

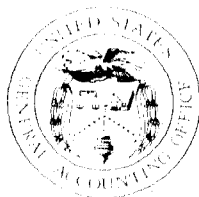
GAO

Report to the Chairman, Subcommittee
on Transportation and Related
Agencies, Committee on
Appropriations, House of
Representatives

July 1991

COAST GUARD

Adequacy of the
Justification for
Heritage Patrol Boats



144562

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**Resources, Community, and
Economic Development Division**

B-244424

July 12, 1991

The Honorable William Lehman
Chairman, Subcommittee on
Transportation and Related Agencies
Committee on Appropriations
House of Representatives

Dear Mr. Chairman:

In 1979, the Department of Transportation (DOT) approved a project to replace Coast Guard patrol boats nearing the end of their service lives. By 1987, the Coast Guard had determined that in addition to replacing these boats, it needed to increase its patrol boat fleet from 87 to 96 vessels by the year 2000. After assessing several patrol boat designs, the agency selected a 120-foot "Heritage Class" design in 1988. To provide the fleet complement of 96, the Coast Guard planned to begin acquiring 47 Heritage vessels in 1990.

This report responds to your September 11, 1990, request that we examine the adequacy of the Coast Guard's justification for the Heritage vessels. As agreed, we assessed the agency's (1) justification for the type and number of patrol boats needed to carry out the agency's missions, (2) evaluation of alternatives to the Heritage design, and (3) support for production schedule and cost estimates for the Heritage vessel. We testified on the preliminary results of our work before your Subcommittee on April 24, 1991.¹ The Heritage acquisition was one of the case studies discussed in our testimony.

Results in Brief

The Coast Guard's project to acquire Heritage vessels was not adequately justified and did not closely adhere to federal guidance for acquiring major systems. As a result, the acquisition has fallen behind schedule, and the vessels will not be available when needed, raising questions as to whether the Coast Guard will be able to effectively conduct its missions. Specifically, we found the following:

- There were weaknesses in identifying mission needs and the capabilities the replacement vessels would require to meet these needs. The Coast Guard also could not support its decision for the number of patrol boats

¹Major Acquisitions: Top Management Attention Needed to Improve DOT's Acquisition Process (GAO/T-RCED-91-45, Apr. 24, 1991).

-
- needed because agency officials could not provide support for the calculations of the computer model used to determine the need for 96 vessels.
- The Coast Guard identified different patrol boat designs that would satisfy its needs but selected the Heritage design without completing the competitive demonstrations of alternatives that should occur during the acquisition process. In addition, the Coast Guard's evaluation did not consider all relevant costs, such as those that would be incurred to renovate over half of the home ports to accommodate a vessel as large as the Heritage boat.
 - The Coast Guard's initial estimates understated the time and cost required to obtain Heritage boats and lacked support. Agency officials acknowledged that factors such as underestimating the time needed to design, develop, and produce a prototype have caused the date for beginning to acquire Heritage boats to slip from 1990, as originally planned, to 1996. Because fleet replacements will not be available when needed, the Coast Guard has had to extend the lives of older patrol boats that it considers to be less than adequate for performing patrol boat missions. The current cost estimate for the Heritage prototype, now under construction, is \$13 million, nearly double the initial estimate of \$7.7 million.² Subsequent production-run vessels are currently estimated to cost about \$7 million each, although the Coast Guard cannot document this figure.

The Coast Guard is currently reevaluating the appropriate size and composition of the fleet, assessing the costs of renovating ports, and considering acquiring smaller, less expensive "off-the-shelf" (commercially available) boats in place of some Heritage boats. The agency plans to complete these studies by mid-1992.

Background

The Coast Guard uses its patrol boat fleet primarily to deter drug smuggling and fishing violations, rescue people, and assist disabled vessels. Today's fleet contains 94 patrol boats, but over half—52—will reach the end of their service lives and be retired during the 1990s. The rest of the current fleet is composed of 42 "Island Class" patrol boats, which the Coast Guard began acquiring in 1985. These 110-foot boats were an off-the-shelf design that had been fully developed and tested and could be produced and acquired quickly to respond to the administration's initiative for drug interdiction in the southeastern United States. The Coast Guard initially acquired 16 Island Class boats, at the direction of the Congress, for this purpose. By February 1992, it will have added a total

²Both cost estimates are in constant 1991 dollars.

of 33 more to the fleet to carry out this and other patrol boat activities. The agency will have spent about \$320 million for the total of 49 Island Class vessels. According to Coast Guard officials, this vessel was a short-term fix to provide some fleet replacements but was not the long-term vessel of choice. Thus, the Coast Guard needed to evaluate various patrol boat designs and select the vessel(s) that would best replace the aging patrol boats being removed from service and provide the required fleet of 96 patrol boats.

