

STATEMENT FOR THE RECORD OF

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FOR THE

SUBCOMMITTEE ON COAST GUARD AND NAVIGATION  
COMMITTEE ON MERCHANT MARINE AND FISHERIES  
U.S. HOUSE OF REPRESENTATIVES

ON

U.S. COAST GUARD ICEBREAKING OPERATIONS

9 FEBRUARY 1984

## POLAR ICE OPERATIONS

### MANDATE/PROGRAM DESCRIPTION

The 1965 Memorandum of Agreement between the Department of the Navy and the Department of the Treasury on the operation of icebreakers assigned the Coast Guard sole responsibility for operating the nation's polar icebreaker fleet. Two recent Presidential documents define United States national polar interests and emphasize the growing importance of the polar regions to the nation. A memorandum dated 5 February 1982 on U.S. Antarctic policy and programs states that this nation shall maintain "an active and influential presence in Antarctica designed to support the range of U.S. Antarctic interests" and tasks the Coast Guard (DOT) with logistic support of the antarctic program. National Security Decision Directive 90 (NSDD 90) dated 14 April 1983, recognizes the Arctic's importance to national security, resource and energy development, and environmental protection. The Coast Guard maintains the United States' sole polar surface maritime capability necessary to project into the polar regions whenever and wherever we want in support of the national interest.

Agencies using icebreaker services fall into two categories: primary users, which require icebreaker services annually; and occasional users. The primary users are the Coast Guard, Department of Defense (DOD), and National Science Foundation (NSF). Occasional users include the Maritime Administration (MarAd), National Oceanic and Atmospheric Administration (NOAA), Department of Energy (DOE), Department of Interior (DOI), and the National Academy of Sciences (NAS).

The polar icebreaker fleet accomplishes Coast Guard missions in polar regions and supports a variety of Coast Guard programs. Traditional Coast Guard missions carried out by polar icebreakers include search and rescue, law enforcement, aids to navigation, and marine environmental response. Another identifiable part of the Coast Guard requirement is maintenance of a military readiness capability to be provided to the Navy during national emergencies.

Polar icebreakers support DOD activities and programs in the eastern and western Arctic. Resupply of Defense Early Warning (DEW) Line sites in the western Arctic is primarily a tug and barge operation requiring ice-breaking services only if difficulty with ice is encountered. Icebreakers conduct classified research in the Bering, Chukchi, and Beaufort Seas almost every year in both winter and summer.

In the eastern Arctic, resupply of defense bases is conducted during the months of July, August, and September by the Military Sealift Command. The sealift involves both tankers and break-bulk cargo ships. Bases at Goose Bay, Canada; Thule and Sondrestrom, Greenland; and DEW line sites at Quaqatoq and

Kulusuk, Greenland are supplied by these ships. During the resupply operation and transit the supply ships operate in ice-covered waters, particularly around Thule and Kulusuk. The supply vessels generally require icebreaker escort to insure safe passage. This escort is performed by either breaking out a channel for vessels to follow, or actually towing the escorted vessel through the ice. The 1983 resupply effort required NORTHWIND's support for 30 days longer than the normal 30 days due to heavy ice conditions along Greenland's west coast. Icebreakers also conduct classified oceanographic research around Greenland and north of Iceland. When conducting classified research, emergency submarine tending, and wartime contingencies in high latitudes, DOD can only depend upon Coast Guard icebreakers.

Icebreakers play a key role in the logistic support of the United States Antarctic Program administered by the National Science Foundation. Ships chartered by the Military Sealift Command supply the U.S. base at McMurdo once annually. Although the supply ships are ice-strengthened, icebreakers are required to cut and clear a channel through heavy concentrations of fast pack ice. Icebreakers also serve as research platforms and have made possible some research projects which could not have been accomplished in any other way (e.g. the Weddell Sea Oceanographic Expedition). Icebreakers also perform a variety of other tasks incidental to their primary ice operations or science assignments. These include refueling stations, transporting cargo and personnel (for instance to Palmer Station), providing helicopters for logistics and science, and giving maneuvering assistance to supply ships. Icebreakers also support Department of State inspections of foreign stations as provided for in the Antarctic Treaty, a function recently accomplished during POLAR STAR's circumnavigation of the continent in 1983.

