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Preface

The Department of Homeland Security (DHS) Office of Inspector General (OIG) was established by the Homeland Security Act of 2002 (*Public Law 107-296*) by amendment to the Inspector General Act of 1978. This is one of a series of audit, inspection, and special reports prepared as part of our oversight responsibilities to promote economy, efficiency, and effectiveness within the department.

This report addresses the strengths and weaknesses of the acquisition of the U.S. Coast Guard's National Security Cutter. It is based on interviews with employees and officials of relevant agencies and institutions, direct observations, and a review of applicable documents.

The recommendations herein have been developed to the best knowledge available to our office, and have been discussed in draft with those responsible for implementation. It is our hope that this report will result in more effective, efficient, and economical operations. We express our appreciation to all of those who contributed to the preparation of this report.

Richard L. Skinner
Inspector General

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Abbreviations

ABS	American Bureau of Shipping
CG-82	Coast Guard Office of Budget and Programs
CLIN	Contract Line Item Number
DHS	Department of Homeland Security
DTO	Delivery Task Order
FY	Fiscal Year
GAO	Government Accountability Office
G-CCS	Coast Guard Chief of Staff
G-D	Coast Guard Deepwater Program Executive Office
G-S	Coast Guard Systems Directorate
ICGS	Integrated Coast Guard Systems
IPDE	Integrated Product Data Environment
IPT	Integrated Product Team
LM	Lockheed Martin Corporation
MOA	Memorandum of Agreement
NAVSEA	Naval Sea Systems Command
NGSS	Northrop Grumman Ship Systems
NSC	National Security Cutter
OIG	Office of Inspector General
PEO	Program Executive Officer
PMP	Program Management Plan
REA	Request for Equitable Adjustment
RFP	Request for Proposal
SAM	Systems Acquisition Manual
TWH	Technical Warrant Holder
U.S.	United States
USCG	United States Coast Guard
USCGC	United States Coast Guard Cutter
WMSL	Maritime Security Cutter, Large

OIG

Audit Report

Department of Homeland Security
Office of Inspector General

Executive Summary

This report presents the results of our review of the U.S. Coast Guard's acquisition of the National Security Cutter (NSC). The objective of our audit was to determine the extent to which the NSC will meet the cost, schedule, and performance requirements contained in the Deepwater contract.

The NSC, as designed and constructed, will not meet performance specifications described in the original Deepwater contract. Specifically, due to design deficiencies, the NSC's structure provides insufficient fatigue strength to be deployed underway for 230 days per year over its 30-year operational service life under Caribbean (General Atlantic) and Gulf of Alaska (North Pacific) sea conditions. Coast Guard technical experts believe the NSC's design deficiencies will also increase the cutter's maintenance costs and reduce its service life. To mitigate the effects of these deficiencies, the Coast Guard intends to modify the NSC's design to support an operational profile of 170 to 180 days underway per year in the North Pacific region, lower than the 230-day performance standard required by the Deepwater contract.

The NSC's design and performance deficiencies are fundamentally the result of the Coast Guard's failure to exercise technical oversight over the design and construction of its Deepwater assets. The Coast Guard's technical experts first identified and presented their concerns about the NSC's structural design to senior Deepwater Program management in December 2002, but this did not dissuade the Coast Guard from authorizing production of the NSC in June 2004 or from awarding ICGS a contract extension in May 2006.

Since the Deepwater contract was signed in June 2002, the combined cost of NSCs 1 and 2 has increased from $517 million to approximately $775 million, resulting primarily from design changes necessary to meet post 9/11 mission requirements and other government costs not included in the original contract price. The $775 million estimate does not include costs to correct or mitigate the NSC's structural design deficiencies, additional labor and materials costs resulting from the effects of Hurricane Katrina, and the final cost of a $302 million Request for Equitable Adjustment (REA) that the Coast Guard is currently negotiating with ICGS.

NSC 1 was christened on November 11, 2006, and final delivery to the Coast Guard is on schedule for August 2007. NSC 2 is currently under

construction and is scheduled for final delivery to the Coast Guard in October 2008, seven months ahead of schedule.

Finally, we encountered resistance from the Coast Guard and ICGS in our effort to evaluate the structural design and performance issues associated with the NSC. The impediments we experienced in obtaining access to personnel, information, and documentation associated with the NSC acquisition are unacceptable in light of the statutory mandates of our office; the severity of the NSC design and performance deficiencies; the importance of the NSC to the Coast Guard's national security and Deepwater missions; and the expenditure of billions of taxpayer dollars that are being invested in this critical acquisition.

We are making five recommendations to the Coast Guard, and one to the Department's Chief Procurement Officer and Office of General Counsel. Our recommendations are intended to: (1) ensure the National Security Cutter is capable of fulfilling all performance requirements outlined in the Deepwater contract; (2) improve the level of Coast Guard technical oversight and accountability; and (3) ensure Office of Inspector General access to all records, personnel, and contractors of the department during all current and future audits and inspections.

The Coast Guard's written response to our draft report was received on December 22, 2006. The response, however, did not indicate whether it concurred or non-concurred with the recommendations, as requested in the transmittal memorandum that accompanied the draft report. Consequently, it is not clear the extent to which the Coast Guard intends to implement the recommendations. We are asking the Coast Guard to advise our office within 90 days of the date of this memorandum of its progress in implementing the recommendations and the date by which each recommendation will be fully implemented.

Background

The Integrated Deepwater System Program (Deepwater) is a $24 billion, 25-year acquisition program designed to replace and modernize the Coast Guard's aging and deteriorating fleet of ships and aircraft. As such, Deepwater is the largest acquisition project in Coast Guard history. Of the 39 similar Navy and Coast Guard cutter fleets surveyed from around the world, only two were reported to be older than the Coast Guard's.[1]

The Deepwater acquisition employs a non-traditional *"system-of-systems"* approach by which a private sector Systems Integrator is authorized to develop an optimal mix of assets designed to accomplish all defined Coast

[1] News Briefing, U.S. Department of Transportation, Office of Public Affairs, dated June 25, 2002.

Guard Deepwater missions.[2] This concept is calculated to provide the Coast Guard with requisite functional capabilities while minimizing life-cycle costs. A traditional acquisition would, on a much smaller scale, replace a single type of asset with a comparable replacement.

In 1999, the National Partnership for Reinventing Government designated Deepwater as a National Reinvention Laboratory project.[3] Consistent with that designation, in June 2000, the Coast Guard's Vice Commandant granted Deepwater a partial waiver from Major Systems Acquisitions Manual (SAM) requirements. (See Appendix C) However, the Vice Commandant's waiver also mandated that the Deepwater Program meet or exceed the fundamental requirements of SAM's *"disciplined management approach,"* including regular briefings to senior Coast Guard leadership and the preparation of robust project documentation.

The Coast Guard awarded the Deepwater contract to Integrated Coast Guard Systems (ICGS)[4] of Rosslyn, Virginia, on June 25, 2002. ICGS received an initial 5-year contract to serve as the Deepwater Systems Integrator. The current base contract term expires in June 2007, and the Coast Guard may authorize up to five additional 5-year (60-month) award terms. On May 19, 2006, the Coast Guard announced its decision to extend the Deepwater contract for 43 out of a possible 60 months, based on its evaluation of ICGS's performance during the first 42 months of the contract.

According to the terms of the contract, it is ICGS, and not the Coast Guard, which has full technical authority over all Deepwater asset design and construction decisions. In a June 2001 Memorandum, the Commandant expressly limited the Coast Guard's technical role to *"providing expertise and credible advice in core integrated engineering and logistics competencies"* and assigned this role to subject matter experts from the Coast Guard's Systems Directorate.[5] The primary mechanism by which the Coast Guard provides expertise and credible advice to ICGS concerning the design of Deepwater assets is the Integrated Product Team (IPT).

The Deepwater Program implements a hierarchical network of IPTs to perform key management, oversight, and contract performance functions,

[2] The Deepwater area of operations is typically defined as beyond the normal operating range, approximately 50 miles from shore.

[3] Reinvention Laboratories are innovative organizations or activities that are established to test or prototype new initiatives. They are empowered to experiment with new ways of doing business, share their ideas, successes, and lessons learned across government.

[4] Integrated Coast Guard Systems is a joint venture partnership between Northrop Grumman Ship Systems (NGSS) and Lockheed Martin Corporation (LM).

[5] The Coast Guard formally articulated the Systems Directorate's Deepwater role as the *"sustainment and systems logistics agent"* responsible for *"establishing and providing policies, standards, guidelines and best practices for overall engineering, maintenance, supply, transportation, and other elements of integrated logistics to be used in the development of CG assets and platforms."*

and IPTs' responsibilities include making decisions on meeting cost, schedule, and performance objectives. This authority is ideally delegated to the lowest IPT level practicable. For example, at the asset level, the NSC IPT is chaired by ICGS representatives but includes *"a significant Coast Guard component."* [6] And, although consensus is the preferred decision method, IPT leads are authorized to make unilateral decisions.

The National Security Cutter (NSC) will be the first major surface asset delivered to the Coast Guard as part of the Deepwater Program. (See Figure 1). The Deepwater Implementation Plan specifies that a total of eight NSCs will be built. The initial NSC, i.e., NSC 1, is being constructed under a Cost-Plus-Incentive-Fee agreement while NSCs 2 through 8 are being produced under Firm-Fixed-Price provisions.

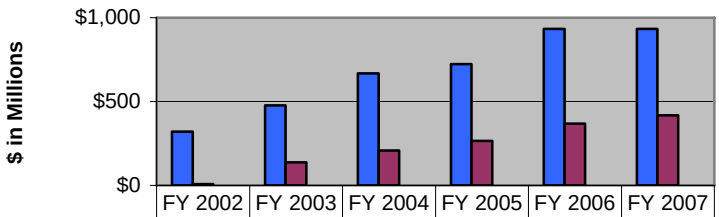
Source: U.S. Coast Guard

Figure 1 – USCGC Bertholf (NSC 1) in drydock prior to launch.

The NSC is the cornerstone surface asset in the Deepwater fleet and, as such, consumes a significant portion of the annual Deepwater budget. Chart 1 shows a comparison of NSC construction costs as a percentage of the total Deepwater budget for Fiscal Years (FY) 2002 through 2007.

[6] Membership of Deepwater Joint IPTs is comprised of both contractor and Coast Guard personnel. The NSC IPT is a Joint IPT.

Chart 1 – NSC Budget as a Percentage of Annual Deepwater Budget FY 2002 - FY 2007



	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Deepwater	$320	$478	$668	$724	$933	$934
NSC	$8	$137	$208	$265	$368	$418
% of Total	2%	29%	31%	37%	39%	45%

Sources: Coast Guard Appropriations Legislation, FYs 2002-2006 Conference Reports, 107-308, 108-10, 108-280, 108-774, and 109-241; Lead Ship Cost Summary, U.S. Coast Guard, July 21, 2005; U.S. Coast Guard 2007 Budget in Brief.

As a result of the events of September 11, 2001, the Coast Guard was transferred to the Department of Homeland Security (DHS) and its national security mission was expanded. Accordingly, the Deepwater Implementation Plan was revised by modifying the original designs of selected assets, including the NSC, and accelerating the delivery of others.

Results of Audit

The NSC, as designed and constructed, will not meet the performance specifications described in the Deepwater contract. Specifically, the NSC's structural design will result in fatigue strengths insufficient to meet the cutter's required capability of being underway[7] for 230 days per year, or 6,900 deployment days over the cutter's stated 30-year service life, in the Caribbean (General Atlantic) and Gulf of Alaska (North Pacific) regions. Coast Guard technical experts believe these design deficiencies, if left uncorrected, could result in fatigue cracks that will significantly increase the cutter's maintenance costs and reduce its service life, thereby undermining the Coast Guard's ability to perform its Deepwater mission.

The Coast Guard acknowledges that the design of the NSC is insufficient to achieve a 30-year service life based on 230 days underway in General Atlantic and North Pacific sea conditions.[8] To mitigate the NSC's performance deficiencies, the Coast Guard intends to task ICGS with

[7] According to 46 CFR § 15.301(a), underway means that a vessel is not at anchor, or made fast to the shore, or aground. It does not include the time spent tied up alongside a pier, in drydock, or on standby in port while at anchor.

[8] The Deepwater Program Office reported to the USCG Commandant in a May 8, 2006, briefing that the NSC design is not compliant with performance requirements and that certain structural elements were inadequate to support a 30-year ship service life based on an operational profile of 6,900 lifetime underway days.

implementing a series of modifications to the cutter's structural design. However, this plan assumes an NSC operating profile of between 170 and 180 days per year in the Pacific Ocean north of the Equator, significantly less than the 230 days underway per year required by the Deepwater contract.

The Coast Guard's technical experts began notifying Deepwater Program management about their concerns regarding the NSC's structural design in December 2002, and continued relaying their concerns in a series of emails, inter-office memoranda, letters, and briefings through January 4, 2005. According to one memorandum from the Coast Guard's Assistant Commandant for Systems to the Deepwater Program Executive Officer (PEO), the findings of two independent third party reviews (See Appendices D and E) not only corroborated the findings of his technical experts, but also confirmed that, *"…significant flaws exist in the structural design of the NSC."* (See Appendix F) These analyses were the basis for the Assistant Commandant's recommendation that the Coast Guard not authorize NSC production until its structural design deficiencies were resolved. Despite these warnings, the Coast Guard authorized construction of NSCs 1 and 2, and authorized the purchase of advance production materials for NSC 3. U.S. Navy technical experts have since conducted a third independent structural assessment of the NSC that not only validated the Coast Guard technical experts' concerns, but also identified other deficiencies in the cutter's design.

According to senior Deepwater Program management, the decision to authorize construction of NSC 1 was based on a balanced consideration of cost, schedule, and performance factors. However, while program management acknowledged that its decision involved evaluating a number of trade-offs, including that any delays in the production schedule would increase the total cost of the NSC acquisition, it did not support, with a business case or other formal cost/benefit analysis, the impacts of delaying production pending further assessment of the structural design. We requested that Deepwater Program management provide us with copies of all emails, decision memoranda, digests, inter-office correspondence, briefings to senior Coast Guard leadership, and any other studies or analyses detailing its rationale for moving forward with NSC production. In response, the Coast Guard was unable to provide the "robust documentation" required by the Vice Commandant in his memorandum granting Deepwater a partial waiver from meeting SAM requirements.

Cost Increases and Schedule Changes

NSC Cost Increases. As of November 15, 2006, the combined cost of NSCs 1 and 2 has increased from $517 million to approximately $775 million, as shown in Table 1. This represents a 50% increase in cost over the original contract prices, resulting primarily from NSC design changes necessary to meet post 9/11 mission requirements, and other government-requested items not included in the original contract price.

Table 1 – NSC Cost Change Summary for NSCs 1 and 2
($ in millions)

NSC Design Cost Changes	NSC 1	NSC 2	Total
June 25, 2002 Contract Estimate	$322.2	$194.6	$516.8
Post 9/11 Changes and Government Items	$140.2	$58.6	$198.8
Inflation from 2002 to 2006	$35.5	$23.7	$59.2
Total November 2006 Cost Estimate	**$497.9**	**$276.9**	**$774.8**

Source: U.S. Coast Guard

It further appears that the cost of NSCs 1 and 2 will increase well beyond the current $775 million estimate, as this figure does not include a $302 million Request for Equitable Adjustment (REA) submitted to the Coast Guard by ICGS on November 21, 2005. The REA represents ICGS's re-pricing of all work associated with the production and deployment of NSCs 1 and 2 caused by adjustments to the cutters' respective implementation schedules as of January 31, 2005. The Coast Guard and ICGS are engaged in negotiations over the final cost of the current REA, although ICGS has also indicated its intention to submit additional REAs for adjusted work schedules impacting future NSCs, including the additional cost of delays caused by Hurricane Katrina. The current $775 million estimate also does not include the cost of structural modifications to be made to the NSC as a result of its known design deficiencies. Future REAs and the cost of modifications to correct or mitigate the cutter's existing design deficiencies could add hundreds of millions of dollars to the total NSC acquisition cost, and could potentially result in the Coast Guard acquiring fewer NSCs or other air and surface assets under the Deepwater contract.

NSC Delivery Schedule. The Deepwater contract originally called for production and deployment work for NSC 1 to be completed on August 3, 2007, with final delivery to the Coast Guard scheduled for August 27, 2007. ICGS still plans to deliver NSC 1 to the Coast Guard in August 2007.

Construction of NSC 2 is also currently underway, with the cutter scheduled for delivery to the Coast Guard on October 13, 2008, seven months ahead of the May 15, 2009, contract date.

NSC Design Deficiencies

The Coast Guard opted to begin production of NSCs 1 and 2 after being advised by its technical experts that the cutter's design contained potential structural deficiencies that could prevent it from meeting contractual performance requirements. Specifically, stress levels on several existing NSC design elements result in fatigue strengths insufficient to endure 30 years of operation in the General Atlantic region, a condition that worsens when operating in the more severe North Pacific region.[9] Technical experts from the U.S. Navy's Naval Warfare Center, Carderock Division,[10] conducted a fatigue analysis of the NSC design under both General Atlantic and North Pacific conditions and concluded that, "*fatigue cracks will initiate well before the ship reaches its 30-year service life*."[11] They also concluded that a fatigue life of only a few years could be expected if the NSC were operated solely under North Pacific conditions.

The Coast Guard agrees with the nature and scope of the structural design deficiencies identified in the Carderock study. In a May 8, 2006, briefing to the Commandant, Deepwater Program management reported that: (1) the NSC design is not compliant with performance requirements; (2) the fatigue service lives of several critical NSC design elements are predicted to be less than 3 years; and (3) fatigue analyses conducted by the Navy confirm the Coast Guard technical experts' concerns regarding the NSC design. The briefing also noted that ICGS and its contractors have yet to express an interest in assuming responsibility for resolving the NSC's design problems or for addressing underlying systems engineering issues. (See Appendix G)

The Coast Guard intends to task ICGS to work with its Systems Directorate and Deepwater Program management on developing and implementing Engineering Change Proposals that will enable the NSC to operate, on average, between 170 and 180 days per year in the Pacific Ocean north of the Equator. (See Appendix H) However, this is a far lower operating standard than the 230 days underway per year required by the NSC's contractual

[9] These design deficiencies include: (1) vent penetration openings in the strength deck stringer plates; (2) large door openings in longitudinal bulkheads near their supports; (3) weakness in the shell fashion plate; and (4) an abrupt discontinuity in deckhouse superstructure.

[10] The Naval Surface Warfare Center, Carderock Division, is the principal Navy resource, national focal point, and international leader in surface and undersea vehicle science, ship systems, and related maritime technology. The division is responsible for research, development, test and evaluation, fleet support, in-service engineering for surface and undersea vehicles, associated hull, machinery and electrical systems, and propulsors.

[11] Technical Report: Structural Assessment of the U.S. Coast Guard National Security Cutter (NSC), Naval Surface Warfare Center, Carderock Division, August 2006.

Performance Specifications. Assuming a 30-year service life for each of the eight planned cutters, if the Coast Guard's plan to operate the NSC for 180 days per year in the North Pacific is implemented, the operational capability of the entire NSC fleet could be reduced by up to 12,000 underway days. This is more than 52 underway years, representing a loss of approximately 1.7 cutters over the course of 30 years.

According to the Coast Guard, much of the repair work to NSCs 1 and 2 would be performed following delivery, while any structural modifications made to NSCs 3 through 8 would be incorporated during the production process. The Coast Guard has not determined the impact of these planned modifications on the delivery schedules of NSCs 3 through 8 or on the final cost of the NSC acquisition.

U.S. Coast Guard's Systems Directorate. Since shortly after award of the Deepwater contract, the Coast Guard's own technical experts assigned to its Systems Directorate have repeatedly advised Deepwater Program management and ICGS of their concerns regarding the NSC's structural design. Until recently, no substantive action was undertaken to resolve these concerns. As a result, opportunities to develop more timely and cost-effective solutions were lost.

For example, in December 2002, the Coast Guard's technical experts first briefed senior Deepwater Program management and ICGS representatives of concerns about the NSC's structural design that they had been unable to resolve through the IPT process. In September 2003, Systems Directorate personnel informed the Coast Guard's Office of Acquisition and Deepwater Program management that there were *"very significant problems"* with the NSC's design. Specifically, they wrote:

> *"Although the Deepwater philosophy is that ICGS bears the responsibility for meeting the performance thresholds, [we] see this risk as being fundamentally owned by the Coast Guard. At delivery we will own the NSC and whatever design problems come with it – it will not be possible to start over…These problems could lead to significant program delays and cost overruns…or even catastrophic hull girder collapse…*
>
> *"[We] have done all we can over the past fourteen months to work collaboratively with ICGS to resolve these problems, however our input has been ignored and ICGS has been unwilling to take the steps necessary to resolve these problems. I remain gravely concerned that the U.S. Coast Guard will take delivery of a ship with a fatally flawed structural design. I recommend that all design efforts be stopped until these issues are resolved."*[12]

[12] Email from the Chief, Naval Architecture Branch, Engineering Logistics Center, dated September 17, 2003.