In 1979, the Deputy Secretary of DOR approved the Coast Guard's project to acquire fleet replacements. To carry out the acquisition, the Coast Guard needed to follow procedures outlined in the Office of Management and Budget's Circular A-109, which is the principal guidance for acquiring major systems in the federal government. To avoid the problems commonly experienced in acquiring major systems, such as cost overruns and delays, A-109 divides the acquisition process into five phases. These are used to (1) determine mission needs, (2) identify and explore alternative design concepts, (3) demonstrate alternative design concepts, (4) undertake full-scale development and limited production, and (5) commit to full production. To secure the involvement of the agency's top management, A-109 establishes four key decision points between the phases to review the project's progress, problems, and risks before moving to the next phase. (See app. I for additional details on A-109.)

The Coast Guard developed a mission needs statement by July 1983. By January 1985, the agency had established a strategy to begin replacing its aging patrol boats starting in 1990. In November 1985, it issued design criteria for the boats and further defined necessary capabilities. By 1987, the Coast Guard had determined that it needed to increase its patrol boat fleet from 87 to 96 vessels by the end of the 1990s. By August 1988, the Coast Guard selected the 120-foot Heritage Class design as the most cost-effective replacement. The Heritage was the agency's own in-house design, a conventional single-hull vessel. The Coast Guard is currently building a Heritage prototype and estimates that testing will begin in 1992 and be complete late in 1993.

Justification Lacking for Patrol Boat Capabilities and Fleet Size and Composition

The first phase of the A-109 process, determining mission needs, is arguably the most important because it establishes criteria for all subsequent decisions. For the patrol boat replacement project, the needs statement should have clearly defined the required capabilities, a key factor in determining the type and number of boats needed for patrol boat missions. While the Coast Guard developed a mission needs statement, as required by A-109, the statement did not adequately describe or justify the capabilities needed. In addition, the Coast Guard did not justify the patrol boat fleet size and composition by vessel type that would meet the agency's needs most cost-effectively.

Capabilities Not Adequately Justified

The 1983 mission needs statement identified some capabilities, but lacked specificity. For example, it stated that the fleet replacements must carry "suitable armament" for law enforcement duties and "maintain space and weight reservations for additional weapon systems" that might be added in the future. The Coast Guard further defined the design criteria in November 1985, which included certain defense capabilities. While some of these defense requirements could be useful for certain situations, they are most often not necessary for the defense operations the Coast Guard supports. Furthermore, the agency was requiring that all of the fleet replacements possess these capabilities, but the defense mission historically has required only a minimal annual commitment of patrol boats' time and is not expected to change in the future.

One of the defense capabilities required in the November 1985 design criteria was degaussing, a mine countermeasure system that neutralizes the steel hull so that magnetic-sensitive mines are unable to detect the boat's presence. According to Coast Guard officials, degaussing was initially required because patrol boats could be called upon to support the Navy in time of war or national emergency and carry out certain defense operations. However, the officials said that the requirement was eliminated in December 1990 primarily because Coast Guard patrol boats have not had this capability or needed to use it. They also said that the defense operations the patrol boats have been used for involve escorting naval vessels from ports to the open sea and aiding training exercises, such as gunnery practice and radio communication. On average, these activities constitute only about 10 percent of all patrol boat activities, and, according to the officials, degaussing was not critical for these defense functions.

Another defense capability, which is currently required but may not be essential, is chemical, biological, and radiation (CBR) protection. Coast Guard officials said that while this feature could be included on patrol boats, the boats had not and probably would not be in situations requiring it. Navy officials also told us that their patrol boats do not have degaussing or CBR protection, even though the boats often operate in hostile environments. Furthermore, they said that the assistance the Navy might need from the Coast Guard patrol boats would not require these capabilities.

Our review suggests that top management did not always play the critical, questioning role, as intended by A-109, needed to ensure sound decisions. Because the Coast Guard did not adequately relate capabilities to its missions, it is currently reevaluating its mission needs, repeating Phase 1 of A-109. It expects to complete this evaluation by mid-1992, and at that time, top Coast Guard and DOR officials will need to assess whether the statement of capabilities adequately addresses the agency's needs.