Occasional users also require polar icebreakers, primarily for research support. Examples include the MarAd western arctic trafficability studies and the joint DOE/DOI sponsored Outer Continental Shelf Environmental Assessment Program, for which NOAA is the primary facilitator.

The following operations are projected for fiscal years 1984 and 1985:

<u>Fiscal Year</u>	<u>Agency</u>	<u>Location</u>	<u>Planned Days in Operating Area</u>	<u>Purpose</u>
1984	NSF	Antarctic	150*	Logistics, research; 2 ships
1984	CG	Antarctic	5	Research-ship design
1984	DOD (Navy)	E. Arctic	43	Fleet exercises
1984	CG	W. Arctic	21	Research-ship design
1984	MarAd	W. Arctic	9	Research
1984	DOD (Air Force, Navy)	E. Arctic	74	Logistics, research
1984	DOD (Navy)	N. Atlantic	32	Fleet exercises
1984	NAS	W. Arctic	30	Research-ship design
1985	NSF	Antarctic	133	Logistics, research; 2 ships
1985	DOD (Navy)	W. Arctic	27	Research
1985	CG	W. Arctic	43	Law enforcement
1985	DOD (Navy)	N. Atlantic	18	Fleet exercises
1985	CG	N. Atlantic	17	International Ice Patrol
1985	DOD (Air Force)	E. Arctic	30	Logistics
1985	DOD (Navy)	W. Arctic E. Arctic	67	Research

\* In progress

## FACILITIES - COMPARISON WITH WORLD'S ICEBREAKER FLEET

The nation's polar icebreaker fleet consists of five ships: two POLAR Class - POLAR SEA and POLAR STAR; GLACIER; and two WIND Class - NORTHWIND and WESTWIND. Their prominent characteristics and capabilities are summarized on the table which follows along with statistics for the entire world fleet of polar icebreakers. The Soviet Union operates 15 (three of which are nuclear powered) of the 30 polar icebreakers in the world today. The United States polar icebreaker fleet is, by a wide margin, the world's oldest, with a median age of 30 years. In contrast, the Soviet and Canadian fleets each have a median age of ten years. In terms of capability, the POLAR Class compares very favorably with the world's fleet. GLACIER, NORTHWIND, and WESTWIND, however, fall substantially below present day icebreaker standards, primarily because of outmoded systems and deteriorating material condition.

## FACILITIES - PRESENT STATUS

The POLAR Class are now fully mission capable. The ships have experienced various engineering reliability problems since their commissionings; however, this reliability is continuously improving as we find specific solutions to the early engineering problems. The major problem now is longitudinal shaft vibration while ice breaking. Other POLAR Class problems include upgrade of the main propulsion console (for which we received AC&I funding in FY84), and reduction gear problems (we will conduct calibration tests for POLAR STAR's reduction gears this winter in the Bering Sea). Recent POLAR Class accomplishments include: continuation of environmental ship design data collection in the Arctic (during POLAR SEA's Arctic West Winter 83); significant reduction of McMurdo Sound break-in, where one POLAR Class icebreaker can accomplish the task in half the time required by two WIND Class icebreakers; and, first circumnavigation of Antarctica within 60 degrees South latitude by a U.S. icebreaker (POLAR STAR during Deep Freeze 83).

GLACIER entered a major maintenance availability (MMA) in May 1983 at a planned cost of \$12.57 million (\$7.27 million AC&I and \$5.3 million OE). The MMA, however, cannot be viewed as a "life extension" project, but rather as corrective action to bring the ship to acceptable operational standards and provide a service life into the early 1990's. The scope of the MMA is as follows:

### Improvements to watertight integrity and structural repairs

- Replacement of certain watertight doors and hatches
- Renew wasted deck (under wood decking).