In January 2004, the Systems Directorate received the results of independent technical reviews conducted by two renowned naval vessel subject matter experts to assess the structural adequacy of the NSC design. Both studies corroborated the Systems Directorate's initial technical concerns. Appendices D and E summarize the respective findings of those assessments.

On March 29, 2004, the Assistant Commandant for Systems issued a memorandum to the Deepwater Program Office outlining his concerns regarding the NSC's structural design. (See Appendix F) He stated:

> *"I am concerned that significant problems persist with the structural design of the NSC. Importantly, several of these problems compromise the safety and viability of the hull, possibly resulting in structural failure and unacceptable hull vibration."*

The Assistant Commandant also noted the failure of the Deepwater IPT process to address the Systems Directorate's NSC technical concerns:

> *"Over the past eighteen months, my subject matter experts have attempted to work collaboratively within the IPT structure to resolve these problems through review, comment and follow-on discussion of the structural design using reference (b)*[13] *and (c)*[14] *as guidance. My concern is that ICGS has unilaterally closed the structural comments and concerns and ended any collaborative effort at the NSC IPT and Sub IPT level, without reaching resolution…"*

In closing, the Assistant Commandant for Systems stated his position that the NSC acquisition should not proceed until its design problems were resolved:

> *"…I am seeking your immediate assistance to bring these critical issues to an agreeable resolution. The fact that the resolution of these engineering issues will most likely impact the NSC design, its [sic] paramount that the impending Delivery Task order for Production and Deployment of the NSC (0030BC), be held in abeyance until we can achieve resolution."*

Deepwater Program management responded to the Assistant Commandant's recommendation by directing that ICGS and the Systems Directorate continue working toward resolution of the NSC's design issues within the established IPT process.[15] This solution was proposed notwithstanding the Systems Directorate's assertion that the IPT process had been ineffective in dealing with these issues in the past.

[13] Memorandum outlining G-D/G-S Roles and Responsibilities, dated June 28, 2001.
[14] Deepwater Program Management Plan, dated December 1, 2003.
[15] Memorandum from the Deepwater PEO to the Assistant Commandant for Systems, dated April 1, 2004.

Since the Assistant Commandant for Systems' recommendation that NSC production be delayed until the resolution of design concerns was achieved, the Coast Guard has issued four work orders, i.e., Delivery Task Orders (DTOs), authorizing the expenditure of more than $406 million for the production and deployment of NSCs 1, 2, and 3. Table 2 shows the nature and cost of the four DTOs issued by the Coast Guard since March 29, 2004.

Table 2 – Delivery Task Orders (DTOs) Authorizing Expenditures for Long Lead Materials,[16] Production, and Deployment of NSCs 1-3

DTO Number	Description of Work	Date of Issuance	Cost
0030BC	Production and Deployment of NSC 1	6/22/04	$140,193,618
0030CA	Long Lead Materials for NSC 2	10/19/04	$56,002,498
0030CC	Production and Deployment of NSC 2	1/3/05	$144,722,038
0030CB	Long Lead Materials for NSC 3	5/5/06	$65,737,197
		TOTAL	**$406,655,351**

Source: U.S. Coast Guard

On January 4, 2005, one day after the production and deployment DTO for NSC 2 was issued, the Systems Directorate sent a second memorandum to the Deepwater Program Office. The purpose of the memorandum was to advise senior Deepwater Program management: (1) that no resolution of NSC design issues had been achieved through the Deepwater IPT process; (2) that several previously identified NSC design deficiencies remained unresolved; and (3) of the Systems Directorate's recommendations for moving the process forward. One of the recommendations called for the Coast Guard to contract with Carderock to conduct a third independent technical assessment of the NSC's structural design. (See Appendix I)

[16] Long Lead Materials refers to the ordering and pre-fabrication of materials required during the asset production phase.

U.S. Navy Design Concerns

In March 2005, two months after receipt of the System Directorate's latest recommendation, but more than 27 months after first being advised of the design deficiencies, the Deepwater Program Office contracted with the U.S. Navy[17] to conduct a fatigue assessment of the NSC's design, emphasizing the Coast Guard technical experts' specific areas of concern. Final results of the Navy's assessment that were published in August 2006 validated most of the Systems Directorate's concerns by determining that, *"there are several areas of concern that have insufficient fatigue strength to endure 30 years of operation in the General Atlantic."* [18] (See Appendix J) This is a significant performance shortcoming given the Deepwater contract's requirement that the NSC be capable of operating for 30 years (6,900 lifetime underway days) in both Caribbean (General Atlantic) and the more severe Gulf of Alaska (North Pacific) sea conditions.

The Navy's analyses also raised additional questions about the structural viability of the NSC's hull. Specifically, the Navy determined that the NSC's hull girder has insufficient fatigue strength to carry bending loads for 30 years when operating in either the General Atlantic or North Pacific regions. As a result, the Navy noted that the Coast Guard might need to make structural modifications to, or impose operational limitations on, the NSC in order to ensure adequate fatigue life.

Coast Guard Technical Authority Within the Deepwater Program

The Deepwater contract gives the Systems Integrator the authority to make all asset design and configuration decisions necessary to meet system performance requirements. This condition allowed ICGS to deviate significantly from a set of cutter design standards originally developed to support the Coast Guard's unique mission requirements, and ICGS was further permitted to self-certify compliance with those design standards. As a result, the Coast Guard gave ICGS wide latitude to develop and validate the design of its Deepwater cutters, including the NSC.

Conversely, the Coast Guard chose to limit the technical oversight role of the Systems Directorate on Deepwater to providing *"expertise and credible advice in core integrated engineering and logistics competencies."* (See Appendix K) However, the Deepwater contract does not require that ICGS or its subcontractors accept or act upon the advice of the Coast Guard's designated technical experts. As a result of this relationship, the Coast Guard is limited in its ability to exercise technical oversight over its assets acquired

[17] Naval Surface Warfare Center, Carderock Division.

[18] The Navy had previously provided the Coast Guard with a summary of its findings during a preliminary briefing to Deepwater Program officials that occurred on December 2, 2005.

under the Deepwater contract. This, in our opinion, is the primary factor contributing to the inclusion of the structural deficiencies that currently compromise the NSC's operational viability.

In contrast to the Coast Guard's approach, the U.S. Navy retains technical authority and accountability over the design and construction of its ships through the institution of Technical Warrant Holder (TWH) authority. Specifically, Naval Sea Systems Command (NAVSEA) Instructions state:

> *"Technical Warrant Holders are subject matter experts. Within the defined technical areas being warranted they are responsible for establishing technical standards, entrusted and empowered to make authoritative decisions, and held accountable for the technical decisions made."*

TWHs ensure that the technical aspects of Navy asset designs are given independent consideration by providing technical authority that is separate from program authority for cost, schedule, and performance. Navy surface asset Program Managers yield to TWH decisions on technical issues and must secure TWH approval for design changes. Efforts of the Coast Guard's technical experts to resolve their long-standing concerns with the NSC design were thwarted because they lack a similar degree of authority on Deepwater.

Coast Guard Permitted Deviation From Established Design Standards. In 1999, the Coast Guard and the American Bureau of Shipping (ABS)[19] signed a Memorandum of Agreement (MOA) to jointly develop standards that would govern the design, construction, and certification of all cutters acquired under the Deepwater Program. (See Appendix L) These standards were intended to ensure that competing industry teams developed Deepwater proposals that met the Coast Guard's unique performance requirements.

Prior to the June 25, 2002, contract award, the Deepwater Program Office provided these design standards to the competing industry teams. Based on their feedback, the Coast Guard converted 998 (85%) of the 1,175 cutter design standards to *"guidance"* and permitted the industry teams to select their own alternative standards without the need for Coast Guard approval. However, the Coast Guard did not incorporate a contractual mechanism to ensure that those alternative standards met or exceeded the original *"guidance"* standards that it developed with ABS. This allowed the competing teams to select potentially ill-defined or inappropriate cutter design criteria that could be inconsistent with the MOA's original intent.

[19] ABS is a member of the International Association of Classification Societies. Classification societies are organizations that establish and apply technical standards in relation to design, construction, and survey of marine-related facilities, including ships and offshore structures. ABS is an independent, self-regulating body that develops classification rules contributing to the structural strength and integrity of essential parts of ships' hulls and appendages.

Coast Guard Allowed the Contractor to Self-Certify Compliance With Standards. The Coast Guard and ABS also initially specified a certifying agent for each standard to ensure that all cutters would be objectively evaluated for compliance. However, the Coast Guard ultimately allowed the competing industry teams to determine the certifying entity for any non-ABS standards it selected and, to the extent that it was permitted, ICGS elected to self-certify compliance with these standards.[20] This decision to permit contractor self-certification contrasts sharply with the intended role of an independent certifying authority, as articulated in the Deepwater contract:

> *"The role of the certification agent is to serve as an independent agent who verifies that the contractor has demonstrated compliance with the applicable standards."*

U.S. Navy and classification community subject matter experts expressed similar opinions, that, *"self-certification is no certification."* By allowing contractor self-certification, the Coast Guard eliminated yet another oversight tool for ensuring that cutter designs developed under the Deepwater Program would meet both contractual and Deepwater mission performance requirements.

Deepwater IPTs Fail to Resolve NSC Structural Design Concerns. Beginning shortly after contract award, Coast Guard technical experts raised concerns about deficiencies in the NSC structural design, but were unable to resolve them through the formal IPT process that was established to make all Deepwater design and construction decisions. The Coast Guard technical experts assigned to the NSC IPT and its component sub-IPTs reported that their efforts to initiate collaborative discussions were repeatedly and summarily closed-off by the ICGS-designated IPT chairpersons. This assertion is reflected in both the March 2004 and January 2005 memoranda from the Systems Directorate to the Deepwater Program Office. (See Appendices F and I)

The Government Accountability Office (GAO) has also raised concerns about the Deepwater IPT process. In June 2005, GAO testified before the U.S. Senate that the Coast Guard had achieved *"mixed success"* in its efforts to improve IPT effectiveness as the primary tool for overseeing the contractor and managing the program.[21] An earlier GAO report cited comments in Deepwater monthly program assessment reports made by Coast Guard officials who were involved in a number of different IPTs. While these comments reflect individual opinions and not necessarily the views of Deepwater Program management, they indicate that a degree of customer

[20] According to the Deepwater Surface Statement of Objectives: *"The contractor shall ensure all standards of the performance specification and cutter specific certification matrix are certified either by self-certification or by an independent agent, except that the contractor shall use ABS to certify compliance with ABS standards."*

[21] *Coast Guard: Preliminary Observations on the Condition of Legacy Deepwater Assets and Acquisition Management Challenges* (GAO-05-651T), June 2005.

dissatisfaction with the Deepwater IPT process existed. Table 3 contains a sample of Coast Guard members' observations made between June 2002 and December 2003 regarding the performance of Deepwater IPTs.

Table 3 – GAO Excerpts: Coast Guard Observations Regarding the Performance of Deepwater IPTs
• *"Because of aggressiveness of schedule, team development and collaboration have been negatively affected"*
• *"Team is making progress, but most other teams are not yet productive. Team leaders are challenged by intense pace of work needed to keep up with asset implementation plan."*
• *"High demands and limited resources inhibit commitment to collaboration."*
• *"Team progress is slowed by ineffective collaboration, resulting in missed milestones."*
• *"Limited collaboration in addressing design and production issues."*
• *"Demands on limited personnel resources have restricted collaboration in addressing some items in contract data requirements list in a timely fashion for the 123-foot cutter."*
• *"Team has been unable to resolve some comments in a timely fashion. Human resources within the team are taxed due to multitasking."*
• *"There has been a lack of participation by some of the team members."*
• *"Meeting minutes, decisions, and such have not been documented as outlined in the IPT charter. Important items and risk mitigation plans are not being consistently addressed, tracked, and resolved in a timely manner."*

Source: *Contract Management: Coast Guard's Deepwater Program Needs Increased Attention to Management and Contractor Oversight* (GAO-04-380), March 2004.

In April 2006, the GAO reported that Coast Guard had taken steps to hold the Systems Integrator more accountable for improving the effectiveness of the IPTs. These actions included changing the award fee measures "to place additional emphasis on the Systems Integrator's responsibility for making the IPTs effective. Award fee criteria now incorporate the administration, management commitment, collaboration, training, and empowerment of these teams." However, the GAO also reported that a separate recommendation it made to strengthen IPTs was not fully implemented by the Coast Guard due to a lack of collaboration among the major subcontractors.[22]

[22] *Changes to Deepwater Plan Appear Sound, and Program Management Has Improved, but Continued Monitoring Is Warranted,* (GAO-06-546), April 2006.

Deepwater Award Term Decision Assessment

On May 19, 2006, the Coast Guard announced its decision to award ICGS an extension of the Deepwater contract for 43 out of a possible 60 months for the next award term beginning on June 26, 2007. (See Appendix M) According to the Coast Guard, the Award Term decision was based on its assessment that ICGS's overall performance during the first 42 months of the Deepwater base contract period warranted a *"Good"* rating.[23] However, the Coast Guard's assessment only included those Deepwater assets and capabilities that ICGS actually delivered during the base contract evaluation period, not those under development, such as the NSC.

This is a significant shortcoming given the costs of the NSC and the larger operational role it plays in supporting the Deepwater mission. For example, as a key component of ICGS' Deepwater *"system of systems"*, the NSC acquisition accounts for approximately $2.9 billion, or nearly 12% of the Deepwater budget.[24] Because this figure does not include the costs to mitigate the NSC's structural design deficiencies, any costs resulting from the effects of Hurricane Katrina, or the final cost of any current or future REAs submitted by ICGS, the NSC acquisition, as a percentage of the overall Deepwater budget, could further increase.

The NSC is also intended to be the Coast Guard's most technologically advanced class of cutter and will typically deploy with multi-mission cutter helicopters and vertical unmanned aerial vehicles. The NSC structural design and performance deficiencies that were identified and validated during the 42-month evaluation period raise serious questions about ICGS' ability to deliver cutters fully capable of supporting the Coast Guard's Deepwater mission and, therefore, these realities should have been considered in the Deepwater award-term decision-making process.

Documentation Supporting Key Deepwater Decisions

The Coast Guard did not consistently document key Deepwater decisions impacting the design and construction of the NSC, as required by the Deepwater Program Management Plan (PMP) and mandated in the SAM waiver. As a result, we could not determine the thoroughness of the analyses underlying the Deepwater PEO's decision to proceed with NSC production against the written advice of the Assistant Commandant for Systems. We also could not determine the role of senior Coast Guard's leadership in any debate preceding this decision, or the extent to which it was aware of the long-standing concerns of its technical experts regarding the NSC's design.

[23] The performance evaluation period was from June 25, 2002, through December 31, 2005.
[24] Per the Revised Deepwater Implementation Plan, dated August 29, 2005.

Documentation of IPT Meetings. The Deepwater PMP requires that all major Deepwater decisions made within IPTs are to be documented to indicate the context, methodology, and purpose, as well as the information and rationale applied, to make the decision. According to the PMP, non-consensus decisions should be identified and dissenters provided the opportunity to include their opinions in the decision documentation. We requested a copy of the minutes for all NSC IPT meetings, including those where the NSC design and performance issues were discussed or resolved. The minutes of NSC IPT meetings that occurred between August 2002 and September 2005 were often incomplete and did not properly support NSC program and resource allocation decisions. As a result, the extent to which the NSC design and performance issues were debated within the NSC IPT could not be verified.

Rationale Behind NSC Production Decision. The Deepwater Program was granted a partial waiver from adhering to SAM requirements. However, Deepwater was not exempted from meeting *"the fundamental requirements of SAM,"* including the need for program management to keep the Commandant and Vice-Commandant fully briefed on the progress of the project, and to ensure that final project documentation was either equal to or better than that required by SAM.

On September 1, 2005, we first asked the Coast Guard to provide all documentation associated with its decision to authorize production of the lead NSC. The purpose of our request was to determine the rationale or business case underlying the Coast Guard's decision to move forward with NSC production against the written advice of its Assistant Commandant for Systems. The Coast Guard acknowledged that no formal cost/benefit analyses had been conducted prior to authorizing production of NSC 1, but explained that the primary reasons for proceeding were its uncertainty regarding the validity of the concerns raised by its technical experts and the impact that such a delay could have on project cost and schedule.

We also sought these records to determine the extent to which the Commandant, Vice-Commandant, and Chief of-Staff were aware of or were involved in decisions impacting the design, construction, and deployment of the NSC. It was not until our August 8, 2006, exit conference that the Coast Guard provided any substantive documentation in response to our initial request. However, this documentation did not indicate that these most senior members of the Coast Guard's leadership were aware of, or understood the full extent of, the NSC design and performance debate prior to a December 8, 2005, briefing by the Deepwater Program Office.

The absence of complete records to support key acquisition decisions limits the ability of those with oversight responsibility – the Congress, the department, senior Coast Guard leadership, and the OIG – to fully understand the circumstances, conditions, and rationales underlying these decisions. In

addition, documentation supporting key decisions provides transparency of information and can lead to self-correcting behavior. To this extent, the Coast Guard must ensure that the basis for all key decisions associated with the acquisition of assets acquired under the Deepwater Program are fully, consistently, and accurately documented.

Office of Inspector General Access to Personnel and Documentation

We encountered resistance from the Coast Guard and ICGS in our effort to evaluate the structural design and performance issues associated with the NSC. In the case of the Coast Guard, responses to document requests were either delayed or incomplete, while both the Coast Guard and ICGS attempted to impose conditions on our authority to conduct private interviews with their personnel. While we were eventually able to conduct confidential interviews with personnel assigned to the Coast Guard's Systems Directorate, efforts to obtain access to all Coast Guard and contract personnel remain unresolved. Such behavior by an auditee is contrary to the Inspector General Act of 1978,[25] as amended, and inconsistent with the intent of DHS Management Directive 0810.1. (See Appendix N) Resistance to legitimate inquiries by our office cannot and will not be tolerated, as we need to ensure the timeliness and completeness of our audits, inspections, and investigations to fulfill our statutory mission and to avoid imposing limitations on the scope of any future reviews.

Access to Coast Guard Personnel and Documentation. During the course of this audit, the Coast Guard challenged our request for unfettered access to its active duty and civilian employees assigned to the Systems Directorate. Specifically, the Coast Guard requested: (1) that all interview requests be submitted to its Office of Budget and Programs (CG-82); (2) that we provide a description of the nature and subject of topics to be discussed in advance; (3) that CG-82 staff be permitted to attend these interviews; and (4) that Coast Guard personnel report all contacts with our office to their respective supervisors.

Additionally, Coast Guard interviewees were not permitted to provide documents directly to our office unless they were first submitted to CG-82

[25] The Inspector General Act of 1978, Pub. L. 95-452, 92 Stat. 1101, as amended, codified in 5 U.S.C.A. App. 3, provides that each Inspector General is authorized, "to have access to all records, reports, audits, reviews, documents, papers, recommendations, or other material available to the applicable establishment which relate to programs and operations with respect to which that Inspector General has responsibilities under this Act…," 5 U.S.C.A. App. 3 § 6(a)(1), and to "request such information or assistance as may be necessary for carrying out the [Inspector General's] duties and responsibilities." Id. § (a)(3). The statute further provides that, "Upon request of an Inspector General for information or assistance under subsection (a)(3), the head of any Federal agency involved shall, insofar as is practicable and not in contravention of any existing statutory restriction or regulation . . . furnish to such Inspector General . . . such information or assistance." Id. § 6(b)(1).

for review and approval. Systems Directorate personnel sought advice from Coast Guard legal counsel because they were concerned about their ability to provide us with information and documentation in confidence. Coast Guard counsel subsequently briefed Systems Directorate personnel on whistleblower protections and in doing so, expressed an opinion that the ground rules imposed by CG-82 were in violation of the employees' rights to meet with us and respond to our requests in confidence.

Because the Coast Guard's demands were hindering our audit efforts, on September 28, 2005, we suspended all fieldwork on the NSC audit until these issues could be resolved. We contended and continue to contend, that the Coast Guard's attempts to impose conditions on our authority violated both the Inspector General Act of 1978 and DHS Management Directive 0810.1 by unreasonably restricting our access to any information, documentation, and personnel we deemed necessary to perform our oversight role within the department.

On October 21, 2005, the Coast Guard's Chief of Staff (G-CCS) issued a memorandum temporarily suspending CG-82's role in reviewing and organizing audit-related documentation requested by our office. The memorandum also suspended the requirement that CG-82 personnel be present at our interviews. However, this guidance only applied to the participation of a specific division within the Systems Directorate in the current NSC audit. It also did not apply to any other Coast Guard personnel or to future OIG audits, nor did it provide any guidance on whistleblower protection. (See Appendix O)

We also experienced difficulties obtaining timely, complete, and accurate documentation directly from CG-82. For example, we requested a copy of a December 2005 briefing that Carderock presented to the Coast Guard detailing the preliminary results of its NSC structural analyses. At first, the Coast Guard responded by providing us with an internal briefing document that contained only selected portions of the Carderock analysis. Specifically, this internal document omitted several pages of technical information prepared by Carderock that described the individual NSC structural deficiencies, as well as all of Carderock's corresponding notations, in large red lettering, stating that the design of these elements was insufficient to support a 30-year service life. More than two weeks later, the Coast Guard provided us with a copy of the original Carderock briefing that we initially requested.