Support Lacking for Fleet Size and Mix

According to Coast Guard officials, the required fleet size was calculated in 1987 by a computer model that incorporated previous years' data from each Coast Guard district on the activities actually conducted by the patrol boats. However, the officials could not identify the time period of the historical data, verify the data's accuracy, or provide documentation to explain the model's methodology and calculations. Thus, the accuracy and validity of the model—and the need identified by the model—cannot be assessed.

Similar weaknesses were identified by DOR's Office of Inspector General, which reported in December 1990 that the process the Coast Guard uses to determine the number of vessels needed for its missions was not fully documented and that Coast Guard officials could not explain it.³ The Inspector General reviewed the documentation that the Coast Guard uses to project, for a 5-year period, the number of vessels it will need to meet its anticipated missions. Coast Guard officials could not explain how this information was used to develop the agency's projection. The Inspector General recommended that the Coast Guard document and update the process used to identify the number of vessels required. Agency officials agreed and currently plan to do so by the end of 1991.

³Report on the Audit of Cutter and Personnel Staffing Requirements - United States Coast Guard (Dec. 26, 1990).

As part of its reevaluation of patrol boat needs, the Coast Guard decided in August 1990 to reevaluate the type and number of patrol boats it requires to meet mission needs, in effect returning to Phase 2 of A-109. It developed a new computer model to estimate its patrol boat needs, but according to agency officials, the model did not function as intended. In May 1991, the Coast Guard requested that the Congress provide \$1 million in the agency's fiscal year 1992 budget, in part, to continue this reevaluation. If funding is approved, the Coast Guard plans to work with an outside contractor to develop a model that will identify patrol boat needs and evaluate the effectiveness of different mixes of patrol boats in each Coast Guard district.

Weaknesses Found in the Coast Guard's Evaluation of Patrol Boat Alternatives

Before the Coast Guard selected the Heritage Class patrol boat in 1988 as its preferred fleet replacement, it identified and explored alternatives, as required for Phase 2 of A-109. However, the Coast Guard did not complete competitive demonstrations of alternative designs, Phase 3 of A-109, or consider all relevant costs. In addition, the benefits of Phase 4 of A-109—the knowledge that can come from full-scale development and limited production and from testing prototypes in an operational environment—may not be fully realized because of the Coast Guard's decisions.

Alternatives Not Adequately Evaluated

The Coast Guard identified different patrol boat designs, such as hydrofoils, twin-hull vessels, and conventional single-hull vessels that would satisfy its needs, as required by Phase 2 of A-109. It evaluated each design's (1) acquisition and life-cycle costs; (2) performance, speed, and handling characteristics; and (3) ability to support routine missions and operate in different environments. However, pressures to replace the aging fleet as soon as possible favored conventional single-hull designs and eventually led to the selection of the conventional, but unproven, Heritage design. Even though the Heritage design was unproven, the Coast Guard claimed to have the engineering knowledge and expertise to quickly design and develop the vessel and bring it into the fleet. The decision to reject other options and proceed solely with the Heritage design eliminated the competitive demonstrations of other alternatives that should occur in Phase 3. This decision, approved by top management in the Coast Guard and DOT, runs counter to the thorough analysis and decision-making intended under A-109.

In Phase 4, the agency had planned to construct and test two separate Heritage prototypes so that it could better assess the design's basic

strengths and weaknesses under a wider range of conditions. However, as the costs to develop the Heritage design increased, the Coast Guard decided in 1988 to produce only one prototype. In December 1990, the Coast Guard official responsible for carrying out the Heritage acquisition decided to reduce the testing period from 24 to 18 months to recoup some of the lost time and hasten production. Coast Guard officials said that reducing the testing period would not compromise the thoroughness and integrity of the operational testing intended by A-109. However, agency officials had stated in August 1989 that the performance and schedule risks for the Heritage acquisition would increase if the evaluation period were reduced.

Evaluation Did Not Include All Relevant Costs

When the Coast Guard identified and evaluated alternative designs, beginning in 1985 and continuing through mid-1988, it did not adequately consider the costs involved to renovate most of the 49 home ports that currently serve the aging 82-foot patrol boats.⁴ At least 39 of these ports cannot accommodate a vessel as large as the 120-foot Heritage and would require channel dredging, pier extension, and/or shore facility improvements to do so. In October 1990, the Coast Guard began to assess in detail the cost of renovating the ports and by April 1991 had received preliminary cost estimates ranging mostly from several hundred thousand to over a million dollars per port. The agency expects to complete this assessment by mid-1992.