### Machinery overhauls and replacement

- Overhaul all ten main generators
- Overhaul coolers on all ten main generators
- Overhaul blowers on all ten main diesel engines
- Replace all four ship's service generators and voltage regulators
- Renew evaporator
- Overhaul bilge drainage system
- Overhaul seven main diesel engines

### Safety improvements

- Install additional lighting
- Renew ventilation system in paint locker

### Mission equipment overhauls

- Overhaul cranes
- Overhaul oceanographic winches
- Overhaul boat davits

### Berthing rehabilitation

- Expand and upgrade scientific berthing areas
- Renovate some heads

### Drydocking

- Remove and inspect shafts
- Remove and inspect propellers
- Renew stern bearings if beyond tolerances
- Renew zincs
- Touch up inertia bottom coating where needed

The MMA will be completed this summer. During fiscal year 1985, GLACIER will shift homeports from Long Beach, CA to Seattle, WA due to the high cost of mooring the ship in Long Beach (gratis Navy berthing is no longer available and Coast Guard mooring is available in Seattle) and the availability of the Coast Guard Icebreaker Support Facility in Seattle.

The WIND Class are 40-year old hulls which require timely replacement. The Coast Guard re-engined these ships in the early 1970's during extended yard availabilities with the intention to operate the vessels until 1981. Three years later, the Coast Guard continues to operate these ships in the remote polar environment. The WINDs are not only aged by U.S. standards, but are by far, two of the world's oldest operational polar icebreakers.

A Ship Structure and Machinery Evaluation Board (SSMEB) conducted aboard WESTWIND in July, 1983, determined that at least \$5 million is required to finance the safety and supportability corrective action necessary to operate the ship until 1990-1991, the earliest a replacement icebreaker could be operational. The Board reported the following major deficiencies:

### Main propulsion maintenance

-Replace main diesel engine lube oil and fresh water coolers with a series of smaller coolers that are accessible for repair and maintenance.

-Replace lube oil and fuel oil purifiers with self cleaning models to reduce maintenance manpower requirements.

-Replace main engine exhaust coolers.

### Auxiliary equipment assigned remaining service life of zero

- Steam system
- Ventilation system
- Steering system
- Air conditioning system
- Fire fighting systems
- Food handling and storage systems
- Salt water systems

### Deficient prime mission equipment

- Arctic survey boat
- Boat cranes
- Oceanography laboratory air conditioning system

### Structural deficiencies

- Lack of longitudinal space in vicinity of deep sea anchor winch room
- Several tripped frames and buckles in the ice-impact area
- Severe deterioration under most interior and exterior deck coverings

### Habitability

- General lack of space
- Deficient ventilation and air conditioning
- Overall very poor living conditions

At the beginning of WESTWIND's present Deep Freeze 84 deployment, Navy Fleet Training Group Guantanamo Bay Training Assist Team documented serious material conditions. As you will see below, their training and survey proved invaluable on WESTWIND's subsequent voyage.

Several years ago the Coast Guard conducted an SSMEB on NORTHWIND and documented many of the same problems found on WESTWIND. Although progress has been made in correcting NORTHWIND's deficiencies, numerous significant problems remain. It is clear the WIND Class require extensive work to insure their safe operation until the early 1990's.

## WESTWIND CASUALTY

WESTWIND's problems were recently compounded by a major casualty suffered during Deep Freeze 84. While operating in loose brash in the vicinity of Antarctica's Larsen Ice Shelf, the ice field became extremely pressurized, besetting the ship. The pressure in the ice field forced the ship's port side against a protrusion from the ice shelf, resulting in structural damage above the hull's ice belt. The crew was able to control the flooding and eventually extract the ship. WESTWIND sustained extensive damage to her hull, decks, starboard propeller, steering gear, fuel tanks, and piping systems.

A Coast Guard repair team made temporary repairs in Antarctica. The additional repairs required will cost an estimated \$2.4 million. The Coast Guard will begin repairing WESTWIND upon her return from Antarctica in March.

## POLAR ICEBREAKER REQUIREMENTS STUDY

In its review of the Coast Guard fiscal year 1984 budget request, the Office of Management and Budget (OMB) directed "...an Interagency Policy Committee (DOT, MarAd, Coast Guard, DOD, NSF, NOAA, OMB) to develop an analysis of polar icebreaking (sic) requirements for the balance of the century." The Study is proceeding, with a projected completion in April, 1984. The study will make recommendations concerning icebreaker renovation/replacement and appropriate funding methods.

## ACQUISITION, CONSTRUCTION, & IMPROVEMENT (AC&I)

Several years ago, Congress added \$20 million to the Coast Guard AC&I appropriation for a "dual-draft" icebreaker to be capable of Great Lakes and polar operation. The Coast Guard had not requested these funds nor was it prepared to acquire such vessels. Funds were reprogrammed when the need and feasibility of the "dual-draft" vessel were not established.

