential replacement by better alternatives. What is certain is that the product tanker is one of the most expensive distribution elements for DOD, and is thus highly susceptible to cost effectiveness policies.

If one accepts that the product tanker is vital to DOD operational planning, then it is necessary to explore the types of action and behavior that can be utilized in an effort to retain it as a viable resource.

B. CONCLUSIONS

There appear to be three general action alternatives for consideration regarding the potential demise of the product tanker fleet:

1. Take action to support and maintain product tanker availability;
2. Adapt to the changing environment;
3. Or do nothing.

These alternative actions will be discussed primarily from an MSC viewpoint, since they are presently the most vitally concerned and involved in this area of conjecture.

In discussing the first alternative, it is particularly helpful to include a number of actions which MSC has identified as having value toward a policy of retention of the product tanker resource. Included are strong DOD opposition to both CDS repayment and ANS exports, as well as several indirect subsidization schemes. The latter involve the suggestion that other employment be created for small clean product tankers, such as increased afloat storage and refueling at sea responsibilities, or that the MSC fleet be openly over-sized to meet contingency requirements rather than peacetime needs. In addition, they suggest that current commercial surplus tankers destined for scrap be purchased (at considerably lower prices) for expansion of the Ready Reserve and National Defense Reserve fleets. Finally, they suggest that direct subsidy, when compared with the costs of reduced capability, may be the least expensive alternative in the long run.

Aside from opposition to CDS repayment and ANS exports, each of these actions designed to retain the product tanker fleet represent a considerable cost to DOD and the government. Excess capacity, as the commercial industry has discovered, is excessively expensive. Funding for both the RRF and NDRF is a budget item which receives annual painstaking Congressional attention, and additional funding for acquisition and maintenance is unlikely to receive favorable response. The afloat storage vs. in-ground storage issue is one which requires further study and planning before taking any action. There is some question, moreover, as to whether the tug and barge combination might not be the all around better method for such storage. Based upon current governmental attitudes and policies, it appears unlikely that direct subsidy of the product tanker fleet is a viable alternative. Only the refueling at sea activity, in which MSC requirements have more than doubled over the past six years, appears to offer potential for increased product tanker employment. Yet as DFSC continues to utilize other modes and reduce MSC fleet size, this aspect is unlikely to provide sufficient employment for optimal contingency fleet sizing [Ref. 64].

The second alternative action, adapting to the changing environment, requires a change in some of the basic assumptions which underlie current operational planning. MSC suggests that present planning assumes that the majority of POL required for wartime and contingency efforts will originate from the United States (specifically from the Gulf coast), thereby requiring extensive product tanker capability [Ref. 65]. DFSC, however, contracts for and stores POL worldwide. If the assumption were modified to reflect a dependence upon oil sources within projected scenario locations, as well as distribution systems, from NATO allies, potentially less product tanker capability would be

required. The latter suggestion has been raised by James Milas, Deputy Director of the Tanker Division at MSC Headquarters. Other suggestions include a relaxing of the requirement to use U. S. flag vessels which would have an impact on MSC fleet requirements. Mr. Milas suggests that the dependence which could be placed on a foreign ship owner to transport POL into a contingency or wartime area may be to some extent a function of the dollar price DOD is willing to pay for such service [Ref. 66].

Within the context of changing assumptions is a requirement for detailed assessment of available resources, including a planned conversion or adaptation scheme and a determination of possible hold actions by DOD on certain resources. If large crude tankers are likely to be the primary available asset, then a scheme by which they can be quickly converted for POL lift must be devised. If MSC adapts to the new environment by sizing its fleet strictly to meet DFSC needs, then contingency planning must include the number of ships likely to be required to expand this fleet. Determination of the relationship between civilian requirements and military requirements in contingency situations is necessary to identify the extent of resources available for military hold and utilization. In addition, planning must include an identification of available foreign storage facilities and a determination of whether increased prepositioned storage is a viable alternative to transoceanic shipment.

Finally, an increased dependence on commercially available fuels versus the current dependence on fuels refined to meet military specifications, could potentially increase the available resources for POL lift. The product tanker's primary advantage is, after all, the ability to strictly compartmentalize and protect sensitive military fuels. Fuels less susceptible to short tank life and contamination

could effectively increase the number of ships available to carry it, as well as decreasing current necessary adaptation requirements. In addition, the use of commercially available fuels would also increase the base of acquisitions both locally and worldwide. There is, of course, a performance cost in such an alternative. It is a cost which ultimately must be measured against the cost of too little lift capability and too few POL sources.

The last alternative involves allowing the market to essentially take care of the problem through supply/demand/competition factors. Taking no action would result, theoretically, in: 1) allowing DFSC and the world market to continue to increase dependence on pipeline and tug barge modes of transport; 2) allowing a continued decrease in MSC fleet sizing based on decreasing DFSC requirements; 3) taking no action to curtail a diminishing commercial product tanker fleet; and 4) depending upon market forces to supply a substitute for product tanker capability.

The opportunity to choose an alternative action implies that the situation has been closely studied, accepted, and that planning activities are well under way. Adaptation is obviously the preferred route in this instance, yet we are rapidly approaching the point where the only alternative will be to react to this changing resource environment. With the exception of the Military Sealift Command Tanker Division, there appears to be limited involvement or concern regarding the potential loss of the product tanker fleet as an element of sealift capability. At the present time, only one pertinent study appears to be underway. The original "DOD Sealift Study" attempted to define and quantify all types of lift capability required for contingency and wartime purposes [Ref. 67]. Because of major disagreements concerning the study's projections for future capability with regard to the product tanker by the MSC Tanker

Division, a separate study is now being conducted as an adjunct to the original with its primary focus on the product tanker resource [Ref. 68,69]. It is to be hoped that such a study will provide a base of information from which DOD planners can define a policy of action regarding DOD's role in future POL sealift.