These costs led the Coast Guard to consider a smaller, less expensive off-the-shelf patrol boat that could be acquired in lieu of some of the 47 currently planned Heritage boats. According to officials, a smaller patrol boat design would not require costly port modifications, and other cost savings could also be realized. The officials estimated the smaller boat's acquisition cost to be half of the Heritage boat's estimated cost of \$7 million, and the annual operating costs—for fuel, maintenance, and personnel—would be about \$600,000 versus \$975,000 per boat, or about 40 percent less. The agency expects to complete its evaluation by mid-1992.

⁴The Coast Guard has a total of 70 home ports for its patrol boat fleet; the remaining 21 ports are currently used by 110-foot vessels.

Time and Cost Estimates Were Inaccurate and Lacked Support

The Coast Guard underestimated the time and cost required to produce the Heritage and obtain needed fleet replacements. The acquisition is already 5 years behind the agency's initial estimate, and the Heritage prototype, now under construction, has yet to be tested and proven as required by A-109 before full production can begin. In addition, the most recent cost estimate for the prototype is about \$13 million, nearly double the initial estimate of \$7.7 million.

Delays May Result in Fleet Shortfall

In January 1985, the Coast Guard estimated that it would be able to produce fleet replacements beginning in 1990 and took the position that any delay in replacing existing patrol boats would adversely affect mission performance and the safety of personnel. However, the Heritage boats are now not expected to be available until fiscal year 1996, more than 5 years past the time the Coast Guard said it needed fleet replacements. Coast Guard officials attribute the delays to weaknesses in planning and managing the acquisition. Specifically, they cited the (1) difficulty in identifying capabilities and mission needs, (2) lack of specific guidance for required documentation, and (3) excessive time needed to coordinate the acquisition between the pertinent Coast Guard and DOR officials and obtain the necessary approvals.

In view of the delays experienced to date, officials estimated in February 1990 that a shortfall of as many as 16 boats, or about 17 percent of the number of patrol boats needed to support patrol boat missions, could occur during the 1990s. To minimize this shortfall, the agency is extending the service lives of its aging 82-foot patrol boats from 1 to 5 years, replacing the engines in 39 of these vessels at a total cost of about \$8.5 million. It estimates that this extension will reduce the fleet shortfall to two patrol boats from now through 1998. This decision to extend the boats' service lives occurred even though a March 1987 Coast Guard study found the hulls of the 82-foot patrol boats were becoming structurally unsound and recommended these boats be removed from the fleet upon completing 30 years of service, or earlier. This study also found that even if renovated, the 82-foot patrol boats would not have the speed, endurance, or capabilities required to carry out patrol boat missions. These shortcomings raise questions as to whether the agency will be able to effectively carry out its missions.

Cost Estimates Inaccurate and Unsupported

The Coast Guard's initial cost projection for the Heritage prototype, developed in 1987 during Phase 2 of A-109, was underestimated. The most recent cost estimate—in May 1991—is about \$13 million, nearly

double the \$7.7 million estimated in November 1987. Coast Guard officials could not support or fully explain the original cost estimate, but acknowledged—in light of actual experience—that it understated the labor hours needed to design, develop, and produce the prototype. The May 1991 estimate reflects the most recent increase in labor hours—from about 141,000 to about 164,000—which added almost \$1 million to the cost of the prototype. According to the agency official in charge of prototype development, the increase in labor hours was made in an attempt to keep the acquisition on its current schedule.

Coast Guard officials maintain that costs will be much lower for the production Heritage boats because the labor hours required to develop and refine the design will not be needed for full production. In October 1989, the Coast Guard used a computer model that estimated a cost of \$6.5 million per boat.⁵ This model incorporates the factors the Navy uses to estimate shipbuilding costs, but the Coast Guard had not developed documentation to support the model and could not verify the accuracy of the estimate. Furthermore, this estimate was based on the Coast Guard's plan to acquire 58 Heritage boats. The projected acquisition dropped to 47 Heritage boats during 1990 and may decrease further, given that possible port renovations and other cost concerns have prompted a reconsideration of alternatives. The Coast Guard's most recent estimate—in March 1991—based on 47 boats, is a per-boat cost of about \$7 million. This estimate was not generated from the computer model, and agency officials could not provide documentation to support it.