At another time, we obtained a May 2002 letter from the Coast Guard to ICGS describing, "a disappointingly large number of deficiencies and weaknesses for all factors evaluated" in its Phase 2 contract proposal, and referencing four enclosures to the letter in support of this statement. In response to our request for the four enclosures referenced in the original letter, the Coast Guard notified us that it were unable to locate them. On

another occasion, we requested copies of enclosures to a July 2002 letter from the Coast Guard to ICGS concerning preliminary NSC contract design issues that we obtained independently through the Integrated Product Data Environment (IPDE), the Deepwater Program's data management environment. The Coast Guard responded that it was unable to locate either the original letter we requested or the referenced enclosures within its own database: "We have searched the IPDE and paper files to find further letters and have not found any. Unfortunately, we have also not located a copy of what you referenced."

We are concerned with Coast Guard's inability or unwillingness to provide us with documentation necessary to support a thorough evaluation of the NSC acquisition or other Coast Guard programs or projects. Our concern is heightened by the fact that these document requests involved records that the Coast Guard should have kept on file. To date, issues regarding Coast Guard's cooperation and our access to information, documentation, and personnel for future reviews, remain unresolved.

Access to Contractor Personnel. We also experienced difficulty in obtaining access to ICGS personnel knowledgeable of the structural design and performance issues associated with the NSC. Specifically, ICGS maintained that we should comply with the audit access policies of its two Tier 1 subcontractors, Northrop Grumman Ship Systems and Lockheed Martin Corporation, and also established conditions applicable to our requests for documents or interviews. These ground rules purported to require that we make all such requests in writing through the Deepwater Program Office and the ICGS Liaison Team Lead, with a detailed description of the purpose of the request and topics to be addressed. ICGS also informed the Deepwater PEO that it was appropriate to have other ICGS or sub-contractor representatives present, including legal counsel, during our interviews. (See Appendix P) As a result, no formal interviews with ICGS or its contract personnel were conducted, thereby preventing us from taking into consideration their informed and relevant perspectives.

The impediments we experienced in obtaining access to personnel, information, and documentation associated with the NSC acquisition are unacceptable in light of the statutory mandates of our office; the severity of the NSC design and performance deficiencies; the importance of the NSC to the Coast Guard's national security and Deepwater missions; and the expenditure of billions of taxpayer dollars that are being invested in this critical acquisition.

Current Status of the NSC

NSC 1, USCG Bertholf, was christened on November 11, 2006, with final delivery to the Coast Guard scheduled for August 2007. NSC 2 is under construction, with final delivery scheduled for October 2008. According to the Revised Deepwater Implementation Plan of August 2005, delivery of NSCs 3 through 8 is currently scheduled to occur between 2009 and 2017.

Source: U.S. Coast Guard

Figure 2 – NSC 1 under construction at NGSS shipyard in Pascagoula, MS.

Conclusions and Recommendations

The NSC, as designed and constructed, will not meet the performance specifications described in the Deepwater contract. Specifically, the NSC's structure, due to design deficiencies, has insufficient fatigue strength to be deployed underway for 230 days per year over its 30-year operational service life under Caribbean (General Atlantic) or Gulf of Alaska (North Pacific) conditions as required by contract. Additionally, the structural modifications under development by the Coast Guard are also insufficient to meet the cutter's contractual operational capability requirement and will further increase the cost of the NSC acquisition.

The NSC's design and performance deficiencies are fundamentally the result of the Coast Guard's failure to exercise its technical and management oversight authority over the design and construction of the assets acquired under Deepwater. As a result, the Coast Guard lost an opportunity to resolve these issues in a timely and cost-effective manner.

Proceeding with the NSC acquisition may be unavoidable in light of the funds invested to date and the importance of the NSC to the Deepwater mission. Consequently, it is critical that any structural modifications made to the NSC be adequate to ensure that each of the cutters in this class meet all of the performance requirements outlined in the Deepwater contract.

Recommendations

To improve management oversight and accountability, we recommend that the Commandant, U.S. Coast Guard:

1. Develop and implement a plan to ensure the National Security Cutter is capable of fulfilling the operational profiles as defined in the Deepwater contract. The plan should include a detailed description of the modifications to be made, including any requests for waivers/deviations from the Deepwater performance specifications. In addition, the plan should include timelines**,** milestones, and quarterly reporting requirements outlining the progress being made, the identity of the organizational entities to be responsible for implementation, and any short- and long-term funding requirements.

2. Provide assurances that a solution to the cutter's structural design issues are fully developed and the costs associated with the solution are identified before issuing new NSC Delivery Task Orders for National Security Cutters 3 through 8.

3. Develop the policies and procedures necessary to empower the Assistant Commandant for Systems with greater, more formal technical authority to ensure that assets acquired under Deepwater meet all design and technical performance requirements.

4. Amend future Award Term decision criteria to include the cost, schedule, design, and performance evaluations of all assets under development, in addition to any Deepwater assets, platforms, or systems delivered during the evaluation period.

5. Ensure that the rationale underlying all key decisions associated with the design, construction, and implementation of all assets acquired under the Deepwater Program is formally documented and approved by senior management.

To improve contract management oversight and accountability, we recommend the Chief Procurement Officer, Department of Homeland Security, in coordination with the Department's Office of General Counsel:

6. Ensure that all future Department contracts, including those governing the Deepwater acquisition, contain terms and conditions that clearly stipulate the Department of Homeland Security, Office of Inspector General's right of unfettered access to contract and subcontract documents and personnel, including private, confidential interviews, information, inter-office correspondence, and pre-decisional documentation.

Management Comments and OIG Analysis

U.S. Coast Guard Comment: *The Coast Guard has serious concerns with the DHS OIG's approach to reviewing and analyzing this major system acquisition. The report contains selective inclusion of documents that do not represent the most current, comprehensive, or technically accurate data. Consequently, the report's utility for program status analysis or program improvement is inherently limited. This statement presents the Coast Guard's position and addresses inaccuracies identified in this report.*

Specifically, the report:

1. *Incorrectly characterizes the operational profile requirement for the NSC;*
2. *Misunderstands the decisions regarding the NSC service-life issue;*
3. *Inaccurately characterizes cost data;*
4. *Illustrates the DHS OIG's lack of understanding of acquisition strategy utilizing Performance Based Contracts; and*
5. *Mischaracterizes the level of Coast Guard cooperation during the conduct of this audit.*

OIG Response: The conclusions and recommendations included in the final NSC report are the result of the analysis of information that we obtained as of November 21, 2006. We stand by our assertion that the facts, findings, and recommendations contained in the report are accurate.

The operational profile, service life, and cost data contained in the report was obtained as a result of extensive interviews of and briefings by active duty and civilian technical experts assigned to or contracted by the Coast Guard's Systems, Acquisition, and Operations Directorates, the Deepwater Program office, and the Commandant's Chief of Staff.

Our conclusions regarding the operational profile, service life, cost data, and structural design issues associated with the NSC are the result of analyses performed by naval architects, marine engineers, structural engineers, statisticians, and shipbuilding professionals with decades of experience designing, constructing, and operating Coast Guard cutters and naval combatants. These conclusions are not ours; our report simply documents what the Coast Guard's own technical experts, independent contractors, and the U.S. Navy have been trying to tell them in emails, memoranda, briefings, and inter-office correspondence dating back to December 2002.

The Coast Guard had six different opportunities to review drafts of this report and provide additional evidence relevant to the NSC acquisition. All comments that were accompanied by sufficient and relevant data were incorporated into the final report as appropriate.

Further, the IG met with the Deepwater Program Executive Officer, the current Assistant Commandant for Systems, the Coast Guard Commandant, and the Secretary on October 3, 2006, to discuss the circumstances and conditions that led to the identification of structural deficiencies associated with the NSC. At no time during these discussions did the Commandant or his senior staff indicate to the Secretary or the IG that they had any substantive problems with the facts as they were presented in the NSC report. On the contrary, a substantial portion of the meeting was spent discussing the Coast Guard plan to mitigate the effect the NSC structural deficiencies could have on the cutter's ability to perform the Deepwater mission.

U.S. Coast Guard Comment: *The Coast Guard is also concerned about the DHS OIG's failure to seek the necessary expertise to aid in fully evaluating the complex technical issues, such as the specialized topic of fatigue life of a structural component of a cutter, in this report. Established best practices, contained in Generally Accepted Government Auditing Standards (GAGAS), state that audit organizations may need to employ or hire specialists who are knowledgeable, skilled or experienced in certain subject matter areas like engineering to aid and assist audit teams (GAO-03-673G).*

The DHS OIG did not follow these accepted best practices when conducting this audit. Additionally, an independent engineering organization could have served as the audit's subject matter expert, saving valuable time for multiple staffs to explain engineering theory and practice to the in-house audit staff.

OIG Response: The NSC audit was conducted according to Generally Accepted Government Auditing Standards (GAGAS). The objective of our review was to determine the extent to which the NSC will meet the cost, schedule, and performance requirements contained in the Deepwater contract. It was not our intention to assess the cutter's technical design. The conclusions discussed in this report relating to the operational profile and fatigue/service life of the NSC, are the result of analyses conducted by the Coast Guard's own technical experts, shipbuilding industry professionals, and U.S. Navy personnel with decades of experience designing, constructing, and operating Coast Guard cutters or naval combatants. They are not our conclusions. Our report documents what the Coast Guard's own technical experts, independent contractors, and the U.S. Navy have communicated to the Deepwater Program Office, the Coast Guard's Chief of Staff, and the Commandant in emails, memoranda, briefings, and inter-office correspondence dating back to December 2002.

Further, the Coast Guard and the U.S. Navy's Surface Warfare Center (Carderock Division) have verified the structural design flaws originally documented in the Assistant Commandant for Systems' March 29, 2004, memorandum to the Deepwater Program Executive Officer (PEO). The

Coast Guard is currently developing a mitigation strategy based on the U.S. Navy's determination that the NSC's structure, as currently designed, provides insufficient fatigue strength to be deployed underway for 230 days per year over its 30-year service life under either Caribbean (General Atlantic) or Gulf of Alaska (North Pacific) sea conditions as required by the Deepwater contract.

U.S. Coast Guard Comment No. 1: ***[The OIG] Incorrectly characterizes the operational profile requirement for the NSC:***

This report states that:

> *"To mitigate the effects of these deficiencies, the Coast Guard intends to modify the NSC's design to support an operational profile of 170 to 180 days underway per year in the North Pacific region, lower than the 230-day performance standard required by the Deepwater Contract."*

The DHS OIG is incorrect. The Coast Guard has not lowered performance standards. Fatigue issues identified and addressed by the Coast Guard do not and will not impact the NSC's operational performance, nor will they require operational restrictions of any kind. The NSC performance standard is in accordance with Commandant's Instruction (COMDTINST 3100.5A), by which all cutters are managed. This instruction specifically dictates what is meant by Underway Days versus Days Away From Home Port (DAFHP). The DAFHP requirement for the NSC is 230 days. The 230 days consists of: 185 days underway (165 Mission Days and 20 Average Transit Days) and 45 in-port logistics DAFHP. Although the Performance Specification (P-Spec) contains minor ambiguities, the Coast Guard and Integrated Coast Guard Systems (ICGS), the Deepwater Program's systems integrator, are working in accordance with COMDTINST 3100.5A. It is understood by all parties that the 230-day requirement is Days Away From Home Port (DAFHP), not Underway Days.

OIG Response: We stand by our assertion that the Coast Guard has adopted an NSC operational profile of 170 to 180 days underway per year. The NSC's performance standards, as stated in the Deepwater contract, remain unchanged at 230 days underway per year, on average, in the General Atlantic and North Pacific regions over the cutters' 30-year service life. However, the Coast Guard has adopted an NSC operational profile of 170 to 180 days underway per year, on average, in the Pacific Ocean north of the Equator, as the basis for the structural design modifications that are needed to enable the NSC to meet the performance standards as stated in the Deepwater contract. (See Appendix H) This decision could result in a design solution that prevents the NSC from the meeting the 230 days

underway requirement, thereby compromising its ability to meet future mission needs.

The Coast Guard's decision to base its modifications to the NSC on an operational profile of 170 to 180 days underway is a recent development. Prior to June 2006, the Coast Guard expected the contractor to deliver a cutter that met the 230 days underway requirement. For example, in March 2006, the NSC Program Manager and Deputy Surface Program Manager both communicated to ICGS that 230 days underway is a contractual requirement. In April 2006, the NSC Contracting Officer also acknowledged the 230-day performance requirement when he advised ICGS by letter that the analysis conducted by the Coast Guard has been based on the Deepwater contract requirement that states, "The ship is expected to be underway 230 days in a average year." More recently, the NSC Program Manager briefed the Commandant in May 2006 that areas of the NSC design were "inadequate for a 30-year ship service life, based on performance requirements for 6,900 lifetime underway days." He also informed the Commandant that the NSC design was inadequate based on ICGS's "20% Reduced NSC Utility position of 5,550 lifetime underway days" (or approximately 184 days underway per year). (See Appendix G) All of this changed in June 2006 when the Coast Guard determined that designing the NSC to operate for 230 days, each year would lead to "an overly conservative design" and adopted a less capable operational profile on which to base the NSC structural modifications. (See Appendix H)

According to the Coast Guard's response to this NSC report, it has chosen to reinterpret the Deepwater contract rather than hold the contractor accountable for the 230 days underway requirement of the contract. Specifically, the Coast Guard has, in effect, substituted the term Days Away From Homeport (DAFHP) in place of "underway" in the contract. According to COMDTINST 3100.5A, DAFHP is defined as, "All days in which the cutter is not in its homeport to grant normal liberty." (See Appendix Q) The homeport is defined as an area within a 90-minute automobile driving time from a cutter's permanent berth (approximately 75 miles). As a result, the NSC could be moored in a port other than its homeport indefinitely, but never spend one day underway at sea. This raises concerns about how the Coast Guard intends to evaluate contractor performance as it relates to the NSC, as well as the Fast Response Cutter (FRC) and Offshore Patrol Cutter (OPC).

By adopting the DAFHP interpretation, the Coast Guard is also able to:

- downplay the seriousness of the structural design deficiencies associated with the NSC and their impact on the operational capability of the NSC fleet;

- minimize the number, size, scope, and cost of the "structural enhancements" needed to bring the NSC up to minimum Deepwater performance standards;
- reduce the likelihood that operational restrictions will have to be imposed on NSCs 1 and 2 if they are deployed to the North Pacific as originally planned; and,
- redefine downward the cutter performance specifications governing the Fast Response and Offshore Patrol Cutters acquisitions.

We are concerned that the Coast Guard has chosen to pursue a strategy similar to one employed by ICGS in responding to the Coast Guard's own concerns about the NSC's structural design. Specifically, in its May 2006 briefing to Commandant, the NSC Program Office described ICGS' level of participation in partnering with the Coast Guard to achieve NSC design solutions as follows: "Energy focused on deflecting Government technical analysis and reinterpreting contract requirements." In the current case, the Coast Guard's approach to addressing the NSC's structural deficiencies has been to reinterpret established performance measurements rather than hold the contractor accountable for meeting the terms of the performance-based Deepwater contract.

Regardless of the operational profile for days underway that the Coast Guard decides to use for NSC operations, it is still entitled to an NSC "designed to support an operational scenario of up to 230 days underway per year" as stipulated in the Deepwater contract.

U.S. Coast Guard Comment No. 2: ***[The OIG] Misunderstands the decisions regarding the NSC Structures Issue***

The Coast Guard opinion is that decisions regarding structures and production have been well-considered and were prudent and correct. The NSC structure does not pose an immediate concern; rather, it presents a risk that it may need some structural repairs during its service life. Any known or suspected fatigue concerns will be addressed when the design change now being developed is incorporated on the NSC. In the end, the NSC will be designed to achieve a 30-year fatigue life.

OIG Response: The Coast Guard's opinion that decisions regarding [NSC] structure issues and production were well considered and prudent, is not supported by the facts. The Coast Guard failed to formally document the cost, schedule, and performance rationale underlying its decision to proceed with NSC 1 production against the written advice of its Assistant Commandant for Systems. This is a serious shortcoming given the Assistant Commandant for Systems' statement in a memorandum that several of these structural design problems compromised "…the safety and viability of the

[NSC] hull, resulting in structural failure and unacceptable hull vibration." (See Appendix F)

The former Assistant Commandant for Systems, who was also known as the Coast Guard's "Chief Engineer," had served as assistant engineer, engineering officer, and executive officer aboard the Coast Guard Icebreaker *Burton Island*, high endurance cutter(s) *Jarvis* and *Rush*. He also holds 4 masters degrees, including a master's degree in Naval Architecture and Marine Engineering and industrial and operations Engineering from Rensselaer Polytechnic Institute; a masters degree in Business Administration, and a masters degree in National Security and Strategic Studies from the Naval War College. In our view, the Assistant Commandant for Systems was as knowledgeable as anyone in the Coast Guard regarding the adequacy of the NSC's structural design. For these reasons, we believe the Commandant and the Deepwater PEO should have been far more responsive to his concerns.

The Coast Guard response also contends that the NSC structure does not pose an immediate concern but rather it presents a risk that it may need some structural repair during its service life. However, the response neglects to mention that the NSC, as currently designed, has several key structural components with a calculated service life of less than 3 years that require immediate remediation. This is especially true with regard to NSCs 1 and 2. (See Appendix G) It is not clear whether NSCs 1 and 2 can be fixed given their stage in construction. What is clear, however, is that any plan developed by the Coast Guard to resolve these structural deficiencies can be expected to have a substantial cost, schedule, and performance implications, the extent to which will be dependent on the Coast Guard's final interpretation of the fatigue life standards for the NSC.

U.S. Coast Guard Comment: *During the Coast Guard's review of the NSC's design from 2002 to 2004, concerns were raised about certain aspects of the ship's structure that could prevent it from achieving its required 30-year service life. Specifically, Coast Guard and independent technical experts questioned whether some of the cutter's structural components would experience fatigue[26] damage prior to the service-life objective, a critical consideration given the extended, high-tempo operations expected of the NSC.*

The IDS Program Office has been working with Assistant Commandant for Engineering and Logistics (designated as CG-4), the Coast Guard's

[26] Structural fatigue is a result of cyclic loading. In the case of ship structures, fatigue stresses from these loads develop in the hull girder as it hogs (arches) and sags while moving through waves. After time, these stresses can lead to cracks in the ship's structures. How and where the ship is operated can impact fatigue life; if a ship regularly operates in high sea states, for example, especially at higher speeds, greater stress is imposed on the hull cumulatively.

technical authority, to address structural concerns throughout the design development and production process. The Program Executive Officer (PEO) for the IDS (designated as G-D) did not ignore the concerns of CG-4, but rather used his authority as the acquirer to require ICGS to perform due diligence in developing the structural details, which resulted in numerous improvements to the structural design. In fact, many structural issues presented to IDS in the RADM Brown memo were incorporated into the NSC design prior[27] to the issuance of the Delivery Task Order (DTO) 0030BC, which authorized and funded ICGS to begin production of the first-in class NSC. Regarding those remaining areas of concern identified by CG-4, G-D requested Naval Surface Warfare Center, Carderock Division (NSWC-CD) to conduct an independent analysis of the structural adequacy of NSC critical areas using a statement of work tailored by CG-4. The IDS managers decided to address the remaining NSC structural issues in parallel with the NSC design and construction as a lower-risk alternative when compared to waiting for resolution of the structural issues and then starting design and construction. Only after the preliminary results of the NSWC-CD study became available in December 2005, during the first progress review, did the IDS program have additional actionable information upon which further corrective action could be considered.

After thorough review[28], and to remove any lingering doubts, the Coast Guard determined that it is in the government's interest to increase the fatigue tolerance of the NSC to ensure that the ship's basic structures will meet its projected 30-year service life. Engineering changes to address the desired structural enhancements, developed in collaboration with the U.S. Navy and other naval engineering experts, were approved by the Deepwater Program's technical authority, the Engineering and Logistics Directorate at Coast Guard Headquarters. To improve the current design, a Request for Proposal (RFP) for changes to be implemented on NSC #3 was issued to ICGS.

[27] Structural enhancements such as the following were incorporated into the design of NSC #1 prior to the beginning of ship construction: Material upgrades from 51 ksi to 80 ksi yield for deck stringer and side shell shear strakes, thickness and material upgrades for deck strakes near openings, increased thickness of plates and structure under reduction gears resulting from vibration and finite element analyses of the hull structure and propulsion foundations, utilization of improved fatigue compensation for selected penetrations as specified by the USN for extended hull life, fatigue analysis using USN Fatigue Guidance for explicit fatigue life design determination, independent analyses to confirm and revalidate specific areas of concern raised by the USCG, increased superstructure scantlings for buckling strength and stress concentrations and revised geometry, scantlings and details associated with side shell fashion plates as well as the horizontal fashion plates in way of the re-entrant corners of the superstructure.