Based on the present condition of the fleet, and consideration of the national interest, the Coast Guard has recommended that WESTWIND, NORTHWIND, and GLACIER be replaced in the early 1990's. Pending outcome of the Polar Icebreaker Requirements Study and a final budgetary determination to replace the vessels, due to design leadtimes, the earliest a replacement program could begin is fiscal year 1987.



FUNDING

Over the years, various methods have been used to finance the polar icebreaker fleet. The Coast Guard funded all costs prior to fiscal year 1977, when House-Senate conferences directed the Coast Guard to bill primary users for the incremental costs of operating in the polar regions. The Coast Guard identified DOD and NSF as the primary users and budget base transfers of \$1.8 million to DOD and \$0.8 million to NSF were made. Memoranda of Agreement between the Coast Guard and each primary user governed the program. Average annual reimbursement varied between \$1.3 million and \$2.7 million during fiscal years 1977-1982. In its review of the FY83 Coast Guard budget and consistent with a Roles and Missions Study recommendation, OMB directed that primary users share the full direct costs of icebreaker services. The Coast Guard identified \$36 million as the direct program costs for polar ice operations. Effective fiscal year 1983, this \$36 million was apportioned among DOD, NSF, MarAd (a primary user in fiscal year 1983 only), and the Coast Guard on the basis of historical and projected icebreaker usage, taking into account the fiscal year 1977 transfers. The fiscal year 1977 and 1983 budget base transfers are summarized below:

	<u>FY77</u>		<u>FY83</u>	<u>Total (FY83\$)</u>
	FY77 \$	FY83 \$		
NSF	\$ 789,000	\$1,211,000	\$13,400,000	\$14,611,000
DOD	\$1,793,000	\$2,755,000	\$ 8,000,000	\$10,755,000
MARAD	-	-	\$ 5,300,000	\$ 5,300,000
CG	-\$2,582,000	-\$3,966,000	-\$26,700,000	-\$30,666,000

FY83 Direct Program Costs (Estimate):	\$35,754,000
- Total Budget Base Transfers (FY83 \$):	\$30,666,000

Retained by CG to defray CG share of direct program costs =	\$ 5,088,000
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Memoranda of Agreement between the Coast Guard and DOD, NSF, and MarAd govern full reimbursement. Since fleet ownership is now shared, the Memoranda of Agreement establish a Polar Icebreaker Users Council, comprised of representatives from the primary user agencies, to resolve fleet management issues.

Costs are divided into two components under full reimbursement: (1) Fixed costs, which include pay and allowances of icebreaker crews and supporting staffs, parts, maintenance of the ships and aircraft, and some fuel; and (2) deployment operating costs, which are based upon the actual fuel consumed in the polar regions. Each primary user reimburses the Coast Guard for its

share of fixed costs (based on each user's icebreaker usage) early in the fiscal year, and is charged for deployment operating costs on a quarterly basis. Direct program costs for fiscal years 1983-1984 are shown below:

	<u>Fiscal Year 1983</u>	<u>Fiscal Year 1984</u>
Department of Defense		
Fixed Costs	\$ 9,060,000	\$ 9,515,000
Deployment operating costs	\$ 1,407,000	\$ 828,000*
Total	\$10,467,000	\$10,343,000*
National Science Foundation		
Fixed Costs	\$12,416,000	\$13,251,000
Deployment operating costs	\$ 2,027,000	\$ 1,748,000*
Total	\$14,443,000	\$14,999,000*
Coast Guard		
Fixed Costs	\$ 4,515,000	\$ 4,859,000
Deployment operating costs	\$ 573,000	\$ 607,000*
Total	\$ 5,088,000	\$ 5,466,000*
Maritime Administration		
Fixed Costs	\$ 4,515,000	--
Deployment operating costs	\$ 1,174,000	--
Total	\$ 5,689,000	NA
Total program costs	\$35,687,000	\$30,808,000

\*Estimates

The costs shown are the costs for accomplishing all primary user missions. MarAd's withdrawal from the reimbursable program after fiscal year 1983 (and the loss of its \$5.3 million) increases the funding responsibility on the remaining primary users.