In the final analysis, there are only two real issues which must be considered and resolved: 1) how much and what kind of carrying capability is required for the DOD petroleum distribution system to continue to operate effectively; and 2) what trade-offs between readiness and cost efficiency is DOD willing to make.

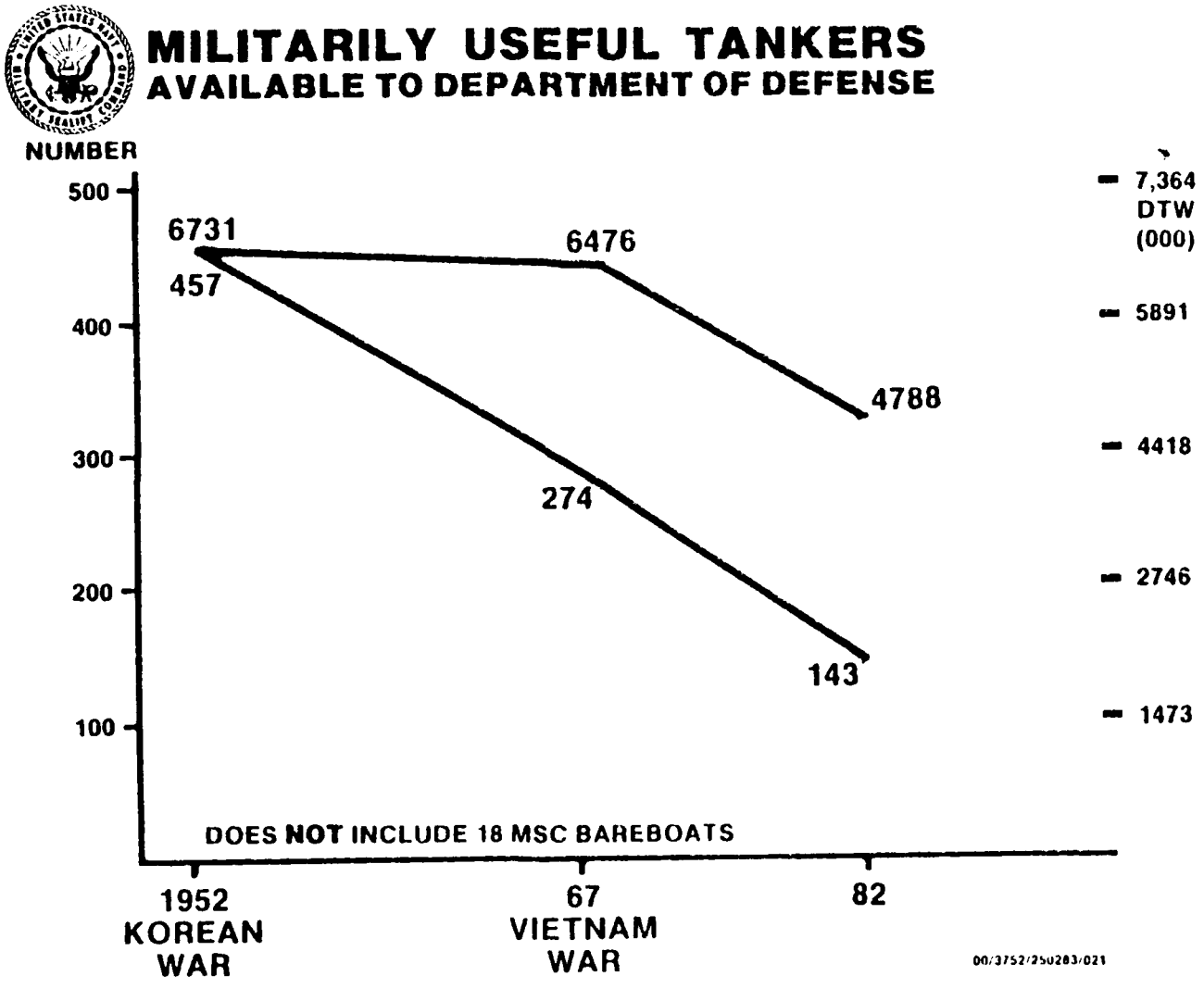
The product tanker has been a readily available and highly capable asset for the distribution system. It is this author's opinion that it will continue to be an element of that system, albeit a reduced one, for many years to come. It is simply too agile, too flexible, and too reflective of the qualities of quick response needed by the military to let disappear. It is unlikely, however, that it can continue to carry the burden for POL sealift responsiblity in contingency and wartime scenarios.

> "To assume that you can move huge amounts of petroleum long distances (via the product tanker) ... is just not valid anymore. The military has to adapt its planning ... when the commercial system changes, we have to change. If we don't change and we can't adapt, then we will have to spend bundles of dollars to create our own distribution system. And no one is going to be willing to do that" [Ref. 70].

Readiness does not depend upon the product tanker, but on the ability of DOD to get POL where it's needed and when it's needed. Therefore, it is vitally important to identify where available and assured sources of POL are, and thus determine route distances required for movement and ultimately the transportation modes best suited for those lift situations.

Simultaneously it must be accepted that readiness is an elusive quality which will always exceed cost efficiency limits. Ultimately our degree of readiness will depend on how much we are willing to pay for it.

Figure 6-1



Source: Military Sealift Command, Washington, D. C.

Figure 6-1 Supplement

USEFUL CLEAN PRODUCT TANKER

- 10,000 - 50,000 DWT
  - — Can load/discharge at most clean product terminals worldwide

- Multi-Product Capable
  - — Characteristic of small clean product tanker, i.e., more cargo compartments, more complex piping and specially coated tanks

Source: Military Sealift Command, Washington, D. C.

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