[28] Agencies that participated in the review of the NSC's design (at the Coast Guard's request) included subject matter experts from the Coast Guard Program Executive Office Integrated Deepwater System (PEO IDS), the Engineering and Logistics Directorate at Coast Guard Headquarters (CG-4, the Deepwater Program's technical authority), and the Coast Guard's Engineering and Logistics Center. The Coast Guard also contracted with the U.S. Navy's Naval Sea Systems Command's Naval Surface Warfare Center, Carderock Division for an independent review of the NSC design. Integrated Coast Guard Systems (ICGS, a joint venture of Northrop Grumman and Lockheed Martin and the Deepwater Program's lead system's integrator) similarly conducted a review, and a private engineering firm (Designers & Planners) also made an assessment of the NSC design with regard to fatigue.

A variety of methods are commonly used to enhance the strength of a ship's structure (e.g., treatment of welded joints, material upgrades, increased thickness of plates and structures, revised geometry for components). Specific details of the structural configuration changes needed to implement the design enhancements will be finalized when ICGS reviews the Coast Guard's recommendations, identifies possible alternatives, and develops detailed design drawings of the changes. Structural enhancements to improve the NSC's fatigue life need not be done immediately. Hulls #1 and #2 will have much of the work done after delivery. NSC hulls #3 through #8 will incorporate design changes during construction. Any known or suspected fatigue concerns will be addressed when this design change is incorporated on the NSC. In the end, the NSC will be designed to achieve a 30-year service life.

OIG Response: We are concerned that the Coast Guard's former Assistant Commandant for Systems, as the Coast Guard's "Chief Engineer," was unable to convince the Deepwater PEO that significant problems persisted with the structural design of the NSC and that "several of these problems compromise the safety and viability of the [NSC] hull." These concerns, which had been independently verified by shipbuilding industry experts, were spelled out in the Assistant Commandant for Systems' March 29, 2004, memorandum to the Deepwater Program Executive Officer. Further, the memorandum explicitly recommended that the Deepwater PEO hold the impending task order for the production of NSC 1 in abeyance until a resolution to the structural design problems could be achieved. Despite these warnings, the Coast Guard went ahead with the issuance of four work orders, i.e., Delivery Task orders (DTOs) authorizing the expenditure of more than $406 million for the production and deployment of NSCs 1, 2, and 3. We remain concerned that: (1) the construction of NSCs 1 and 2 may be too far along in the construction process to resolve these structural deficiencies; (2) the Coast Guard may have to impose operating restrictions on NSCs 1 and 2 should these vessels be deployed to the Gulf of Alaska (North Pacific) region as is currently planned; and (3) construction of NSCs 4-8 will commence before all outstanding NSC performance standard issues, i.e., fatigue life requirements, etc., are fully-resolved.

U.S. Coast Guard Comment: *There are several methods which the naval engineering community could use to predict a ship's service life. Choice of methodology, entering arguments and assumptions, and desired margins greatly influence the outcome and lead to differing conclusions. RADM Brown's memo 9050 of 29 March 2004 noted that "… even the best engineers can disagree on data, and in their analyses, conclusions and recommendations." Production decisions were made with these thoughts in mind as well as other programmatic factors such as cost, schedule and performance.*

OIG Response: We agree with the Coast Guard that even the best engineers can disagree on data, and in their analyses, conclusions, and recommendations. However, in this case, the Deepwater PEO, who was neither a naval architect nor a structural engineer, repeatedly ignored the advice of technical experts with decades of experience designing, constructing, or operating cutters and naval combatants. Further, ICGS and Northrop Grumman Ship Systems (NGSS) have yet to publicly acknowledge that there are any problems associated with the NSC design despite pervasive evidence indicating otherwise.

U.S. Coast Guard Comment: *The NSC program manager provided DHS OIG a very succinct summary of the rationale leading to the decision to award the NSC #1 production DTO. The summary indicated that "no formal Cost-Benefit Analysis" was conducted, but clearly laid out the decision factors based on the information that was available at that time. The NSC program manager specifically stated that "…pre-production activities were already underway in preparation for the start of construction (e.g., fabrication of jigs and fixtures, scheduled job orders issued throughout the yard, material ordered, labor assignments made)…any disruption of the normal production effort would have been very costly due to not only the direct increase in escalation and material handling costs from shifting the construction effort to the right, but the inevitable impact on the NSC and Navy shipbuilding programs within the yard resulting from changes to carefully planned and integrated material, labor, and facility assignments … if the independent analysis did provide conclusive evidence …of deficiencies in the structural details, the System Integrator would be responsible to correct them… given the uncertainty of the validity of … structural concerns and the certainty of the significant delay and disruption costs the Government would incur, as well as the real urgency of delivering NSC's to the fleet to replace rapidly-deteriorating legacy assets, the Program Office decided to proceed with production." The memorandum to award DTO 0030BC, from Mr. Gregory Giddens, COMDT, (G-Dd) to Ms. Cathy Martindale, COMDT, (G-ACS-6) of 22 June 2004 states; "I believe we have achieved a balance between the risk of moving forward and the risk of not moving forward."*

The decisions regarding NSC structures reflected more than simply the naval engineering perspective; rather, they also encompassed considerations of cost, schedule, and performance, as required by the PEO's charter.

OIG Response: We stand by our assertion that the Coast Guard failed to document key Deepwater decisions impacting the design and construction of the NSC. This was especially true regarding the Coast Guard's decision to go ahead with production of NSC against the written advice of its Assistant Commandant for Systems. While the Coast Guard provided us with the basic rationale underlying its decision to go ahead with production of NSC 1, it

was unable to provide a breakdown of the cost and schedule data to support its decision as required by the Deepwater Program Management Plan. Further, the Coast Guard has acknowledged to us that documentation of key Deepwater decisions was a problem and that no formal cost/benefit analyses were conducted prior to authorizing production of NSC 1. As a result, we could not determine the thoroughness of the analyses underlying the decision. We also could not determine the role that the Coast Guard's senior leadership, i.e., Commandant, Vice Commandant, and Chief of Staff, played in any deliberations preceding this decision, or the extent to which it was aware of the NSC design concerns outlined in the Assistant Commandant for Systems' March 29, 2004, memorandum.

We continue to believe that the absence of complete records to support key acquisition decisions limits the ability of those with oversight responsibility – the Congress, the department, senior Coast Guard leadership, and our office – to understand fully the circumstances, conditions, and rationales underlying these decisions. In addition, documentation supporting key decisions provides transparency of information and can lead to self-correcting behavior. It also provides the appropriate level of accountability for technical oversight of the Deepwater Program. To this extent, the Coast Guard must ensure that the basis for all key decisions associated with the acquisition of assets acquired under the Deepwater Program are fully, consistently, and accurately documented.

U.S. Coast Guard Comments No. 3: ***[The OIG] Inaccurately characterizes cost data:***

Cost data in the report inaccurately reflects the NSC #1 and #2 cost impacts associated with post 9/11 changes and government items. In November 2006 the table below was provided to the DHS OIG and specifically discussed in follow-on meetings. It indicates that the projected budget amount for the NSCs is approximately $960M for NSC #1 and #2. However, in the report, the DHS OIG labels a cost summary table as a "Coast Guard source" and indicates that the Coast Guard stated the project cost was approximately $775M. The Coast Guard believes the table below accurately breaks down and explains the associated cost elements for NSC #1 and #2.

Chart 1 using OMB Inflation of 1.85%			
(Dollars in Millions)	NSC #1	NSC #2	Total
June 02 Contract Proposal in 2002$ (A)	$322.20	$194.60	$516.80
Post 9/11 Changes and Government Items in 2002$ not in Contract Proposal of 2002 (B)	$144.16	$116.87	$261.03
Total before Inflation	$466.36	$311.47	$777.83
Inflate from 2002$ to 2006$ using 1.85% OMB Factor (C)	$35.50	$23.70	$59.20
Total Cost after adding in Government Items and Inflating by 1.85%	$501.86	$335.17	$837.03
Hurricane Katrina Amounts added in 2006 (D)			$123.00
Updated Total			$960.03
Notes:			
A. Only ICGS Costs			
B. ICGS Costs Plus CG Post 9/11 Changes necessitate by the Homeland Security Act and Government items such as Testing and Evaluation as well as other Full Operational Capability amounts.			
C.OMB required USCG to use a 1.85% inflation Factor			
D. Congress funded an additional $123M in FY2006 for Hurricane related costs for the NSC 1 and the NSC 2			

OIG Comments: The Coast Guard's response contends that the NSC cost data cited in our draft report inaccurately reflects the NSC costs incurred to date. We respectfully disagree. The cost data contained in our report was derived directly from a chart that was hand-delivered by the Coast Guard Commandant to the Inspector General during a meeting held on November 22, 2006. This cost data excluded the $302 million Request For Equitable Adjustment submitted by ICGS; the $123 million costs associated with Hurricane Katrina; and the cost of the "structural enhancements" to be made to the NSC. We did not include this cost data in our report because: (1) the Coast Guard is engaged in negotiations with ICGS over the amount of the REA and we did not want to compromise ongoing negotiations; (2) the Coast Guard was unable to document the NSC costs associated with Hurricane Katrina; and (3) negotiations between the Coast Guard and ICGS regarding the number, scope, and cost of the NSC structural enhancements were ongoing. It is expected that these costs will add hundreds of millions of dollars to the cost of the NSC. We remain concerned that these and other cost increases could result in the Coast Guard acquiring fewer NSCs or other air and surface assets under the Deepwater contract.

U.S. Coast Guard Comment No. 4: ***[The NSC Report] Illustrates the DHS OIG's lack of understanding of the acquisition strategy utilizing Performance Based Contracts.***

The IDS program is not a traditional acquisition approach. The contract embraces acquisition reform in an effort to curtail costs and maintain

schedule. Law and regulation[29] establish a preference for performance-based acquisition. Federal acquisition policies seek outcomes that are more competitive, entrepreneurial, and performance oriented. This approach gives industry the flexibility to achieve alternative options better suited to the government's needs.

The Deepwater Program is guided by a system-wide, performance-based acquisition approach. In addition to surface and aviation assets, the acquisition strategy recognizes that interoperability, integrated logistics support, human systems integration, and life-cycle considerations must be addressed at the inception of the program.

Best practices incorporated in the IDS program include the notion that the government's focus should be on performance – measurable results. Unlike past asset-for-asset replacement programs, the Coast Guard's contract with ICGS provided industry with specifications for the system-wide capabilities the Coast Guard needs to perform its IDS missions rather than specifications for specific assets (With the exception of the NSC, the Coast Guard did not specify or require any particular asset in the IDS system solution, let alone technical specifications.) This performance-based approach directly links mission requirements to industry solutions.

Nonetheless, the Coast Guard recognizes the imperative to keep the basic elements of the IDS acquisition program squarely in focus. Cost, schedule, and performance are the fundamental building blocks. It is our obligation to deliver assets and systems on or below cost, on or before schedule, and with at least the minimal threshold performance that the government has stipulated. While performance-based acquisition allows the Coast Guard some opportunities to gain value for the government above and beyond traditional methods, it does not mean we have abandoned those methods; the two are complementary.

The Deepwater Program, the largest acquisition in Coast Guard history, is fully committed to continuing process improvement as a learning organization. The Government Accountability Office framework for acquisition management is used to assess the program and identify areas where improvement is necessary. The Coast Guard recognizes the need for program management reforms to improve acquisition project execution and is proceeding with the sense of urgency to be expected from an agency whose core value is public service. A series of measures[30] is being aggressively

[29] Over the last decade and a half, innovators in Congress and the executive branch have reformed the laws and policies that govern Federal acquisition. Among the most important of these reforms are the Government Performance and Results Act of 1993, the Federal Acquisition Streamlining Act of 1994 (FASA), and the Clinger-Cohen Act of 1996.

[30] Business processes have been strengthened, new evaluation criteria have been developed for Deepwater's follow-on contract term, the primacy of Coast Guard technical authority has been reaffirmed; Coast Guard's chief engineer has been assigned greater responsibility to review ship designs, independent, third-party technical evaluations of industry's proposed designs for new assets are now required and regularly obtained, staffing at manufacturing facilities for

implemented to ensure more effective oversight, sound stewardship of taxpayer dollars, and timely delivery of much-needed assets.

OIG Response: The Coast Guard's comments that we lack an understanding of the acquisition strategy utilizing Performance Based Contracts are misinformed.

The Coast Guard's Integrated Deepwater System acquisition approach recognizes the need for a comprehensive, systemic solution to the complex challenges of upgrading existing assets and acquiring state-of-art ships and aircraft. The Coast Guard's performance-based acquisition strategy to address these challenges is, in our opinion, a good one. Partnering with the private sector adds fresh perspective, insight, creative energy, and innovation to the Coast Guard's effort to meet its multi-mission responsibilities. It shifts the focus from traditional acquisition models, i.e., strict contract compliance, into one of collaborative, performance-oriented teamwork with a focus on performance, improvement, and innovation.

Nevertheless, using this type of approach does not come without risks. To ensure that this partnership is successful, the Coast Guard must lay the foundation to oversee and assess contractor performance, and control costs and schedules. The Coast Guard has not yet laid that foundation, at least not fully.

Specifically, the Coast Guard's acquisition management capacity lacks the appropriate work force, business processes, and management controls for executing a major acquisition program such as the Integrated Deepwater System. Key positions are still being identified and filled. The Coast Guard is still trying to come from behind and create the organization needed to manage the program. That is why we believe the Coast Guard needs to proceed with caution as it moves forward with the implementation of the Integrated Deepwater System initiative. Expediency and urgency should not drive the acquisition; instead, the Coast Guard needs to ensure that it has the capacity to manage such an initiative. Then, and only then, can it provide assurances that it is being a good steward of the taxpayers' dollar.
Also, the Coast Guard needs to ensure performance management systems and processes are in place and functioning. The design flaws of the NSC, as well as the problems that the Coast Guard has experienced with the System Integrator's design of the Fast Response Cutters and the 123-Cutters, clearly demonstrate that improvements are needed. The Coast Guard needs to build the management and oversight capacity that will allow it to acquire the

Deepwater platforms is being increased to place a sharper focus on higher quality contract performance, we are filling vacancies in our own Deepwater workforce and improving its training, certification, recruitment, and retention and we have shifted more funding to program management activities.

assets it needs to accomplish its mission. Furthermore, the Coast Guard needs to build a performance management system that will ensure:

- Transparency – a clear roadmap on how the systems integrator plans to meet the Coast Guard's deepwater objectives.
- Visibility – a clear, open line of communications with all stakeholders on the progress of the initiative.
- Accountability – the means to determine, on a real time basis, what is working and what is not working.
- Oversight – including not only by the Coast Guard's technical and program management offices, but also by the OIG and the Congress.

U.S. Coast Guard Comment No. 5: ***[NSC Report] Mischaracterizes the level of Coast Guard cooperation during the conduct of this audit:***

While the Inspector General Act of 1978 provides that the IG is to have "access to all records, reports, audits, reviews, documents, papers, recommendations, or other material available," neither the Act nor DHS MD #0810.1 specifically stipulates the manner in which access to information is to occur.[31] *Instead, both the Act and MD #0810.1 direct that the IG and the audited agency conduct audits consistent with the standards issued by the Comptroller General of the United States.*

At the start of all reviews of Coast Guard programs by external audit organizations, the Office of Budget and Programs (CG-82) meets with the auditors and discusses the Coast Guard's policies and procedures with regard to audit protocol. The Coast Guard's audit procedures follow the guidelines established by the Government Accountability Office (GAO) within the Generally Accepted Government Auditing Standards (GAGAS). As stated above, the GAGAS provides the appropriate framework for all audits conducted by staff of an Inspector General's Office.

The GAGAS sets forth policies and procedures to assist auditors in obtaining data /information, scheduling meetings and interviews with appropriate staff, conducting follow up meetings and ensuring compliance with all requests. Equally important, it also helps to minimize the disruption to and administrative burden upon agencies being audited.

The Coast Guard has adhered to these procedures for several years, resulting in productive and successful audit efforts with teams from the GAO, the Department of Transportation Inspector General's Office (DOTIG) and the Department of Homeland Security Office of Inspector General (DHS

[31] Inspector General Act of 1978, §4(b)(1)(A), 5 U.S.C. App. 3 (Westlaw 2006).

OIG). These procedures have enabled the Coast Guard to assist audit teams, as well as Coast Guard program offices, during the conduct of numerous audits. The Coast Guard has a long history of cooperation with external audit organizations and uses these long-established audit management procedures to ensure employee cooperation, timeliness in response, and efficiency in gathering information.

At no time during the NSC review did the Coast Guard deny DHS auditors access to Coast Guard personnel or any information requested by the audit team. Our numerous requests for the DHS OIG audit team to follow the Coast Guard's audit management procedures were deliberately made to expedite delivery of information and responses to the audit teams' inquiries, as well as to maintain internal awareness of auditors' needs. In fact, the DHS OIG used the Coast Guard's established procedures and asked for CG-82 assistance when they were unable to directly find desired subject matter experts or they were not satisfied with responsiveness to direct data requests. Notwithstanding our ordinary practice, the Coast Guard responded to the IG concerns by providing guidance that information requested by the DHS OIG could flow directly from the interviewed Coast Guard employees to the OIG audit team. In no instance did the Coast Guard prevent any employee from initiating a meeting with the audit team or deny to any employee rights under the Whistleblower Protection Act.

OIG Response: The Coast Guard admits that our office is entitled to full access to all agency information, but contends that it, not our office, can determine "the manner" in which access is to occur. The law, agency policy, and governing audit procedures flatly contradict the Coast Guard's position. Under the IG Act, DHS MD, and GAGAS, under which our audits are conducted, it is our office, not the Coast Guard that determines what information must be produced as well as how it is to be produced.

The Coast Guard contends that it cooperated with our office and followed GAGAS. It did not. The Coast Guard challenged and continues to challenge our requests for unfettered access to its active duty and civilian employees, documents, and information. Specifically, the Coast Guard imposed unacceptable conditions on our right of access by requiring a pre-brief for interviews and requiring that interviews be cleared through a centralized component. Further, the Coast Guard prohibited interviewees from providing documents directly to our staff, and required that that all documents first be reviewed and cleared. The Coast Guard also insisted that its management attend all interviews. Finally, the Coast Guard personnel were required to report all contacts they may have had with our staff.

These conditions are totally unacceptable. Agency personnel often are more comfortable and candid when discussing matters confidentially with our auditors without a supervisor or other management official present. We seek to learn the facts, not the "company line." Likewise, personnel ought to be

free to provide government documents directly to our auditors, without such documents first being reviewed or sanitized. Nevertheless, we never rely only on a single interviewee or document; instead, we check and crosscheck all information. And, in compliance with government-wide auditing standards, we provide a draft of our findings to the auditee for review and comment, a failsafe mechanism intended to eliminate any factual errors or misrepresentations.

We explained these procedures and protections to the Coast Guard and asked that they remove the obstacles to our having unfettered access to personnel and documents. Following several weeks of discussion during which the Coast Guard refused to budge, we ultimately suspended all fieldwork. All fieldwork remained suspended for five weeks, until a senior Coast Guard official issued a memorandum to the Coast Guard's Engineering Logistics Center personnel bringing a portion of the Coast Guard into compliance with the IG Act and DHS Management Directive. Inexplicably, the Coast Guard limited the memorandum not only to a portion of its workforce, but made it applicable for this audit only, foreshadowing a continued uncooperative posture toward our office.

The Coast Guard claims that it has "a long history of history of cooperation with external audit organizations." Our office, however, is an "internal" audit organization, unlike the GAO, and procedures the Coast Guard has used with the GAO simply do not govern interactions with our office. We operate under an entirely different statutory scheme. Likewise, the Coast Guard claims it has "a long history" of cooperation and had worked successfully in the past with the DOT OIG. Whatever the Coast Guard's working relationship has been with another entity, its working relationship with us, for the reasons explained above, has been unacceptable.

U.S. Coast Guard Comment: *As part of the NSC review, DHS auditors sought to interview contractor personnel at ICGS. ICGS personnel agreed to being interviewed by OIG; however, as a condition precedent, the contractors asked to have additional representatives present at the interviews to ensure accuracy of information. DHS auditors elected not to interview these individuals at all. Their decision resulted in a gap of information from which to substantiate the findings in the NSC report.*
The DHS Chief Financial Officer and Office of General Counsel currently are working to promulgate Department-wide guidance and process procedures concerning relations between the DHS OIG and DHS components. The Coast Guard strongly supports these efforts and will comply with all guidance established by DHS.

OIG Response: We experienced significant difficulties in obtaining access to ICGS personnel knowledgeable of the structural design and performance issues associated with the NSC. IGCS interposed many of the same

obstacles initially used by the Coast Guard, such as unacceptable and burdensome preconditions on interviews by requiring advance written identification and justification of interview topics, refusal to permit private interviews, and insistence that management personnel attend all interviews. The Coast Guard claims the contractor merely sought "to ensure accuracy of information," an incongruous argument given the delayed and incomplete responses to our document requests. The government auditing standards provide multiple safeguards to ensure that information contained in a final audit report is accurate. Indeed, the Coast Guard and its contractors had at least six different opportunities to review and comment on our draft reports.