The loss of MarAd funding illustrates one of the difficulties of full reimbursement, a system whose fragmented budgetary review could lead to long-term degradation of the nation's sole surface maritime polar capability. The \$5.3 million transferred to MarAd in FY83 for icebreaker costs was placed into the MarAd research and development (R&D) appropriation. In the course of developing the MarAd FY84 budget, it became necessary to reduce the R&D

figure by \$5 million. Rather than reduce its traditional R&D activities by 50%, MarAd had little choice but to forfeit the newly acquired icebreaker funding. No operational shortfall existed in fiscal year 1984 due to GLACIER's removal from the reimbursable fleet for the MMA.

## DOMESTIC ICE OPERATIONS

### MANDATE/PROGRAM DESCRIPTION

The Coast Guard is responsible for facilitating navigation and conducting Congressionally mandated Coast Guard responsibilities on domestic ice-covered waters. Executive Order 7521 tasks the Coast Guard with facilitating commerce on domestic ice-covered waters.

The primary domestic ice-breaking operating areas are the Great Lakes/St. Lawrence Seaway, northeast U.S. Coast, Mississippi River system, and Alaskan coastal waters; the first two areas are those of most activity. The Coast Guard maintains an open shipping season on the Great Lakes during the approximate period 1 April - 31 December and accomplishes Coast Guard missions on the Lakes year-round. The Coast Guard maintains a year-round shipping season on the northeast U.S. coast in the following areas: Penobscot Bay and River, Hudson River, southeastern New England coast, Delaware Bay, upper Chesapeake Bay, and the Chesapeake and Delaware Canal. Ice breaking in support of Coast Guard missions is conducted elsewhere as required. The Coast Guard presently conducts limited domestic ice breaking on Alaskan waters; however, national arctic policy (NSDD 90) and the continuing development of arctic hydrocarbon resources suggest possible future ice-breaking work in this region.

The Coast Guard must maintain the capability to conduct domestic ice breaking during periods of national or regional emergency. For example, the success of any defense effort is highly dependent upon timely delivery of raw materials and finished products; degradation of shipping between industrial and transportation centers cannot be permitted.

The Coast Guard also conducts ice breaking for flood control. 14 U.S.C. 141(a) permits the Coast Guard to assist other agencies in flood control and 14 U.S.C. 88(a) authorizes the Coast Guard to aid persons and property imperiled by flood. Therefore, upon requests of the appropriate authorities of the Corps of Engineers, U.S. Army, the Coast Guard may provide ice-breaking facilities and services to aid in the prevention of floods and hazardous water stages caused by ice jams. On the same basis, the Coast Guard may also provide ice-breaking facilities and services for flood control directly in response to requests by federal, state, or local governmental agencies or private interests. However, since responsibility for flood control is vested in the Corps of Engineers, the Coast Guard must consult with cognizant officials of that organization before undertaking ice breaking for flood control to determine if such ice breaking will interfere with regulation or operation of the waterway in question.

## ICE JAM ON MISSISSIPPI RIVER

A situation which we are currently monitoring is the ice jam on the Mississippi River in the vicinity of Keokuk, Iowa. Approximately 600 grain barges and 35 tow boats are beset in 16 to 20 inch ice and will probably remain so until Spring. The Coast Guard is working with the Industry Advisory Committee and the Army Corps of Engineers to alleviate the impact. Precautionary measures, such as shortening tows and having tugs remain with beset barges, have been ordered. The Coast Guard does not normally conduct ice breaking for the facilitation of commerce on the Mississippi River, nor does the Coast Guard possess facilities capable of penetrating such an ice jam.

### FACILITIES

The following table lists the facilities available for domestic ice breaking. Of these facilities, only MACKINAW, the WTGBs, WYTMs, and WYTLs are specifically constructed as icebreakers and are assigned ice breaking as one primary mission. The other vessels either have more limited ice-breaking capability and/or are assigned ice breaking as a secondary mission; however, their importance should not be discounted because during heavy ice seasons, these additional resources are necessary to supplement the primary facilities.