The number of production boats is an important factor in determining the cost per boat. If fixed costs, such as start-up and overhead expenses, can be apportioned among more boats, the cost per boat is less. The Coast Guard is currently updating its model that estimates the cost per boat, but according to officials, the new model and supporting documentation will not be completed until sometime in 1992. After the agency determines the number of Heritage Class patrol boats it will acquire, it will use the model to estimate a new cost figure for full production.

Conclusions

The Coast Guard did not adequately justify the patrol boat's capabilities and number of boats needed to carry out its missions. Nor did it thoroughly evaluate alternative fleet replacements before selecting the Heritage design. In addition, the agency's cost estimates have been

⁵This estimate is based on the production of boats during fiscal years 1994 to 1998 and incorporates projected inflation rates for this time period.

understated and poorly supported and have excluded the significant expense that would be incurred to renovate home ports if fleet replacements larger than the current patrol boats are acquired. Furthermore, the agency did not accurately estimate the time needed to acquire the Heritage boats, and the acquisition is more than 5 years behind schedule. Because of delays, fleet replacements will not be available when needed, which could adversely affect the Coast Guard's ability to conduct missions.

In an attempt to avert a fleet shortfall, the agency is extending the service lives of its older patrol boats. However, these boats have structural weaknesses and may be inadequate for many of the patrol boat missions. The agency's ongoing reevaluations of the appropriate fleet size, suitable patrol boat alternatives, and home port renovations represent steps toward providing needed fleet replacements.

The A-109 guidance calls for oversight by top management to ensure that essential determinations are made before the acquisition proceeds from one phase to the next. For the patrol boat acquisition, more rigorous oversight by top management might have ensured stricter adherence to A-109. The analytical shortcomings, cost overruns, and delays that have occurred to date for the planned Heritage acquisition, as well as the significant outlay of funds that will be required to obtain fleet replacements, warrant close attention by top management and underscore the need to keep the Congress fully informed of the Coast Guard's ongoing reevaluations and acquisition strategy.

Recommendations to the Secretary of Transportation

We recommend that the Secretary of Transportation direct the Commandant of the Coast Guard to ensure that the ongoing patrol boat replacement project closely adhere to the A-109 guidance to minimize the inherent risks of acquiring major systems. Specifically, the Commandant should

- ensure that the ongoing reevaluations (1) accurately identify and justify the capabilities required to carry out patrol boat missions; (2) justify the identified fleet size and composition; (3) evaluate suitable, cost-effective alternatives; and (4) include accurate and up-to-date cost and schedule estimates for fleet replacements and
- keep the Congress informed regarding the progress of the reevaluations, providing results as they become available, including current estimates of the cost and time required to provide the fleet replacements and explanations of any significant deviations from prior estimates.

Matters for Consideration by the Congress

In view of the problems experienced since the inception of the patrol boat replacement acquisition, the Congress may wish to consider making funding contingent upon the timely completion of the Coast Guard's ongoing studies and an adequate justification of the agency's patrol boat needs and acquisition strategy.

We discussed the contents of this report with Coast Guard officials. They generally agreed with our findings and conclusions and provided some clarifications, which we incorporated where appropriate. However, as requested, we did not obtain official agency comments.

Our review was conducted between September 1990 and June 1991 in accordance with generally accepted government auditing standards. Additional details on our scope and methodology are contained in appendix II.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the Secretary of Transportation, the Commandant of the Coast Guard, and other interested parties and will make copies available to others upon request. This work was performed under the direction of Kenneth M. Mead, Director, Transportation Issues, who can be reached at (202) 275-1000. Major contributors to this report are listed in appendix III.

Sincerely yours,



J. Dexter Peach
Assistant Comptroller General

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Abbreviations

CBR	chemical, biological, and radiation
DOT	Department of Transportation
GAO	General Accounting Office

A-109 Major System Acquisition Process

Major system acquisitions are high in cost, critical to the agency's mission, and warrant top management's attention. The Office of Management and Budget's Circular A-109 provides the principal guidance for such acquisitions in the federal government. On April 24, 1991, we testified before the Subcommittee on Transportation and Related Agencies, House Committee on Appropriations, on the Coast Guard's and Federal Aviation Administration's handling of major acquisitions.

Circular A-109 has two primary objectives. First, to avoid the problems commonly experienced in acquiring major systems, such as cost overruns and delays, it divides the acquisition process into five phases. Second, to secure top management's involvement, it establishes between the five phases four key decision points at which top management reviews the project's progress, problems, and risks. The purpose of this review is to ensure that the acquisition does not advance to the next phase until management's concerns are resolved.