Believing that interviews conducted under the conditions imposed by ICGS would be of dubious utility, we declined to conduct them. In the absence of a contract clause such as that contained in Recommendation 6 of this report, questions remained about our authority to compel private interviews. Extensive, and likely fruitless, negotiations with ICGS obviously would be required, and we were unwilling at that point to add to the delays in completing the audit that we already had experienced.

The Coast Guard says that the DHS Chief Financial Officer and Office of General Counsel are working to promulgate department-wide guidance on dealing with our office. Inexplicably, no one ever has notified us of such discussions, much less invited us to participate. More importantly, no new protocols are needed—DHS Management Directive 0810.1 already requires all DHS employees to "cooperate fully" with our office. Instead, what is needed is departmental support and enforcement of the existing procedures. To this end, we prepared, for the Secretary's signature, a one-page memorandum to all DHS personnel identifying our authorities and instructing them to cooperate with our office. We also prepared a four-page document providing "Frequently Asked Questions" regarding interactions with our auditors and inspectors. Both documents were provided to senior department officials in July 2006, and despite repeated requests and meetings, neither has been issued.

The need for Departmental support is undeniable, evidenced not only by the obstructions interposed by the Coast Guard and its contractors, but by the fear Coast Guard personnel have of cooperating with our office. These fears reached a crescendo and necessitated that a briefing on participation in OIG audits be provided to personnel at the Engineering Logistics Center, the place where many of the NSC structural design concerns were first identified.

In summary, the impediments we experienced in obtaining access to personnel, information, and documentation are unacceptable in light of the statutory mandates of our office; the severity of the NSC design and performance deficiencies; the importance of the NSC to the Coast Guard's national security and Deepwater missions; and the expenditure of billions of dollars that are being invested in this critical acquisition.

SPECIFIC COAST GUARD RESPONSES TO DHS OIG RECOMMENDATIONS:

Recommendation #1:

Develop and implement a plan to ensure the National Security Cutter is capable of fulfilling the operational profiles as defined in the Deepwater contract. The plan should include a detailed description of the modifications to be made, including any requests for waivers/deviations from the Deepwater performance specifications. In addition, the plan should include timelines, milestones, and quarterly reporting requirements outlining the progress being made, the identity of the organizational entities to be responsible for implementation, and any short and long-term funding requirements."

U.S. Coast Guard Comment: *The Coast Guard's Assistant Commandant for Engineering and Logistics (CG-4) and the Deepwater PEO have developed a plan to accommodate more robust fatigue-life margins to ensure a full 30-year service life. A cross-functional team composed of personnel from the IDS Program, independent contractors and CG-4 has developed a technical solution that will be reflected in an Engineering Change Proposal (ECP) submitted by the contractor. The modifications included in the solution will be installed on NSCs #1 and #2 after delivery; modifications to NSC #3 and beyond will be incorporated during production. Any known or suspected fatigue concerns will be addressed with these design changes.*

OIG Response: The Coast Guard's response does not indicate whether it concurs or non-concurs with this recommendation. Consequently, this recommendation will remain open and subject to follow up procedures until the Coast Guard develops a detailed and verifiable plan to ensure that all eight NSCs will be capable of operating underway for 230 days a year (on average) under Caribbean (General Atlantic) and Gulf of Alaska (North Pacific) conditions as required by the Deepwater contract. If the Coast Guard is unable to come up with a plan to ensure the NSC meets Deepwater contract performance requirements, it should say so, explain why, and detail the steps to be taken to compensate for the reduced operational capability.

Recommendation #2:

Provide assurances that a solution to the cutter's structural design issues is fully developed and the costs associated with the solution are identified before issuing new NSC Delivery Task Orders for National Security Cutters #3 through #8.

Coast Guard Comment: *An Engineering Change Proposal (ECP) has been developed and will be priced and negotiated. This proposal will incorporate*

the remaining structural improvements into the design to address the fatigue issues associated with the 30-year service life in NSC #3 through #8. A retrofit plan for NSC #1 and #2 will be developed upon completion of the detailed design for NSC #3.

OIG Response: The Coast Guard's response does not clearly indicate whether it concurs or non-concurs with our recommendation. We believe that any solution to the structural design and fatigue life issues associated with the NSC will be complex, time-consuming, and expensive. Further, the Coast Guard has yet to resolve the ambiguity surrounding the 230-day underway requirement to our satisfaction. Consequently, this recommendation will remain open and subject to follow-up procedures until the Coast Guard has: (1) developed an ECP that will enable the NSC to meet the 230-day underway requirement as outlined in the Deepwater contract; (2) identified all costs associated with the ECP; and, (3) agreed to delay the issuance of additional NSC DTOs for NSCs 3 through 8 while the ECP and the costs associated with the ECP are being developed and verified.

Recommendation #3:

Develop the policies and procedures necessary to empower the Assistant Commandant for Systems with greater, more formal technical authority to ensure that assets acquired under Deepwater meet all design and technical performance requirements.

U.S. Coast Guard Comment: *CG-4 is the Coast Guard's Technical Authority for the Deepwater Program, and CG-4's opinion and expertise are highly valued in making technical decisions. Indeed, CG-4 has been the technical lead in determining modifications to the NSC to meet the 30-year service life. According to the PEO's Charter, cost, schedule, and performance must be taken into consideration when moving forward with a major programmatic decision. CG-4 provides the Program Manager with technical decisions and is not required to consider cost and schedule in its deliberations, although it may elect to do so. G-D and CG-4 have an active ongoing dialogue, and CG-4's recommendations are utilized.*

When discussing the role of the Technical Warrant Holder (TWH), the DHS OIG refers to traditional U. S. Navy ship design and ship construction contracts. In such instances, the TWH actually writes and approves the shipbuilding specifications. It is the TWH's responsibility to ensure that the ship design agent has correctly interpreted the requirements of the shipbuilding specifications and translated those requirements into a technical data package that includes construction drawings. The TWH, therefore, has a major responsibility at the beginning of the ship-design process in a traditional acquisition. Under this performance-based

acquisition there is no government supplied design or technical data package; hence there is no TWH role within the project.[32]

OIG Response: The Coast Guard's response does not clearly indicate whether it concurs or non-concurs with our recommendation. Secondly, we disagree with the Coast Guard's contention that there is no role for a TWH (or its equivalent) within the Deepwater Project. Specifically, it is not sufficient for the Coast Guard to say that the Assistant Commandant for Systems is its "Technical Authority for the Deepwater Program." This is the same authority that existed when the former Assistant Commandant for Systems issued his March 29, 2004, memorandum. It did not work then and there is no guarantee it will work now or in the future. We believe the Assistant Commandant for Systems should have the authority to enforce asset performance requirements and to adjudicate technical disputes associated with assets being acquired under the Deepwater Program or other Coast Guard acquisition projects. To close this recommendation, the Coast Guard will need to provide documentation verifying that the Assistant Commandant for Systems has the authority to enforce asset performance requirements and to adjudicate technical disputes associated with the NSC and any other air and surface assets acquired under the Deepwater Program.

Recommendation #4:

Amend future Award term decision criteria to include the cost, schedule, design, and performance evaluations of all assets under development, in addition to any Deepwater assets, platforms, or systems delivered during the evaluation period.

U.S. Coast Guard Response: *A step in the Award Term process involves Coast Guard determination of criteria to be used in evaluating ICGS in the next Award Term. This new criterion was signed and provided to ICGS on July 27, 2006. As a result of lessons learned during the initial base period, the Coast Guard has redefined the criteria to include consideration for cost control, operational effectiveness, program management and execution, logistics and competition on all assets regardless of their stage of development and delivery.*

[32] Fundamentally, all major acquisition programs must have the complete authority to appropriately balance the inherently competing factors of performance and technical risk versus program cost and schedule. The IDS Program will continue to value and rely heavily on the oversight and input provided by CG-4 to establish the right standards and to review any suggested changes to those standards. The Program will also continue to use a combination of subject matter experts from the Navy's SUPSHIP, Coast Guard Directorates, ICGS, and ABS in the collaborative certification of IDS surface assets. However, CG-4 is and will continue to be used to interpret and resolve these often-diverse technical opinions.

The Award Term evaluation process for the 60-month base performance period was established at contract award (June 2002) with an annual assessment of three factors: Operational Effectiveness (OpEff), Total Ownership Cost (TOC), and Customer Satisfaction. The criteria used for each factor were detailed in an attachment to the contract and were agreed to by both the government and ICGS prior to contract award in June 2002.

All of the facts regarding the NSC program were known to the Award Term Determining Official (ATDO) who, at the time of award, was the IDS PEO. The new Award Term Plan was placed on contract July 27, 2006 and is now in effect. This includes elevating the ATDO to the Agency Acquisition Executive (AAE) position. The new criteria were provided to the DHS OIG August 8, 2006.

OIG Response: The Coast Guard's response does not clearly indicate whether it concurs or non-concurs with the recommendation. We believe the Award Term used to evaluate the performance of ICGS during the first four years of the contract did not properly account for the cost, schedule and performance issues associated with the NSC or the FRC, which date back to December 2002 and May 2005, respectively. Had they done so, it is arguable whether the Deepwater contract would have renewed for the additional 43-month period. To close this recommendation, the Coast Guard will need to provide documentation verifying the Deepwater Award term criteria includes the cost, schedule, design, and performance evaluations of all assets under development, in addition to any Deepwater assets, platforms, or systems delivered during the evaluation period.

Recommendation #5:

Ensure that the rationale underlying all key decisions associated with the design, construction, and implementation of all assets acquired under the Deepwater Program is formally documented and approved by senior management.

U.S. Coast Guard Comment: *The Coast Guard agrees with the importance of documenting key decisions and has undertaken efforts and implemented systems to improve documentation management.*

Mechanisms are now in place to ensure appropriate milestone entrance and exit criteria are understood and met, and documented in IPT minutes and action-item tracking systems. Bi-weekly Program Management reports keep the PEO and other internal and external stakeholders aware of updates and challenges. The PEO also meets with the AAE monthly to discuss programmatic issues. Congress, the GAO, The Office of Management and Budget (OMB), and DHS OIG receive quarterly briefings and reports to keep them up to date on the program's status.

OIG Response: The Coast Guard's response does not clearly indicate whether they concur or non-concur with this recommendation. Consequently, the recommendation will remain open until the Coast Guard provides evidence showing that it is requiring key decisions to be formally documented, including the rationale underlying the decisions and the disputes and solutions associated with the design, construction, or implementation of assets acquired under the Deepwater Program.

Recommendation #6:

Ensure that all future Department contracts, including those governing the Deepwater acquisition, contain terms and conditions that clearly stipulate the Department of Homeland Security, Office of Inspector General's right of unfettered access to contract and subcontract documents and personnel, including private, confidential interviews, information, inter-office correspondence and pre-decisional documentation.

U.S. Coast Guard Comment: *Defer to the Department of Homeland Security, Chief Procurement Officer.*

OIG Response: The Coast Guard's response does not clearly indicate whether they concur or non-concur with this recommendation. We believe the Coast Guard has the authority to include the recommended provision in its contracts and has chosen not to take this action unless required to do so by the department.

We also believe that unfettered access to contract personnel, documents, and information associated with DHS acquisitions is required by law, will provide transparency, and significantly improve the oversight capability of the department and our office. It will also increase the public's confidence that taxpayer funds are being utilized in an effective and responsible manner. For these reasons, we strongly urge the Coast Guard to reconsider its position to implement the recommendation.

The objective of this audit was to determine the extent to which the NSC will meet the cost, schedule, and performance requirements contained in the Deepwater program contract.

We notified the Coast Guard of the initiation of our audit and held an entrance conference with Coast Guard personnel on September 7, 2005. From that time until September 28, 2005, our fieldwork consisted of analyzing relevant program information obtained through independent research, document requests, and private interviews with Coast Guard personnel.

We interviewed and obtained documents from current and former military and civilian employees of the Coast Guard, including representatives of the Deepwater Program Office, and the Systems and Acquisitions Directorates. We also interviewed and obtained documents from external sources, including representatives of the American Bureau of Shipping and the U.S. Navy's Naval Surface Warfare Center, Carderock Division.

On September 28, 2005, we suspended our fieldwork due to the challenges we encountered to our authority by the Coast Guard to conduct private interviews with its personnel. On October 21, 2005, the Coast Guard Chief of Staff issued guidance, limited to this audit, which authorized all Coast Guard personnel and contractors to meet privately with our audit team. As a result, on November 1, 2005, we resumed our audit fieldwork, which consisted of:

- Reviewing prior audits on the Integrated Deepwater System program;
- Reviewing publicly available background information on the Deepwater program and the acquisition of component assets;
- Reviewing the Deepwater contract and related program documents, technical information and asset designs, financial data, and internal and external Coast Guard communications, including emails, memoranda, reports, and past presentations provided by the Coast Guard Office of Budget and Programs (CG-82);
- Attending Coast Guard prepared briefings related to the production of the NSC;
- Conducting in-person interviews with current and former Coast Guard military and civilian personnel;
- Conducting in-person interviews with American Bureau of Shipping and U.S. Navy representatives; and;
- Analyzing Coast Guard budgetary allocations and requests in support of the Deepwater program for Fiscal Years 2002 through 2007.

We also intended to interview employees of, and review documents provided by Integrated Coast Guard Systems, the Deepwater Systems Integrator, and its two Tier 1 sub-contractors: Northrop Grumman Ship Systems and Lockheed Martin Corporation. In response to a request for confidential interviews with its employees, ICGS refused, stating that since there was no ICGS policy regarding procedures for participation in a DHS/OIG audit, we would have to comply with the separate policies of Lockheed Martin Corporation and Northrop Grumman Ship Systems, as appropriate. To date, we have not received copies of said policies. The lack of participation in this audit by ICGS, LM, and NGSS prevented us from taking into account their informed and relevant perspectives on critical decisions relating to the design and production of the NSC.

We conducted this audit according to generally accepted government auditing standards and pursuant to our authority under the Inspector General Act of 1978, as amended.

Appendix B
Management's Comments to the Draft Report

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

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Washington, DC 20593-0001
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7501

22 DEC 2006

MEMORANDUM

From: R. J. Papp, Jr., VADM
Chief of Staff, U.S. Coast Guard

Reply to Attn of: CG-823
Mark Kulwicki
202-372-3533

To: Assistant Inspector General for Audits

Subj: Acquisition of the National Security Cutter, U.S. Coast Guard

Ref: (a) Draft Report dated 15 December 2006

1. This letter transmits the Coast Guard's response to the Department of Homeland Security Inspector General draft report findings and recommendations contained in reference (a).

2. The Coast Guard appreciates the opportunity to comment on this report and we will continue our work for improving efforts to acquire assets through the Integrated Deepwater System (IDS) Program. Please direct your questions to Mark Kulwicki at (202)-372-3533.

#

Enclosure: U.S. Coast Guard Response

UNITED STATES COAST GUARD (USCG) STATEMENT ON DEPARTMENT OF HOMELAND SECURITY INSPECTOR GENERAL REPORT

TITLE: "ACQUISITION OF THE NATIONAL SECURITY CUTTER"
REVISED DRAFT REPORT, DECEMBER 2006

THE UNITED STATES COAST GUARD POSITION IS:

The Coast Guard has serious concerns with the DHS OIG's approach to reviewing and analyzing this major system acquisition. The report contains selective inclusion of documents that do not represent the most current, comprehensive, or technically accurate data. Consequently, the report's utility for program status analysis or program improvement is inherently limited. This statement presents the Coast Guard's position and addresses inaccuracies identified in this report.

Specifically, the report:

1. Incorrectly characterizes the operational profile requirement for the NSC;
2. Misunderstands the decisions regarding the NSC service-life issue;
3. Inaccurately characterizes cost data;
4. Illustrates the DHS OIG's lack of understanding of acquisition strategy utilizing Performance Based Contracts; and
5. Mischaracterizes the level of Coast Guard cooperation during the conduct of this audit.

The Coast Guard is also concerned about the DHS OIG's failure to seek the necessary expertise to aid in fully evaluating the complex technical issues, such as the specialized topic of fatigue life of a structural component of a cutter, in this report. Established best practices, contained in Generally Accepted Government Auditing Standards (GAGAS), state that audit organizations may need to employ or hire specialists who are knowledgeable, skilled or experienced in certain subject matter areas like engineering to aid and assist audit teams (GAO-03-673G).

The DHS OIG did not follow these accepted best practices when conducting this audit. Additionally, an independent engineering organization could have served as the audit's subject matter expert, saving valuable time for multiple staffs to explain engineering theory and practice to the in-house audit staff.

1

COAST GUARD'S DISCUSSION OF DHS OIG'S FINDINGS:

1. Incorrectly characterizes the operational profile requirement for the NSC:

This report states that:

"To mitigate the effects of these deficiencies, the Coast Guard intends to modify the NSC's design to support an operational profile of 170 to 180 days underway per year in the North Pacific region, lower than the 230-day performance standard required by the Deepwater Contract."

The DHS OIG is incorrect. The Coast Guard has not lowered performance standards. Fatigue issues identified and addressed by the Coast Guard do not and will not impact the NSC's operational performance, nor will they require operational restrictions of any kind. The NSC performance standard is in accordance with Commandant's Instruction (COMDTINST 3100.5A), by which all cutters are managed. This instruction specifically dictates what is meant by Underway Days versus Days Away From Home Port (DAFHP). The DAFHP requirement for the NSC is 230 days. The 230 days consists of: 185 days underway (165 Mission Days and 20 Average Transit Days) and 45 in-port logistics DAFHP. Although the Performance Specification (P-Spec) contains minor ambiguities, the Coast Guard and Integrated Coast Guard Systems (ICGS), the Deepwater Program's ~~systems integrator, are working in accordance with COMDTINST 3100.5A.~~ It is understood by all parties that the 230-day requirement is Days Away From Home Port (DAFHP), not Underway Days.

2. Misunderstands the decisions regarding the NSC structures issue:

The Coast Guard opinion is that decisions regarding structures and production have been well-considered and were prudent and correct. The NSC structure does not pose an immediate concern; rather, it presents a risk that it may need some structural repairs during its service life. Any known or suspected fatigue concerns will be addressed when the design change now being developed is incorporated on the NSC. In the end, the NSC will be designed to achieve a 30-year fatigue life.

During the Coast Guard's review of the NSC's design from 2002 to 2004, concerns were raised about certain aspects of the ship's structure that could prevent it from achieving its required 30-year service life. Specifically, Coast Guard and independent technical experts questioned whether some of the cutter's structural components would experience fatigue[1] damage prior to the service-life objective, a critical consideration given the extended, high-tempo operations expected of the NSC.

[1] Structural fatigue is a result of cyclic loading. In the case of ship structures, fatigue stresses from these loads develop in the hull girder as it hogs (arches) and sags while moving through waves. After time, these stresses can lead to cracks in the ship's structures. How and where the ship is operated can impact fatigue life; if a ship regularly operates in high sea states, for example, especially at higher speeds, greater stress is imposed on the hull cumulatively.

The IDS Program Office has been working with Assistant Commandant for Engineering and Logistics (designated as CG-4), the Coast Guard's technical authority, to address structural concerns throughout the design development and production process. The Program Executive Officer (PEO) for the IDS (designated as G-D) did not ignore the concerns of CG-4, but rather used his authority as the acquirer to require ICGS to perform due diligence in developing the structural details, which resulted in numerous improvements to the structural design. In fact, many structural issues presented to IDS in the RADM Brown memo were incorporated into the NSC design prior[2] to the issuance of the Delivery Task Order (DTO) 0030BC, which authorized and funded ICGS to begin production of the first-in class NSC. Regarding those remaining areas of concern identified by CG-4, G-D requested Naval Surface Warfare Center, Carderock Division (NSWC-CD) to conduct an independent analysis of the structural adequacy of NSC critical areas using a statement of work tailored by CG-4. The IDS managers decided to address the remaining NSC structural issues in parallel with the NSC design and construction as a lower-risk alternative when compared to waiting for resolution of the structural issues and then starting design and construction. Only after the preliminary results of the NSWC-CD study became available in December 2005, during the first progress review, did the IDS program have additional actionable information upon which further corrective action could be considered.

After thorough review[3], and to remove any lingering doubts, the Coast Guard determined that it is in the government's interest to increase the fatigue tolerance of the NSC to ensure that the ship's basic structures will meet its projected 30-year service life. Engineering changes to address the desired structural enhancements, developed in collaboration with the U.S. Navy and other naval engineering experts, were approved by the Deepwater Program's technical authority, the Engineering and Logistics Directorate at Coast Guard Headquarters. To improve the current design, a Request for Proposal (RFP) for changes to be implemented on NSC #3 was issued to ICGS.