<u>Coast Guard District</u>	<u>Cutter Type</u>	<u>Number</u>
First	WYTM (medium harbor tug)	2
	WYTL (small harbor tug)	5
	WLB (seagoing buoy tender)	2
	WLM (coastal buoy tender)	3
	WLI (inland buoy tender)	1
Second	WLR (river buoy tender)	18
Third	WYTM	3
	WYTL	6
	WLB	2
	WLM	3
	WMEC (EVERGREEN)	1
Fifth	WTGB	1*
	WYTM	4
	WYTL	2
	WLB	2
	WLM	2
	WLIC (construction tender)	3
	WLI	2
Ninth	WAGB (MACKINAW)	1
	WTGB	5
	WLB	5
	WLI	1
Seventeenth	WMEC (STORIS)	1
	WLB	6
	WLI	1

\*Primary mission is Reserve Training Center, Yorktown training vessel.

## 110' WYTM REPLACEMENT

The Coast Guard continues to replace the aging (39-44 years old) 110' WYTM's. All five Great Lakes WYTM's have been replaced with five 140' WTGB's. The Coast Guard originally intended to assign six WTGB's to the Great Lakes; however, the termination of the extended navigation season in 1979 coupled with WTGB's exceeding expected performance capabilities led to the determination that only five are required.

The Coast Guard plans to replace the eight northeast coast WYTM's with five WTGB's (one of which is the permanent replacement training vessel for Reserve Training Center Yorktown) and two patrol boats. Due to the multi-mission nature of the WYTM's, it is possible to replace them with a mix of ice-breaking and non-ice-breaking hulls. The first replacement vessel (WTGB 107) will be delivered second quarter, fiscal year 1985. The Coast Guard awarded a contract for construction of WTGB 108 on 16 December 1983. AC&I funding (\$17.9 million) for WTGB 109 is requested in fiscal year 1985 and the Coast Guard plans to request funding for the final WTGB, hull 110, in a future budget.

## DOMESTIC ICEBREAKING POLICY/IMPACT OF USER FEES

The 1982 Roles and Missions Study recommends the Coast Guard continue to respond to emergencies and perform other Coast Guard missions such as search and rescue, enforcement of laws and treaties, aids to navigation, port and environmental safety, and marine environmental response, on ice-covered domestic waters. The Study also recommends that ice breaking for routine facilitation of commerce be conducted under a user fee schedule only; however, user fees are not yet established. Executive Order 7521 (E.O.7521) directs the Coast Guard to "assist in keeping open to navigation by means of ice-breaking operations ...channels and harbors in accordance with the reasonable demands of commerce...". The Coast Guard is complying with this mandate (E.O.7521) by conducting domestic ice breaking as follows:

- On principal waterways which are normally open to navigation in the winter, the Coast Guard will conduct ice-breaking operations as needed to facilitate navigation.

- On principal waterways which are normally impassable without icebreaker assistance in the winter, the Coast Guard will continue to provide ice-breaking services to meet the reasonable demands of commerce as it has heretofore, pending resolution of the user fee issue.

Vessel owners and operators in these areas are being encouraged to assist in holding down the need for Coast Guard ice-breaking assistance by providing for themselves, by using vessels adequately powered and constructed to move safely through ice-covered waterways without Coast Guard help, by rescheduling voyages until ice conditions ease, etc. This is a long-standing Coast Guard practice.

In conducting ice-breaking operations to facilitate navigation the Coast Guard does not normally interfere with private enterprise. If commercial ice-breaking assistance is available and adequate, Coast Guard ice-breaking assistance is not provided. If, however, available commercial ice-breaking assistance is inadequate, Coast Guard ice-breaking assistance will be provided in accordance with other operational priorities. The "availability" and "adequacy" decisions are made by the cognizant District Commander. Safety of assisted and assisting vessels is a prime consideration in making these decisions.

The Coast Guard is proceeding with action necessary to impose user fees to cover the costs of certain Coast Guard services, including some domestic ice breaking, under Section 9701 of Title 31, U.S. Code. The Coast Guard anticipates publishing a notice of proposed rulemaking in April 1984.

It is not clear that the advent of user fees will require substantial adjustments to Coast Guard domestic ice-breaking policy. A user fee schedule will not reduce the number of required domestic ice-breaking facilities since the Coast Guard must by statute respond to emergencies and accomplish other missions. The Coast Guard anticipates collecting minimal revenue under a user fee schedule.