The first phase of the A-109 process, which involves determining mission needs, is most important because it establishes the criteria for all subsequent decisions. A mission needs statement should clearly demonstrate the purpose and requirements of the project, how it would meet the agency's needs, and the risks involved. The mission needs statement must be reassessed and approved at each key decision point, before a project can move from one phase to the next.

In the second phase, the agency identifies alternative designs that would satisfy its needs and selects the most promising designs for further exploration. This evaluation includes a comparative analysis of capabilities, associated costs and benefits, and likely timetables for completion.

The third phase provides for a competitive demonstration of selected alternative designs, which typically involves building, testing, and evaluating prototypes. The competitive demonstration should verify that the chosen design concepts are sound and able to perform as claimed.

In the fourth phase, the agency conducts full-scale development and limited production of the system. In addition, the system is also subject to independent testing and evaluation under anticipated operating conditions. Independence, in this context, means that testing is conducted by organizations not associated with the units responsible for developing and using the system.

The fifth and final phase of the A-109 process involves full production and deployment of the system. Top management gives the authorization to move into this phase after assessing the results of the testing and evaluation of the fourth phase and reconfirming mission needs in light of these results and current conditions.

Objectives, Scope, and Methodology

On September 11, 1990, the Chairman, Subcommittee on Transportation and Related Agencies, House Committee on Appropriations, requested us to review the Coast Guard's proposed acquisition of Heritage Class patrol boats. We subsequently agreed to examine the Coast Guard's (1) justification for the type and number of patrol boats needed to carry out the agency's missions, (2) evaluation of alternatives to the Heritage design, and (3) support for production schedule and cost estimates for the Heritage boat.

To address our objectives, we interviewed Coast Guard headquarters officials involved with this acquisition. These officials were from the Offices of Acquisition, Law Enforcement and Defense Operations, Engineering Logistics and Development, and Personnel and Training. They provided information and documentation on the events that led to the decision to acquire the Heritage Class patrol boat, the studies and analyses conducted to evaluate patrol boat alternatives, and the initial and subsequent production schedule and cost estimates for the Heritage boat. We also interviewed officials at the Coast Guard Academy and the Research and Development Center, both located in Connecticut, to obtain information on the history of the acquisition project and on current studies the agency is conducting to reevaluate the capabilities the patrol boats should have and the needed fleet size and composition.

We also interviewed 12 Coast Guard officials who recently had been or currently are commanding officers of Island Class patrol boats. These officials, dispersed among the eight Coast Guard districts that have patrol boats, provided information on the capabilities and habitability of the boats, the boats' typical use, the average number of days the vessels remain on continuous patrol, and the crew size needed to conduct patrol boat operations.

To obtain information on the Department of Transportation's (DOT) oversight of the patrol boat acquisition, we interviewed headquarters officials from DOT's Office of the Assistant Secretary for Administration. We also contacted officials from DOT's Office of Inspector General to follow up on the Office's reports that were relevant to our review.

To obtain a basic understanding of shipbuilding and the factors involved in estimating production schedules and costs, we visited the Coast Guard Yard in Curtis Bay, Maryland, and three private shipyards—Bollinger, Swift Ships, and Trinity Marine—in Louisiana. At the Coast Guard Yard, we discussed the progress to date on the Heritage Class

prototype, the initial and current cost and production schedule estimates, and the engineering technology and construction techniques being used for the prototype. Representatives of the three private shipyards discussed prior and ongoing projects that were similar to the Coast Guard's. They also provided information on cost and production schedule estimates, patrol boat's capabilities, engineering and construction techniques, and the different properties of the metals—aluminum and steel—generally used for vessel construction.

We also interviewed officials from the Department of the Navy's Office of the Chief of Naval Operations and Naval Sea Systems Command. They provided information on the Navy's ongoing acquisition of 170-foot patrol boats, operations conducted by the Navy's patrol boats, and the role the Coast Guard's patrol boats might play to assist the Navy.

Our review was conducted between September 1990 and June 1991 in accordance with generally accepted government auditing standards. We discussed the information in this report with Coast Guard officials. They agreed with our findings and conclusions and provided some clarifications, which we incorporated where appropriate. As requested, however, we did not obtain written agency comments on a draft of this report.

Major Contributors to This Report

Resources,
Community, and
Economic
Development Division,
Washington, D.C.

Emi Nakamura, Assistant Director
Ralph L. Lowry, Assignment Manager
Nancy E. Oquist, Evaluator-in-Charge
Rebecca L. Johnson, Evaluator
John H. Skeen, III, Writer-Editor

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