A variety of methods are commonly used to enhance the strength of a ship's structure (e.g., treatment of welded joints, material upgrades, increased thickness of plates and structures, revised geometry for components). Specific details of the structural configuration changes needed to implement the design enhancements will be finalized when ICGS reviews the Coast Guard's recommendations, identifies possible alternatives,

[2] Structural enhancements such as the following were incorporated into the design of NSC #1 prior to the beginning of ship construction: Material upgrades from 51 ksi to 80 ksi yield for deck stringer and side shell shear strakes, thickness and material upgrades for deck strakes near openings, increased thickness of plates and structure under reduction gears resulting from vibration and finite element analyses of the hull structure and propulsion foundations, utilization of improved fatigue compensation for selected penetrations as specified by the USN for extended hull life, fatigue analysis using USN Fatigue Guidance for explicit fatigue life design determination, independent analyses to confirm and revalidate specific areas of concern raised by the USCG, increased superstructure scantlings for buckling strength and stress concentrations and revised geometry, scantlings and details associated with side shell fashion plates as well as the horizontal fashion plates in way of the re-entrant corners of the superstructure.

[3] Agencies that participated in the review of the NSC's design (at the Coast Guard's request) included subject matter experts from the Coast Guard Program Executive Office Integrated Deepwater System (PEO IDS), the Engineering and Logistics Directorate at Coast Guard Headquarters (CG-4, the Deepwater Program's technical authority), and the Coast Guard's Engineering and Logistics Center. The Coast Guard also contracted with the U.S. Navy's Naval Sea Systems Command's Naval Surface Warfare Center, Carderock Division for an independent review of the NSC design. Integrated Coast Guard Systems (ICGS, a joint venture of Northrop Grumman and Lockheed Martin and the Deepwater Program's lead system's integrator) similarly conducted a review, and a private engineering firm (Designers & Planners) also made an assessment of the NSC design with regard to fatigue.

and develops detailed design drawings of the changes. Structural enhancements to improve the NSC's fatigue life need not be done immediately. Hulls #1 and #2 will have much of the work done after delivery. NSC hulls #3 through #8 will incorporate design changes during construction. Any known or suspected fatigue concerns will be addressed when this design change is incorporated on the NSC. In the end, the NSC will be designed to achieve a 30-year service life.

There are several methods which the naval engineering community could use to predict a ship's service life. Choice of methodology, entering arguments and assumptions, and desired margins greatly influence the outcome and lead to differing conclusions. RADM Brown's memo 9050 of 29 March 2004 noted that "… even the best engineers can disagree on data, and in their analyses, conclusions and recommendations." Production decisions were made with these thoughts in mind as well as other programmatic factors such as cost, schedule and performance.

The NSC program manager provided DHS OIG a very succinct summary of the rationale leading to the decision to award the NSC #1 production DTO. The summary indicated that "no formal Cost-Benefit Analysis" was conducted, but clearly laid out the decision factors based on the information that was available at that time. The NSC program manager specifically stated that "…pre-production activities were already underway in preparation for the start of construction (e.g., fabrication of jigs and fixtures, scheduled job orders issued throughout the yard, material ordered, labor assignments made)…any disruption of the normal production effort would have been very costly due to not only the direct increase in escalation and material handling costs from shifting the construction effort to the right, but the inevitable impact on the NSC and Navy shipbuilding programs within the yard resulting from changes to carefully planned and integrated material, labor, and facility assignments … if the independent analysis did provide conclusive evidence …of deficiencies in the structural details, the System Integrator would be responsible to correct them… given the uncertainty of the validity of … structural concerns and the certainty of the significant delay and disruption costs the Government would incur, as well as the real urgency of delivering NSC's to the fleet to replace rapidly-deteriorating legacy assets, the Program Office decided to proceed with production." The memorandum to award DTO 0030BC, from Mr. Gregory Giddens, COMDT, (G-Dd) to Ms. Cathy Martindale, COMDT, (G-ACS-6) of 22 June 2004 states; "I believe we have achieved a balance between the risk of moving forward and the risk of not moving forward."

The decisions regarding NSC structures reflected more than simply the naval engineering perspective; rather, they also encompassed considerations of cost, schedule, and performance, as required by the PEO's charter.

3. Inaccurately characterizes cost data:

Cost data in the report inaccurately reflects the NSC #1 and #2 cost impacts associated with post 9/11 changes and government items. In November 2006 the table below was provided to the DHS OIG and specifically discussed in follow-on meetings. It indicates that the projected budget amount for the NSCs is approximately $960M for NSC #1 and #2. However, in the report, the DHS OIG labels a cost summary table as a "Coast Guard source" and indicates that the Coast Guard stated the project cost was approximately

$775M. The Coast Guard believes the table below accurately breaks down and explains the associated cost elements for NSC #1 and #2.

Chart 1 using OMB Inflation of 1.85%			
(Dollars in Millions)	NSC #1	NSC #2	Total
June 02 Contract Proposal in 2002$ (A)	$322.20	$194.60	$516.80
Post 9/11 Changes and Government Items in 2002$ not in Contract Proposal of 2002 (B)	$144.16	$116.87	$261.03
Total before Inflation	$466.36	$311.47	$777.83
Inflate from 2002$ to 2006$ using 1.85% OMB Factor (C)	$35.50	$23.70	$59.20
Total Cost after adding in Government Items and Inflating by 1.85%	$501.86	$335.17	$837.03
Hurricane Katrina Amounts added in 2006 (D)			$123.00
Updated Total			$960.03
Notes:			
A. Only ICGS Costs			
B. ICGS Costs Plus CG Post 9/11 Changes necessitate by the Homeland Security Act and Government items such as Testing and Evaluation as well as other Full Operational Capability amounts.			
C.OMB required USCG to use a 1.85% inflation Factor			
D. Congress funded an additional $123M in FY2006 for Hurricane related costs for the NSC 1 and the NSC 2			

4. Illustrates the DHS OIG's lack of understanding of the acquisition strategy utilizing Performance Based Contracts:

The IDS program is not a traditional acquisition approach. The contract embraces acquisition reform in an effort to curtail costs and maintain schedule. Law and regulation[4] establish a preference for performance-based acquisition. Federal acquisition policies seek outcomes that are more competitive, entrepreneurial, and performance oriented. This approach gives industry the flexibility to achieve alternative options better suited to the government's needs.

The Deepwater Program is guided by a system-wide, performance-based acquisition approach. In addition to surface and aviation assets, the acquisition strategy recognizes that interoperability, integrated logistics support, human systems integration, and life-cycle considerations must be addressed at the inception of the program.

Best practices incorporated in the IDS program include the notion that the government's focus should be on performance – measurable results. Unlike past asset-for-asset replacement programs, the Coast Guard's contract with ICGS provided industry with specifications for the system-wide *capabilities* the Coast Guard needs to perform its IDS missions rather than specifications for specific assets (With the exception of the NSC, the

4 Over the last decade and a half, innovators in Congress and the executive branch have reformed the laws and policies that govern Federal acquisition. Among the most important of these reforms are the Government Performance and Results Act of 1993, the Federal Acquisition Streamlining Act of 1994 (FASA), and the Clinger-Cohen Act of 1996.

Coast Guard did not specify or require any particular asset in the IDS system solution, let alone technical specifications.) This *performance-based* approach directly links mission requirements to industry solutions.

Nonetheless, the Coast Guard recognizes the imperative to keep the basic elements of the IDS acquisition program squarely in focus. Cost, schedule, and performance are the fundamental building blocks. It is our obligation to deliver assets and systems on or below cost, on or before schedule, and with at least the minimal threshold performance that the government has stipulated. While performance-based acquisition allows the Coast Guard some opportunities to gain value for the government above and beyond traditional methods, it does not mean we have abandoned those methods; the two are complementary.

The Deepwater Program, the largest acquisition in Coast Guard history, is fully committed to continuing process improvement as a learning organization. The Government Accountability Office framework for acquisition management is used to assess the program and identify areas where improvement is necessary. The Coast Guard recognizes the need for program management reforms to improve acquisition project execution and is proceeding with the sense of urgency to be expected from an agency whose core value is public service. A series of measures[5] is being aggressively implemented to ensure more effective oversight, sound stewardship of taxpayer dollars, and timely delivery of much-needed assets.

5. Mischaracterizes the level of Coast Guard cooperation during the conduct of this audit:

While the Inspector General Act of 1978 provides that the IG is to have "access to all records, reports, audits, reviews, documents, papers, recommendations, or other material available," neither the Act nor DHS MD #0810.1 specifically stipulates the manner in which access to information is to occur.[6] Instead, both the Act and MD #0810.1 direct that the IG and the audited agency conduct audits consistent with the standards issued by the Comptroller General of the United States.

At the start of all reviews of Coast Guard programs by external audit organizations, the Office of Budget and Programs (CG-82) meets with the auditors and discusses the Coast Guard's policies and procedures with regard to audit protocol. The Coast Guard's audit procedures follow the guidelines established by the Government Accountability Office (GAO) within the Generally Accepted Government Auditing Standards (GAGAS). As stated above, the GAGAS provides the appropriate framework for all audits conducted by staff of an Inspector General's Office.

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5 Business processes have been strengthened, new evaluation criteria have been developed for Deepwater's follow-on contract term, the primacy of Coast Guard technical authority has been reaffirmed; Coast Guard's chief engineer has been assigned greater responsibility to review ship designs, independent, third-party technical evaluations of industry's proposed designs for new assets are now required and regularly obtained, staffing at manufacturing facilities for Deepwater platforms is being increased to place a sharper focus on higher quality contract performance, we are filling vacancies in our own Deepwater workforce and improving its training, certification, recruitment, and retention and we have shifted more funding to program management activities.

6 Inspector General Act of 1978, §4(b)(1)(A), 5 U.S.C. App. 3 (Westlaw 2006).

The GAGAS sets forth policies and procedures to assist auditors in obtaining data/information, scheduling meetings and interviews with appropriate staff, conducting follow up meetings and ensuring compliance with all requests. Equally important, it also helps to minimize the disruption to and administrative burden upon agencies being audited.

The Coast Guard has adhered to these procedures for several years, resulting in productive and successful audit efforts with teams from the GAO, the Department of Transportation Inspector General's Office (DOTIG) and the Department of Homeland Security Office of Inspector General (DHS OIG). These procedures have enabled the Coast Guard to assist audit teams, as well as Coast Guard program offices, during the conduct of numerous audits. The Coast Guard has a long history of cooperation with external audit organizations and uses these long-established audit management procedures to ensure employee cooperation, timeliness in response, and efficiency in gathering information.

At no time during the NSC review did the Coast Guard deny the DHS auditors access to Coast Guard personnel or any information requested by the audit team. Our numerous requests for the DHS OIG audit team to follow the Coast Guard's audit management procedures were deliberately made to expedite delivery of information and responses to the audit teams' inquiries, as well as to maintain internal awareness of auditors' needs. In fact, the DHS OIG used the Coast Guard's established procedures and asked for CG-82 assistance when they were unable to directly find desired subject matter experts or they were not satisfied with responsiveness to direct data requests. Notwithstanding our ordinary practice, the Coast Guard responded to the IG concerns by providing guidance that information requested by the DHS OIG could flow directly from the interviewed Coast Guard employees to the OIG audit team. In no instance did the Coast Guard prevent any employee from initiating a meeting with the audit team or deny to any employee rights under the Whistleblower Protection Act.

As part of the NSC review, DHS auditors sought to interview contractor personnel at ICGS. ICGS personnel agreed to being interviewed by OIG; however, as a condition precedent, the contractors asked to have additional representatives present at the interviews to ensure accuracy of information. DHS auditors elected not to interview these individuals at all. Their decision resulted in a gap of information from which to substantiate the findings in the NSC report.

The DHS Chief Financial Officer and Office of General Counsel currently are working to promulgate Department-wide guidance and process procedures concerning relations between the DHS OIG and DHS components. The Coast Guard strongly supports these efforts and will comply with all guidance established by DHS.

SPECIFIC COAST GUARD RESPONSES TO DHS OIG RECOMMENDATIONS:

Recommendation #1:
"Develop and implement a plan to ensure the National Security Cutter is capable of fulfilling the operational profiles as defined in the Deepwater contract. The plan should include a detailed description of the modifications to be made, including any requests for waivers/deviations from the Deepwater performance specifications. In addition, the plan

should include timelines, milestones, and quarterly reporting requirements outlining the progress being made, the identity of the organizational entities to be responsible for implementation, and any short and long-term funding requirements."

Response:
The Coast Guard's Assistant Commandant for Engineering and Logistics (CG-4) and the Deepwater PEO have developed a plan to accommodate more robust fatigue-life margins to ensure a full 30-year service life. A cross-functional team composed of personnel from the IDS Program, independent contractors and CG-4 has developed a technical solution that will be reflected in an Engineering Change Proposal (ECP) submitted by the contractor. The modifications included in the solution will be installed on NSCs #1 and #2 after delivery; modifications to NSC #3 and beyond will be incorporated during production. Any known or suspected fatigue concerns will be addressed with these design changes.

Recommendation #2:
"Provide assurances that a solution to the cutter's structural design issues are fully developed and the costs associated with the solution are identified before issuing new NSC Delivery Task Orders for National Security Cutters #3 through #8."

Response:
An Engineering Change Proposal (ECP) has been developed and will be priced and negotiated. This proposal will incorporate the remaining structural improvements into the design to address the fatigue issues associated with the 30-year service life in NSC #3 through #8. A retrofit plan for NSC #1 and #2 will be developed upon completion of the detailed design for NSC #3.

Recommendation #3:
"Develop the policies and procedures necessary to empower the Assistant Commandant for Systems with greater, more formal technical authority to ensure that assets acquired under Deepwater meet all design and technical performance requirements."

Response:
CG-4 is the Coast Guard's Technical Authority for the Deepwater Program, and CG-4's opinion and expertise are highly valued in making technical decisions. Indeed, CG-4 has been the technical lead in determining modifications to the NSC to meet the 30-year service life. According to the PEO's Charter, cost, schedule, and performance must be taken into consideration when moving forward with a major programmatic decision. CG-4 provides the Program Manager with technical decisions and is not required to consider cost and schedule in its deliberations, although it may elect to do so. G-D and CG-4 have an active ongoing dialogue, and CG-4's recommendations are utilized.

When discussing the role of the Technical Warrant Holder (TWH), the DHS OIG refers to traditional U. S. Navy ship design and ship construction contracts. In such instances, the TWH actually writes and approves the shipbuilding specifications. It is the TWH's responsibility to ensure that the ship design agent has correctly interpreted the requirements of the shipbuilding specifications and translated those requirements into a technical data package that includes construction drawings. The TWH, therefore, has a

major responsibility at the beginning of the ship-design process in a traditional acquisition. Under this performance-based acquisition there is no government supplied design or technical data package; hence there is no TWH role within the project.[7]

Recommendation #4:
"Amend future Award Term decision criteria to include the cost, schedule, design, and performance evaluations of all assets under development, in addition to any Deepwater assets, platforms, or systems delivered during the evaluation period."

Response:
A step in the Award Term process involves Coast Guard determination of criteria to be used in evaluating ICGS in the next Award Term. This new criterion was signed and provided to ICGS on 27 July 2006. As a result of lessons learned during the initial base period, the Coast Guard has redefined the criteria to include consideration for cost control, operational effectiveness, program management and execution, logistics and competition on all assets regardless of their stage of development and delivery.

The Award Term evaluation process for the 60-month base performance period was established at contract award (June 2002) with an annual assessment of three factors: Operational Effectiveness (OpEff), Total Ownership Cost (TOC), and Customer Satisfaction. The criteria used for each factor were detailed in an attachment to the contract (J-30) and were agreed to by both government and ICGS prior to contract award in June 2002.

All of the facts regarding the NSC program were known to the Award Term Determining Official (ATDO) who, at the time of award, was the IDS PEO. The new Award Term Plan was placed on contract 27 July 2006 and is now in effect. This includes elevating the ATDO to the Agency Acquisition Executive (AAE) position. The new criteria were provided to the DHS OIG 8 August 2006.

Recommendation #5:
"Ensure that the rationale underlying all key decisions associated with the design, construction, and implementation of all assets acquired under the Deepwater Program is formally documented and approved by senior management."

Response:
The Coast Guard agrees with the importance of documenting key decisions and has undertaken efforts and implemented systems to improve documentation management.

Mechanisms are now in place to ensure appropriate milestone entrance and exit criteria are understood and met, and documented in IPT minutes and action-item tracking systems.

7 Fundamentally, all major acquisition programs must have the complete authority to appropriately balance the inherently competing factors of performance and technical risk versus program cost and schedule. The IDS Program will continue to value and rely heavily on the oversight and input provided by CG-4 to establish the right standards and to review any suggested changes to those standards. The Program will also continue to use a combination of subject matter experts from the Navy's SUPSHIP, Coast Guard Directorates, ICGS, and ABS in the collaborative certification of IDS surface assets. However, CG-4 is and will continue to be used to interpret and resolve these often-diverse technical opinions.

Bi-weekly Program Management reports keep the PEO and other internal and external stakeholders aware of updates and challenges. The PEO also meets with the AAE monthly to discuss programmatic issues. Congress, the GAO, The Office of Management and Budget (OMB), and DHS OIG receive quarterly briefings and reports to keep them up to date on the program's status.

Recommendation #6
"Ensure that all future Department contracts, including those governing the Deepwater acquisition, contain terms and conditions that clearly stipulate the Department of Homeland Security, Office of Inspector General's right of unfettered access to contract and subcontract documents and personnel, including private, confidential interviews, information, inter-office correspondence and pre-decisional documentation."

Response:
Defer to the Department of Homeland Security, Chief Procurement Officer.

LOOKING TO THE FUTURE:

Prior to the release of this report, Admiral Thad Allen assumed duties as the Commandant of the U.S. Coast Guard on May 25, 2006, and called immediately for a broad assessment and realignment of the service's command-and-control structure and mission-support systems. The Commandant established ten Commandant's Intent Action Orders (CIAOs) to serve as a roadmap for this effort. Two of these CIAOs directly affect the IDS Program:

1. Direct the consolidation of the IDS organization (G-D), Acquisition Directorate (G-A), Headquarters Contracting authority (HCA), and Research and Development into a single Directorate of Acquisition under the leadership of a Chief Acquisition Officer (CAO). The consolidation will enable the Coast Guard to more effectively focus its limited acquisition resources, leverage synergies between these acquisition-related staffs, and improve workforce competencies.

2. Direct the need to design a more responsive and accountable logistics organization designed to support operational mission effectiveness at the lowest achievable costs. This organization will also improve control and accountability for resources and material, and any required process changes needed to achieve and sustain compliance with the Chief Financial Officer (CFO) Act.

RADM Gary Blore assumed duties as the Integrated Deepwater System (IDS) Program Executive Officer (PEO) 17 April 2006. One of his priorities is to assess the Coast Guard's ability, skills, and experience to oversee of a program the size of Deepwater, including contracting and establishment of charters for all of the different acquisition teams. RADM Blore has contracted with Defense Acquisition University (DAU) to provide expert opinion and advice concerning USCG acquisition governance and oversight, acquisition structure, processes, acquisition training, and acquisition workforce management and planning. DAU's independent, third-party panel recommendations will be provided to the Coast Guard early in 2007. The group's findings will make additional important conclusions to improve contract planning, execution, and performance.

CONCLUSION:

The Coast Guard recognizes the significant investment of time these audits require on the part of the Coast Guard, industry, and the DHS OIG. The Coast Guard will continue to cooperate with the DHS OIG staff to the fullest extent possible, and to put into practice all recommendations which aim to improve the effectiveness and efficiency of the our Service.

Appendix C
Memorandum from Assistant Commandant for Acquisition to Vice Commandant, *Request for SAM Waiver; Deepwater Capability Replacement Project,* April 26, 2000

U.S. Department of Transportation
United States Coast Guard

Memorandum

Subject: REQUEST FOR SAM WAIVER; DEEPWATER CAPABILITY REPLACEMENT PROJECT

Date: APR 26 2000

From: Assistant Commandant for Acquisition

Reply to Attn. of: G-A RADM CASTO 7-2007

To: Vice Commandant
Via: Chief of Staff CGK 6/5
Via: Director of Finance and Procurement

1. The Commandant has made the re-capitalization of our Deepwater assets a top priority. This assessment was validated by the "Report of the Interagency Task Force on U. S. Coast Guard Roles and Missions". This report stated that: the re-capitalization of the Coast Guard's Deepwater capability is a near-term national priority and the Integrated Deepwater System project is a sound approach to that end, and the Interagency Task Force strongly endorses its process and timeline. The Deepwater project has enjoyed a high level of oversight and review within the Coast Guard and the DOT, as well as on-going audits from both the DOT IG and GAO. In addition, the Vice President has designated the Deepwater project as a reinvention laboratory to identify and implement innovative processes in the acquisition and deployment of "this critical system of systems."

2. The acquisition strategy for Deepwater is based on an innovative "system of systems" approach which is far different than any project we have undertaken in the past. This approach essentially gives the three industry teams a "blank sheet of paper" to propose an overall solution based upon broad performance requirements allowing the contractor to determine the type and mix of cutters, aircraft, and sensors. The Major Acquisition process, as established by the Systems Acquisition Manual (SAM), COMDTINST M4150.2E, focuses on managing discrete asset replacement or asset acquisition projects as opposed to a system of systems. The SAM prescribes very specific requirements and formats for project documents that are sometimes inappropriate for the Deepwater systems approach.

3. Given the innovative approach being followed for Deepwater and its status as a reinvention lab, we must create flexibility for the Deepwater project to deviate from SAM provisions as necessary to ensure success of this unique project. The fundamental requirements of the SAM will continue to be met. Top level Coast Guard Management, sponsor, and stakeholders will be involved in the project using a highly matrix approach as required by the SAM. We will employ the same disciplined management approach as defined by the SAM. Due to the size and importance of the Deepwater project, senior level involvement, use of the matrix approach, briefings to the Commandant and Vice Commandant will all exceed that which is prescribed by the SAM and typically employed on routine projects. The intent of the SAM's disciplined management approach including the

Subj: REQUEST FOR SAM WAIVER; DEEPWATER CAPABILITY REPLACEMENT PROJECT

3. (cont'd) preparation of robust project documents as required by the SAM, will be strictly followed. Due to the unique nature of this project, we will have to change some of the SAM prescribed content and format to match the "system of systems" approach to the project. Our final project documents will be either equal to or better than that required by the SAM.

4. OMB has endorsed our Deepwater project approach, and it is consistent with their new guidance contained in Circular A-11 and the Capital Programming Guide. We are in the process of updating the SAM to incorporate this new OMB guidance.

5. I recommend that you waive the specific requirements of the SAM for the Deepwater Project, and instead, instruct the project under their auspices of the National Partnership for Reinventing Government (NPR) Reinvention Laboratory, to develop procedures and plans that capture the intent of both OMB Circular A-11 and the SAM – using the SAM as a best practices guide rather than requiring strict adherence to its formats.

VAdm Roy J. Casto
ROY J. CASTO

Concur: J.H. Caplett — Director of Finance and Procurement — 5/25/00 — Date

Concur: CBK — Chief of Staff — Recommend documenting each specific deviation + rationale + for any equivalency declared upon — 6/05/00 — Date

Concur: JLCard — Vice Commandant, U. S. Coast Guard — approved w/proviso indicated by CCS — 6/06/00 — Date

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January 8, 2004

Review of Structural Design of National Security Cutter

Executive Summary

The structural drawings and calculations for the National Security Cutter were reviewed for structural adequacy, considering comments made in a point paper developed by the USCG Engineering Logistics Center. This review has made the following conclusions about the specific concerns expressed in that paper.

1) Strength Deck Stringer Plates. These strakes of plating are not constructed with HY-80 plating, as would be US Navy practice in this critical region of the ship. Care has not been taken in the design of this structure. Openings that cause stress concentrations are located near a break in the superstructure, an area of additional stress concentration. These openings are subject to fatigue failure in service if the ship has a service life of 230 days per year over 30 years of operation in the North Atlantic. The calculations show that there is a 5 percent probability of fatigue failure (crack initiation) within 3 years of operation for 230 days per year. An undetected fatigue crack can grow to sufficient size that could lead to catastrophic hull girder failure during extreme weather or other server loading conditions. If a crack in a critical location is detected at an inopportune time, the time required for repair will lead to loss of mission capability. At best, repeated cracking of ship structure will contribute to higher maintenance costs.

2) Superstructure Side Buckling. The design calculations show that 12.75# (0.3125 in) plate for the deckhouse side is adequate for design loads. However, the drawings show 7.65# (0.188 in) plate for the deckhouse sides, which is inadequate for buckling loads. Furthermore, the calculations are inadequate because they do not consider the additional stresses that occur at areas of discontinuity, especially at the ends of the deckhouse. The calculations do not use as high an assumed primary hull girder bending stress as may occur in service.

3) Hole Control. There are several areas in the structure where inadequate attention was placed on the stress concentrations and loss of stiffness that openings in longitudinal bulkhead structure and other members create. This is of particular concern at the First Platform stringer in way of the engine room and the hull longitudinal bulkheads forward. Detailed finite element analysis should be used for the design of the reinforcement of these areas. The same degree of concern

does not exist for the longitudinal bulkheads in the stern. These are not critical structural members, and though care should be taken to avoid stress concentrations that could lead to fatigue failure, they are not essential for hull stiffness in this area.

4) Innerbottom Design. The innerbottom appears sufficiently deep to support the machinery, including the reduction gear with its integral thrust bearing. However, the calculations to support this adequacy are incorrect because they rely on a stiffness being provided by longitudinal bulkheads above the Second Deck. This stiffness does not exist, especially because of the openings in the bulkheads noted above.

5) Superstructure Re-entrant Design. There is an abrupt discontinuity in the deckhouse amidships that will lead to early fatigue failure. Addition of an expansion joint may reduce the probability of such failure, but if improperly designed will lead to other structural failures. Expansion joints require routine maintenance, and should be avoided. Regardless of whether expansion joints are used or not, the entire deckhouse structure should receive a detailed finite element analysis as part of a fatigue analysis to provide structure that will have an adequate service life.

Concern for other areas of the ship are made for foredeck strength, design of transverse structure, bulkhead stiffener design, and the lack of intercostal shell stiffeners in the bow.

REVIEW OF NORTHRUP GRUMMAN SHIP SYSTEMS STRUCTURAL DESIGN FOR THE DEEPWATER NATIONAL SECURITY CUTTER

JANUARY 9, 2004
Revised January 13, 2004

By
Robert J. Scott, P.E.

INTRODUCTION

This report documents the results of a review of the contract design structural calculations and drawings for the Integrated Coast Guard System (ICGS) DEEPWATER National Security Cutter design. This included finite element analyses of the machinery foundations and adjacent structure and a large cut in the Main Deck and 01 Level stringer strake. This report also provides comments on the Coast Guard paper "Major NSC Structural Design Issues." The review was conducted for the United States Coast Guard Engineering Logistics Center under CDI Marine Company Purchase Order B707-9.2 dated December 17, 2003.

SUMMARY

The structural calculations prepared by ICGS are based entirely on U.S. Navy structural design requirements, and in general incorporate design loads, safety factors and material properties consistent with Naval surface combatant design. Maximum longitudinal bending stresses for the loading conditions investigated do not exceed 6.55 tons per square inch (TSI) compared to a design stress of 9 TSI, which includes a one TSI margin for future growth and corrosion.

The structural drawings indicate a design that is consistent with traditional U.S. Navy combatant design, with longitudinal frames spaced 24 inches on centers and transverse webs spaced 8'-2". High strength steel, ABS grade AH-36, is used for the hull and superstructure, with EH-36 steel for the sheer strake and stringer strake. Stanchions are typically located on alternate web frames with longitudinal girders supporting intermediate transverse web frames. There are relatively few stanchions in the machinery spaces, since the longitudinal bulkheads between the 01 Level (strength deck) and 2nd Deck provide support.

In general, the structural arrangements and details reflect typical surface combatant design and construction practices. However, there are a number of areas of concern that warrant further investigation. Key areas of concern are listed below, in order of priority:

1. There are vent cuts in the Main Deck and 01 Level stringer strakes just aft of midships. Very thick inserts and reinforcing rings are provided that result in

stresses directly in way of the cut that appear acceptable. However, the analysis does not show the stress concentrations at the periphery of the insert or in the reinforcing ring. Because of these concerns and the nearby discontinuity in the deckhouse (see next comment) these cuts should be moved inboard. If that cannot be accomplished, a larger, thinner HY-80 insert should be used.

2. The notch in the deckhouse amidships is a major concern since it includes re-entrant corners and large openings in the 02 Level immediately adjacent to those corners that are likely to create cracking early in the life of the ship that can propagate into the steel hull structure.

3. The machinery foundation incorporates many thick, shallow floors and girders indicating that there is inadequate depth for a well-proportioned foundation structure. The longitudinal bulkheads 12 feet off centerline between the 01 Level and 2nd Deck support the stanchions between the bulkheads and foundations. However, this is compromised by the gap in the starboard bulkhead between frames 55 and 64, 01 Level to Main Deck. The NGSS model does not include these bulkheads, assuming infinite rigidity at the 2nd Deck, which is incorrect.

4. There are areas aft where the intersection of the 1st Platform and side shell are at such a steep angle that they cannot be fabricated due to inadequate access for welding. Options are presented including use of margin plates outboard or terminating the 1st Platform at the longitudinal bulkheads 12 feet off centerline.

5. The aft end of the superstructure in way of the hangar doors lands on unreinforced plate, and the notch amidships for the boats is a serious concern due to the right angle corners inboard and the likelihood of significant longitudinal stresses being carried up into the steel superstructure.

6. There are large numbers of cuts clustered together in areas of the 01 Level, 1st Platform and longitudinal bulkheads 12 feet off centerline, raising concerns about stress concentrations and fatigue failures

7. The vertical stiffeners on the side of the hangar and stack span 2 decks, yet are the same size as similar stiffeners spanning a single deck. Horizontal midspan stringers are too long and too small to effectively support the vertical stiffeners.

8. The extreme aft end of the boat ramp is very shallow and may not be able to withstand stern slamming and boat launch and retrieval without damage.

9. The lower end of many bulkhead stiffeners are supported by small headers and are not welded to bottom longitudinals, thus not providing the fixity assumed in the calculations.

The following sections provide detailed comments for each document listed. A marked up set of drawings is provided to ELC that shows the area of concern and the associated comment. Many of the comments reflect differences between structural arrangements and details used by ICGS and those preferred by the reviewer. In such cases, the ICGS approach will work satisfactorily unless noted

U.S.C.G. PAPER "MAJOR NSC STRUCTURAL DESIGN ISSUES"

The subject paper was received on January 7, 2004, after completion of the comments presented below. Thus this report represents an independent review of the structural issues. As noted below, there is a strong similarity in the assessment of the major problems with the existing NSC structural design.

1. Strength Deck Stringer Plates: This is addressed in comment No. 1 on the 01 Level as well as comments on NGSS Technical Report No. SD 03-01-08, which follow. The drawings that I reviewed did not indicate an insert, though it is assumed that the insert and reinforcing ring analyzed in the NGSS report are now included in the drawings. I am concerned that the sudden and dramatic change in deck thickness with a one-inch insert may lead to stress concentrations not analyzed by NGSS. In my experience, inserts have been limited to no more than twice the thickness of the adjacent plate. The NGSS analysis should have included an analysis of stress patterns around the periphery of the insert and the reinforcing ring, which is not modeled. I am also concerned that the model does not include the hull/superstructure interface, where the notch and re-entrant corners create stress concentrations in the same location as the cuts. My recommendation would be to relocate the cuts further inboard, since locating cuts of this size in strength deck stringer plates is not good shipbuilding practice. I am unaware of any large cuts in the stringer strake of any of the 10 classes of surface combatant that I have helped design over the years. If it is impossible to relocate the cuts, the inserts should be reduced in thickness and extended inboard and down the side shell to be no more than ¾ inches thick (twice the nominal thickness) with edges tapered on a slope of 1:4, and made of HY-80, and the model should be expanded as recommended above.

2. Superstructure Side Buckling: The current (Rev. C) drawings reviewed for this study show the side plating to be 12.75 # between the 01 and 02 Levels, which should be adequate for buckling. The 02 Level remains 7.65# plate other than 2 relatively small 12.75 # inserts between frames 34 and 38 extending in from the deck edge about 2 feet. As noted in Superstructure comment 13 below, the ability of the remainder of the plate to resist longitudinal bending loads is questionable. The manner in which the hull girder loads transition into the superstructure can only be defined by a finite element model. The issue paper references an NGSS report SD-03-01-07 "NSC Superstructure Hull Interaction Assessment" that may have addressed the issue. I have not seen this analysis and cannot comment on its accuracy or completeness.

3. Holes Control: My comment 20 on the longitudinal bulkhead penetrations addresses concerns about the clustering of many large openings particularly when they are in the area of a discontinuity in the bulkhead itself. There are similar problems with penetrations in the decks including the stringer strake penetration addressed above, uptake/intake cuts on the 01 Level and cuts in stringers on the 1st Platform. There are a number of cuts elsewhere on the 01 Level and other decks, but they do not appear to be badly clustered or in areas of high longitudinal stress. Nonetheless, proper holes control would require each cut to be investigated during detail design to ensure that stress concentrations are avoided or properly compensated for. This is important because many more penetrations will show up as vent trunks, cableways. pipes, etc. are run through structure as the design evolves. Clear-cut guidance on location of penetrations is a key design tool during detail design.

4. Innerbottom Design: I concur with the concerns raised in this paragraph of the issues paper as shown in my comment 9 below on the innerbottom. NGSS report SD 03-01-09 "Structural Analysis of Machinery Spaces" indicates that stresses and deflections are acceptable, though some deflections and frequencies are very close to the limits imposed by the gear manufacturer. I am concerned about the NGSS model, which terminates at the 2nd Deck. This implies that the support at the top of the stanchions is infinitely stiff, which is not true. I feel that the interaction between the foundation/innerbottom structure and the deep bulkheads between the 01 Level and 2nd Deck is a very important issue and should have been addressed in the NGSS report. The overall support system is very complex, and USCG concerns about excessive flexibility are valid.

   The issues paper refers to a very shallow 24-inch deep innerbottom. None of the drawings I reviewed shows any recesses in the nominal 4'-1" deep innerbottom at centerline, which transitions to no less than 2'-6" at the margin plate. The transverse frames extending outboard from the margin plate are shown to be as little as 19 3/8" in depth. The NGSS model includes these frames, and shows no apparent high stresses.

5. Superstructure Re-Entrant Design: I fully concur with the concerns expressed in the issues paper, as indicated in comment 11 on the superstructure. The combination of 90 degree unreinforced corners and 02 Level cuts in the immediate area of those corners is a guaranteed crack starter. The experience with the FFG 7 class is particularly relevant. The 2-deck high aluminum superstructure is set inboard of the side shell about 8 feet throughout the forward 60 percent of its length and then slopes outboard with the side of the hangar flush with the side shell. The knuckle where the side slopes outboard is located at about 60 percent of the ship length aft of the bow), and has been a problem throughout the life of these ships. Cracks have developed both at the 02 Level (top of house) and along the vertical knuckle. The Australian FFGs include a radius at the corner of the knuckle and heavy inserts in the 02 Level and house

side in the knuckle area, and cracks are still occurring. For the NSC, the 90-degree corner, the large cuts in the 02 Level and the fact that the steel hull is connected to a steel deckhouse virtually guarantee similar or worse problems. With an aluminum deckhouse, the cracks to not tend to propagate into the steel hull, stopping at the bimetallic or bolted joint. With all steel construction, there is nothing to stop the crack from propagating into the strength deck and elsewhere.

NGSS REPORT SD-03-01-08 STRENGTH DECK STRINGER PENERATIONS

The stress patterns and stress concentration factors listed in the report appear reasonable assuming that they are correct. However, as noted above, my primary concern with the model used for the analysis is that it does not appear to include detailed analysis of the interface between the inserts and the adjacent deck or shell plate, or the 1'' x 10" reinforcing ring. The relatively short distance between the nominal plate and the cut would suggest a very rapid change in the stress patens that is not evident in the results. Also, there also is no apparent combining of this model with the one for the re-entrant corners of the superstructure, which are in close proximity to the deck penetrations. I also question the extreme difference in thickness between the inserts and the nominal deck stringer and sheer strake thickness, which exceeds normal practice.

NGSS REPORT SD-03-09 STRUCTURAL ANALYSIS – MACHINERY SPACES

This analysis addresses all of the areas that should be of concern including stresses, deflections and frequencies in way of the thrust bearing and critical equipment. However, as noted above, I am concerned that the longitudinal bulkheads above the 2nd Deck were not included in the model, which could increase vertical deflections at the top of the stanchions. Since the gear alignment tolerance and diesel engine movements are quite close to the limits, inclusion of the bulkheads might result in exceedance of those limits.

ELIN # S012-11, HULL STRUCTURE LOAD AND STRENGTH ANALYSIS, REV. B

1. Section 1.2.2 states that longitudinal bending stresses are assumed to vary linearly from the maximum value at the deck or keel to zero at the neutral axis. While this is appropriate for internal decks, the side shell is typically designed assuming that the stress tapers to one half of the maximum deck or keel stress.

2. Section 1.2.3.3 states that the assumed bending moment at the supports for fixed beams is wL2/10 whereas a fully fixed beam has a moment of wL2/8.

3. Figure 3-7 and many following figures calculating longitudinal and transverse beams indicate that the selected section fails to meet tripping stability criteria, and recommends resizing or addition of tripping brackets. The structural drawings indicate that ICGS has selected the latter approach. It is very important to ensure that these tripping brackets are included in the detail design drawings and ultimately installed on the ship.

ICGS DWG. # ASC100005 MIDSHIP SECTION

1. Two sets of longitudinal bulkheads are shown between the 01 Level and 2nd Deck, 8 and 12 feet off centerline (CL). The inboard bulkheads are currently supported by the transverses, meaning that there is a large cantilever bending moment at the stanchion. This will require the heavy 12" x 6.5" x 26# I/T to be carried outboard beyond the stanchion to the point that the moment is reduced to what the 8" T can support. This can be avoided by extending the transverse bulkheads at either frame 58.5 or 61.5 below the Main Deck outboard to the longitudinal bulkhead 12 feet off CL with an arch provided for access. This will result in the 12-foot bulkheads supporting the 8-foot bulkheads and reducing loads transmitted into the stanchions below (see mark-up of Main Deck scantlings).

2. The intersection of deck transverses and side shell webs consists of a fabricated radius corner bracket butt welded to the 2 frames. Most of the yards I have dealt with consider these too expensive and causing fit-up problems. Typically, they prefer to run the deck transverse out to the side shell and weld it to the top of the side shell web, after which a bracket cut from the smaller member is installed. Either will work.

3. There appears to be an inconsistency in the size of the stanchions shown. The calculations indicate that the upper one has an axial load of 130 kips compared to 184 kips for the one below (42% more load) while the weight of the lower stanchion (and thus area) is 67% greater. I would expect them to be closer in size.

4. There are 2 deep girders in line with stringers S7 and S8 shown on the innerbottom plan (part of the machinery foundations) that are not shown on the midship section. Also, the depth of the web frame is indicated as "varies". A minimum depth should be specified.

5. The knuckle in the side shell web frame between the Main and 2nd Deck introduces bending stresses due to the axial load, which do not appear to be accounted for in the calculations.

ICGS DWG # ASC101015 SCANTLING PLAN

1. 01 Level: The vent cut shown at frame 53-54 in the stringer plate should be moved inboard. Cuts in the stringer should not be permitted, particularly in the midship region due to the stress concentration created and the potential for cracking. If it is impossible to move the vent, an insert as discussed above in comment 1 on the U.S.C.G. issues paper should be provided to reduce stress concentrations and fatigue problems. Although ABS grade EH-36 has better notch toughness than grade AH-36, it is far less effective in stopping crack propagation that HY-80. Therefore an HY-80 insert is recommended.

2. 01 Level: There are 4 locations where the deck transitions from flat to cambered (forward, aft, and in way of boat stowage amidships). This creates complexity in layout and introduces knuckles in longitudinal members. It is recommended that camber be used throughout.

3. 01 Level: The penetrations between frames 43 and 48 should be reconfigured to reduce the width of the forward cut (it now sets the width of the shadow area) and to combine the cuts between frames 45 an 48 into a single cut with generous corner radii. The proximity of the ladder cut at frame 60 to the aft corner of the uptake cut is also a concern due to potential stress concentrations even though the ladder cut is within the shadow area of the uptake cut.

4. 01 Level: ICGS uses a series of transverse headers forward to terminate the longitudinals as the deck reduces in width. In most cases these can be eliminated. Where the remaining panel width is excessive, the longitudinal aft of it can be knuckled and run for one or 2 frames as shown in the mark-up. Alternatively, the outermost longitudinal can be run 2 feet inboard of the side shell, with inboard longitudinals knuckling and ending on transverse webs as shown. This comment applies to all decks, and is a "preference" item.

5. Main Deck: The vent cut at frame 53-54 should be moved inboard if possible, though it is not as critical here as on the 01 Level. Also, the mark-up shows the extension of bulkheads 58.5 and/or 61.5 discussed in Midship Section comment 1.

6. 2nd Deck: The transverses at frames 46, 48 and 50 between the 8 and 12 foot longitudinal girders can be reduced to 8 x13# Ts since the longitudinal bulkheads above the 2nd Deck span between subdivision bulkheads and effectively support both girders. If the change recommended in comment 5 above is made, the transverses at frames 54, 56 and 58 could similarly be reduced.

7. 1st Platform: There are multiple cuts in the stringer between frames 51 and 53 that reduce its ability to support side shell hydrostatic loads.

8. 1st Platform: The area outboard of the 12 foot longitudinal bulkhead aft of frame 76 will be difficult if not impossible to build since the angle between the shell and platform is so small that access to weld outboard is blocked (see Scantling Section mark-ups at frames 80, 82, 88 which shows the condition more clearly). Between frames 82 and 88 it is recommended that the platform plate terminate at the 12-foot bulkhead with grating outboard to provide a walking surface. Between frames 76 and 82, where the condition is not as severe, it would be possible to install a margin plate between 16 and 18 feet off CL to maintain some of the tankage outboard of the bulkhead. If an alternative location could be found for the fuel, it would be preferable to terminate the platform plate at the bulkhead as recommended between frames 82 and 88.

9. Tank Top: Brackets are recommended at the ends of the margin plate at frames 36 and 70 extending forward and aft one bay.

10. Inner Bottom: The massive structure provided in way of the machinery foundations (51.0 # plate transverse floors, etc.) suggests that the depth available for the foundations is too limited, and is resulting in the need for many very heavy, shallow members to provide adequate strength and stiffness. Welding 51# floors to 15.3# and 25.5# shell and tank top plating is not normal practice, and implies very inefficient structure. The bottom structure is tied by stanchions to the 2 longitudinal bulkheads 12 feet off centerline between the 01 Level and 2nd Deck that span the machinery box. This offers a dual load path for supporting the main machinery, which is not modeled in the NGSS analysis. This load path is compromised by the discontinuity of the starboard bulkhead between frames 55 and 64, 01 Level to Main Deck. This section of bulkhead should be added to provide balanced stiffness port and starboard.

11. Superstructure: The support of the house front and bulkhead 44 is very good, with alignment with transverse bulkheads below the 01 Level. However, the support of the aft end at frame 67 is virtually non-existent. The aft house end is on unsupported plate with nothing but nominal longitudinal to carry the loads to the transverses at frames 66 and 68. The 01 Level longitudinal girder fall in way of the door openings, and thus provide no support. There is a need for a transverse beam and centerline stanchion to support the aft end of the hangar.

12. Superstructure: The notch in the deckhouse in way of the boats, frame 43-52, raises serious concerns. Since the deckhouse is steel and extends over 40 % of the hull length, and is welded directly to the side shell through most of this length, longitudinal bending stresses will be significant. The sharp 90-degree corners inboard in combination with the large cuts in the 02 Level just inboard of the corners is a guaranteed crack maker. Lessons learned from the FFG 7 class with similar notches (though not with 90 degree corners) makes it urgent to solve this problem immediately.

13. Superstructure: It appears that the gas turbine uptake cut, frame 44-46 in the 02 Level, is offset by a frame from the uptake cuts below (frame 45-47) which will make engine removal very difficult. The cuts should be aligned.

14. Superstructure: The ability of the 7.65# plate on the 02 Level to resist buckling from longitudinal bending is questionable, particularly if it is supposedly designed for the same stresses as the 01 Level as stated in Section 1.2.4 of the calculations.

15. Superstructure: The vertical stiffeners on the side of the hangar and stack span 2 levels, with a longitudinal stringer at the half depth. The calculations indicate a length of 10 feet for the hangar side web frames, and 7.5 feet for the stack stiffeners. This implies that they are supported by the stringers. However, the stringers are relatively light sections and have very long unsupported spans

(nearly 50 feet in the hangar). Thus they are not truly supporting the vertical stiffeners, which appear to be badly undersized.

16. Superstructure: There are a number of bulkheads within the stack that appear in some views and not others. It is difficult to determine where the bulkheads are located.

17. Superstructure: Support of the mast below the Top of House is compromised by the discontinuity in transverse bulkhead 38. This bulkhead is essential in resisting overturn loads and rocking of the mast and should be continuous across the deckhouse. As shown by the mark-up of the Top of House, the footprint of the mast base manages to miss most of the potential supporting structure below. The front is 18" aft of the transverse bulkhead at frame 38. The sides miss the longitudinal girders and stanchions by a foot. The centerline bulkhead sits on a 4" T. The two structures need to be integrated.

18. Superstructure: The geometry of the mast is unusual to say the least. It is not clear why the huge openings are required in the sides, but they greatly compromise lateral strength and stiffness. There is no support directly below the structure shown in Section A-A, so that all loads in the triangular brackets must pass into the longitudinal bulkheads below as a point load. The brackets have no shear area to accomplish this.

19. Centerline Bhd: The aft end of the boat ramp, frame 96-99, is extremely thin and will probably not be adequate for life cycle stern slamming and boat handling loads. It may be necessary to add more longitudinal webs and transverse floors to what is shown on the shell expansion.

20. Longitudinal Bhd. 12 Ft. off CL: As noted in comment 9 above, the missing portion of this bulkhead between frames 55 and 64. 01 Level to 2nd Deck, starboard should be added to provide proper support to the decks supported and the machinery foundations.

21. Longitudinal Bhd 12 Ft. off CL: There are several areas where large door and arch cuts are clustered, creating stress concentrations and potential for cracking. This condition is particularly bad in the areas between frames 42-45 and 62-73 where the concentration of openings occurs in areas where the bulkheads terminate. This compounds the stress concentrations and the likelihood of structural failure. It is common to have this problem with such bulkheads since they typically form the boundary of passages with many adjacent compartments requiring access to the passages. This problem can be minimized with careful design. For example, the accesses to 2 adjacent compartments can be via a common vestibule requiring only one opening in the longitudinal bulkhead. That opening would be an arch, with radiused corners and flat bar reinforcement, rather than a door with sharp corners and no reinforcement. Accesses off cross passages also eliminate such cuts.

22. Longitudinal Bhd 12 Ft. off CL: Bottom structure between frames 64 and 70 is missing. Brackets should be provided forward of frame 70. Also, the discontinuity in the bulkhead between the Main and 2nd Decks, frame 72-82 weakens the effectiveness of these bulkheads to stiffen the stern (Hovgaard bulkheads). If they cannot be added, brackets should be provided at the corners to transition stresses into the Main Deck longitudinal girder and the bulkhead below the 2nd Deck.

23. Longitudinal Bhd 12 Ft. off CL: A deep ring frame should be added aft of frame 94 to compensate for the lack of bulkhead above the 2nd Deck.

ICGS DWG # ASC101016 SCANTLING SECTIONS

1. All bulkhead sections indicate 10.2# plate. It is noted on the Midship Section that it is intended to change this to 7.65# plate and that the stiffeners are sized to accept the thinner plate.

2. There are numerous instances marked up on the drawings where bulkhead stiffeners are not adequately supported at both ends to be considered fixed beams. This is particularly prevalent on the lower sections where stiffeners are run vertically until terminated on a header rather than slope them to align with bottom longitudinals. The calculations indicate that fixity is expected at the top and bottom.

3. Bulkhead Frame 9: The drawing indicates horizontal diaphragms below the 1st Platform, which contradicts the shell expansion, which shows vertical floors.

4. Web Frame 40: The outboard portion of the transverse floor appears weak in way of the stanchion landing. The mark-up shows a proposed revision that knuckles the frame at the margin plate and runs it parallel to the bottom shell until it ends at the service tank bulkhead.

5. Web Frame 56: The 8" transverse on the 2nd Deck needs to be strengthened in way of and outboard of the stanchion to carry the cantilever moment (see comment 1 on the Midship Section). Also, the notch in the structure below the stanchion ending is presumably driven by interference with machinery. A preferred alternative would be to slope the stanchion so that the bottom aligns with the girder at S9. This would eliminate the added structure between the 1st Platform and the gear foundation.

6. Bulkhead Frame 70: Welding between the shaft tube and adjacent longitudinal bulkheads will be very difficult.

7. Web Frame 80, Bulkheads 82 and 88: The mark-up illustrates the tight condition outboard where the 1st Platform connects to the shell and the proposed solution discussed earlier.

8. Bulkhead 88 and Web Frame 94: Deep stiffeners should be provided above the 4 shaft strut floors.

ICGS DWG. # ASC101017 SHELL EXPANSION

1. A heavy chafing plate should be installed below the anchor bolster to resist damage from anchor flukes.

2. Where longitudinals cross the knuckle line, the drawing shows the longitudinal terminated on each side of the crossing and a number of transverse frames installed. A preferred solution would be to knuckle the longitudinals to run parallel to the plate knuckle and overlap by one frame to minimize the discontinuity in longitudinal strength.

3. The margin plate, 12-foot longitudinal bulkhead and heavy longitudinal girders (foundation members) should be identified.

4. There should be an insert in way of the rudder posts.

5. An insert of EH-36 plate is recommended where the 01 Level terminates if calculations indicate a potential fatigue problem.

Appendix F
Memorandum from Assistant Commandant, G-S, to Deepwater Program Executive Officer, ***National Security Cutter (NSC) Structural Design Deficiencies,*** **March 29, 2004**

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

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Email: EMBrown@comdt.uscg.mil

9050

MAR 29 2004

MEMORANDUM

From: ERROLL BROWN, RADM
COMDT (G-S)

Reply to Attn of: G-SDW
CAPT Rodriguez
7-0865

To: P.M. STILLMAN, RADM
PEO, Integrated Deepwater System

Subj: NATIONAL SECURITY CUTTER (NSC) STRUTURAL DESIGN DEFICIENCIES

Ref: (a) Deepwater NSC Cutter Certification Matrix
(b) G-D/G-S Roles and Responsibilities memo dtd 28 Jun 01
(c) Deepwater Program Management Plan

1. I am concerned that significant problems persist with the structural design of the NSC. Importantly, several of these problems compromise the safety and the viability of the hull, possibly resulting in structural failure and unacceptable hull vibration. The following are my major areas of concern:

a. Reduction Gear Structure

(1) Structural Design of Ship Bottom - Improper rocking deflection or thrust bearing foundation stiffness.

b. Superstructure Buckling

(1) Superstructure Buckling - Inadequate primary, secondary and tertiary structural stress analysis.

(2) Superstructure Re-Entrant Design - Abrupt discontinuity in the superstructure amidships leading to early fatigue failure and superstructure cracking.

c. Sheer Strake Deck Penetrations

(1) Strength Deck Stringer Plates - Large elongated oval openings in the strength deck stringer strake plates which are prohibited by reference (a).

(2) Hole Control - Inappropriate placement of openings in the longitudinal structural bulkheads prohibited by reference (a).

2. Over the past eighteen months, my subject matter experts have attempted to work collaboratively within the IPT structure to resolve these problems through review, comment and follow-on discussion of the structural design using reference (b) and (c) as guidance. My concern is that ICGS has unilaterally closed the structural comments and concerns and ended any collaborative effort at the NSC IPT and Sub IPT level, without reaching resolution. Enclosure

Subj: NATIONAL SECURITY CUTTER (NSC) STRUTURAL DESIGN DEFICIENCIES

9050
MAR 29 2004

(1) provides additional detail regarding the structural issues I believe remain open and the curren status of the ICGS response(s).

3. I'm seeking your immediate support in finding a mutually agreeable method for resolving these engineering differences. Understandably, even the best engineers can disagree on data, an in their analyses, conclusions and recommendations. To preclude potential technical disputes from creating intractable impasses, I sought the unbiased expertise of an independent third party validation and asked two very highly regarded naval vessel structural experts to independently review and make recommendations on these issues. Mr. Robert Sielski, prior to retirement, was head of the Ship Structures Code at NAVSEA and retains the corporate history of U.S. Navy structural design development over the past 30 years. Mr. Robert Scott is one of the most experienced designers of military ship structures working in the industry today. Mr. Scott is responsible for the structural design of ten surface combatants and is the retired President of Gibbs and Cox and the American Society of Naval Engineer. I am providing Mr. Sielski's and Mr. Scott's findings as enclosures (2) and (3) respectively. These enclosures corroborate the findings of my technical experts and confirm, through independent analyses, that significant flaws exist in the structural design of the NSC.

4. The response by ICGS in Risk number S52 (enclosure (4)) calls for a third study as part of the mitigation strategy. However, this study is ongoing and currently addresses only one of the three remaining concerns. Reference (c) provides the mechanism to bring the issues that canno be reconciled using the IPT process. I am seeking your immediate assistance to bring these critical technical issues to an agreeable resolution. The fact that the resolution of these engineering issues will most likely impact the NSC design, its paramount that the impending Delivery Task Order for Production and Deployment of the NSC (0030BC), be held in abeyanc until we can achieve resolution.

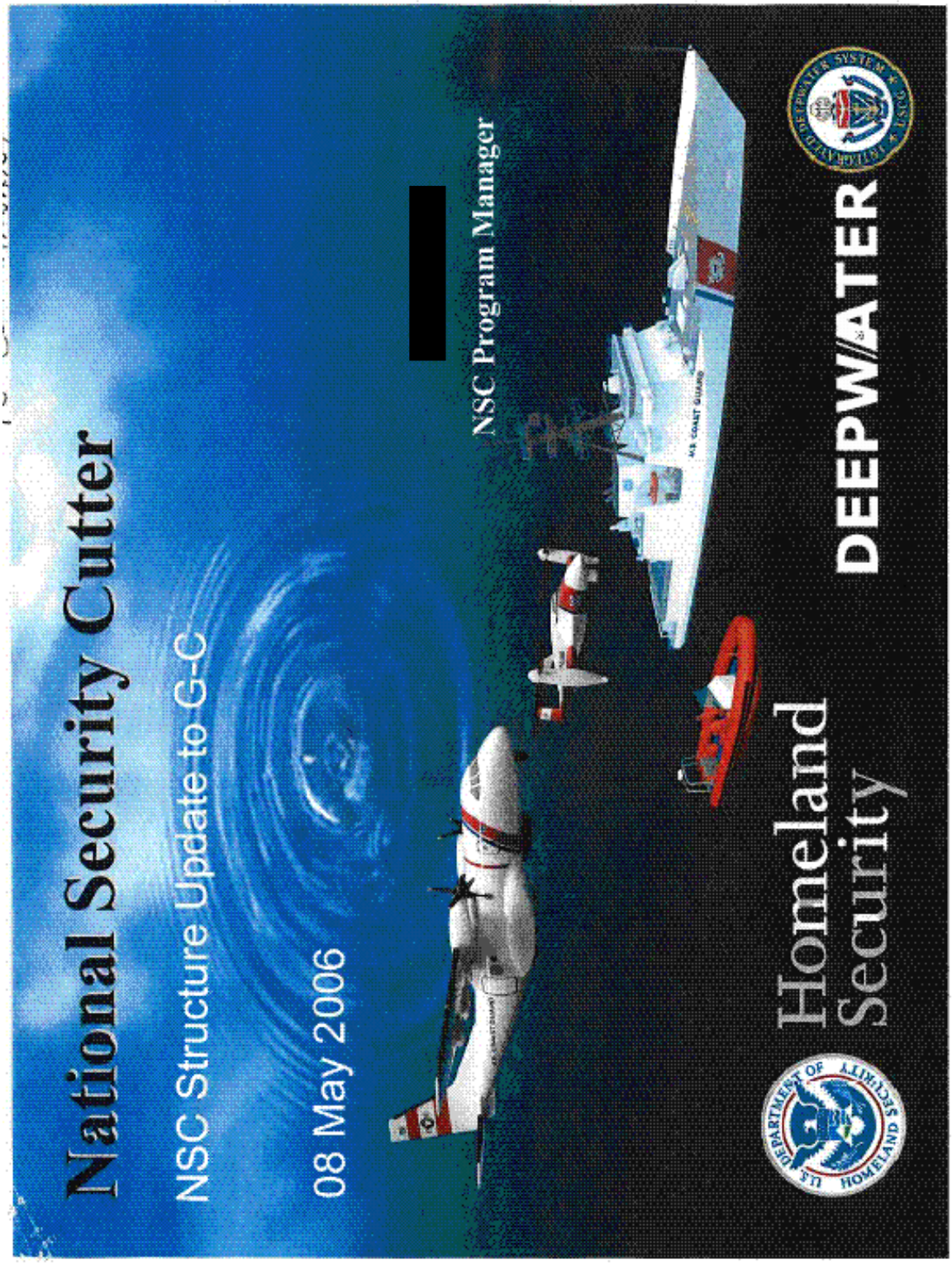
#

Enclosures: (1) NSC Structural Design Concerns
(2) Review of Structural Design of National Security Cutter, R.A. Sielski, January 8, 2004
(3) Review of Northrop Grumman Ship Systems Structural Design for The Deepwater National Security Cutter, R.J. Scott, P.E., January 9, 2004
(4) Deepwater Risk S52, NSC Structural Concerns

Copy: G-O

2

Appendix G
Deepwater Program Office Brief to Commandant, *NSC Structure Update to G-C*, May 8, 2006



Appendix G
Deepwater Program Office Brief to Commandant, ***NSC Structure Update to G-C,***
May 8, 2006

Agenda

- Fatigue Analysis Update
- ICGS/NGSS Collaboration
- Path Ahead
  - Implications for NSC-1, NSC-2 and Follow Ships

Homeland Security

NSC Structure Update [redacted]

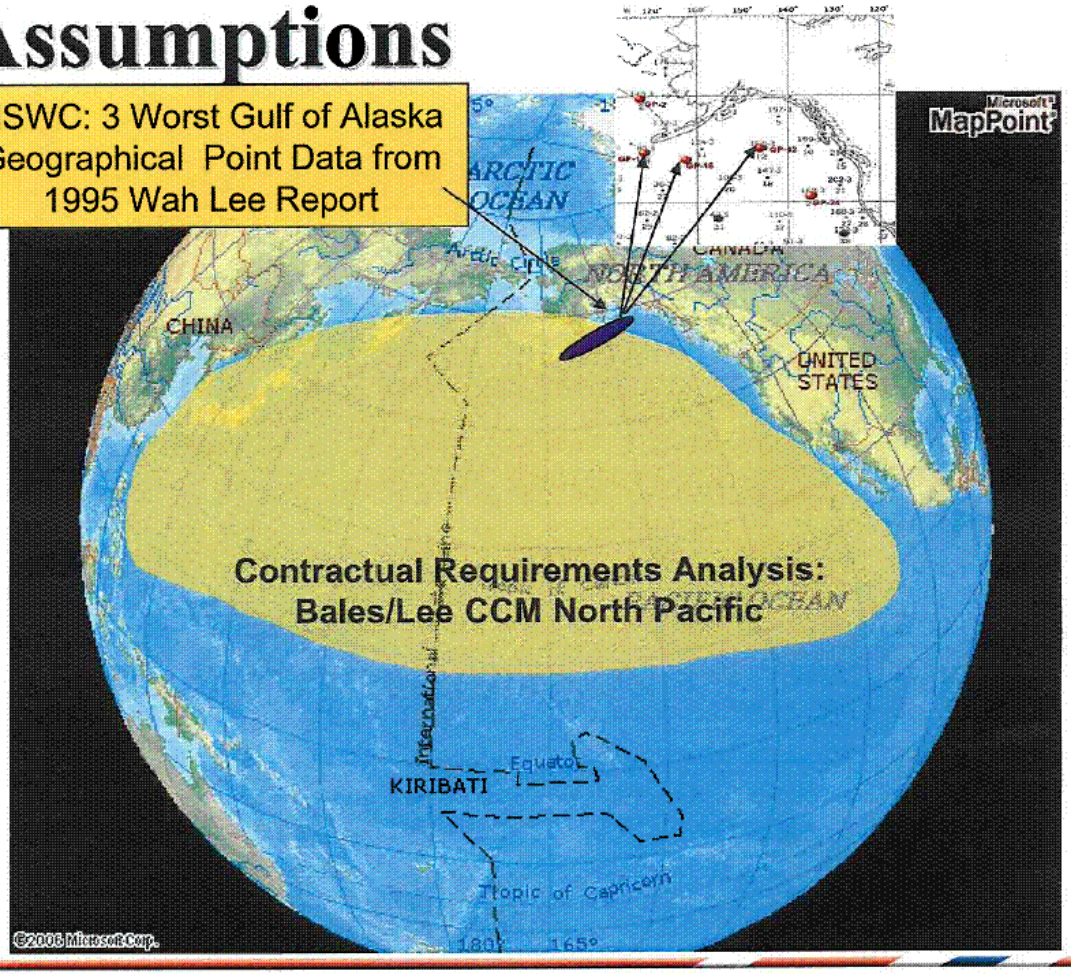
DEEPWATER

2

Analysis Assumptions

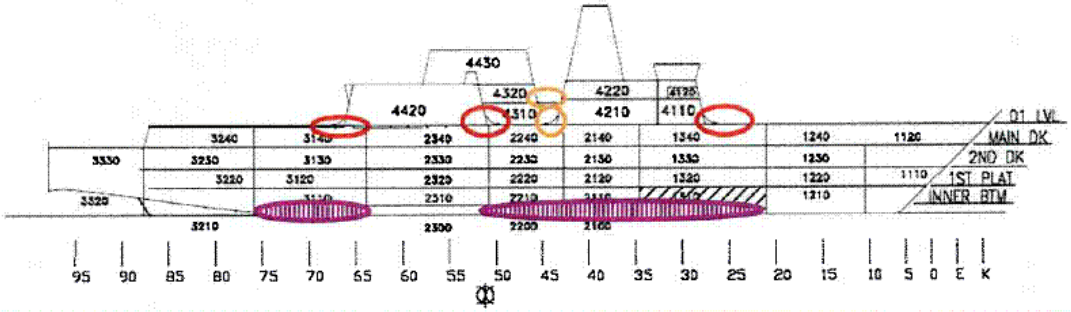
- **Areas Selected for NSWC and Contractual Requirements Analyses**

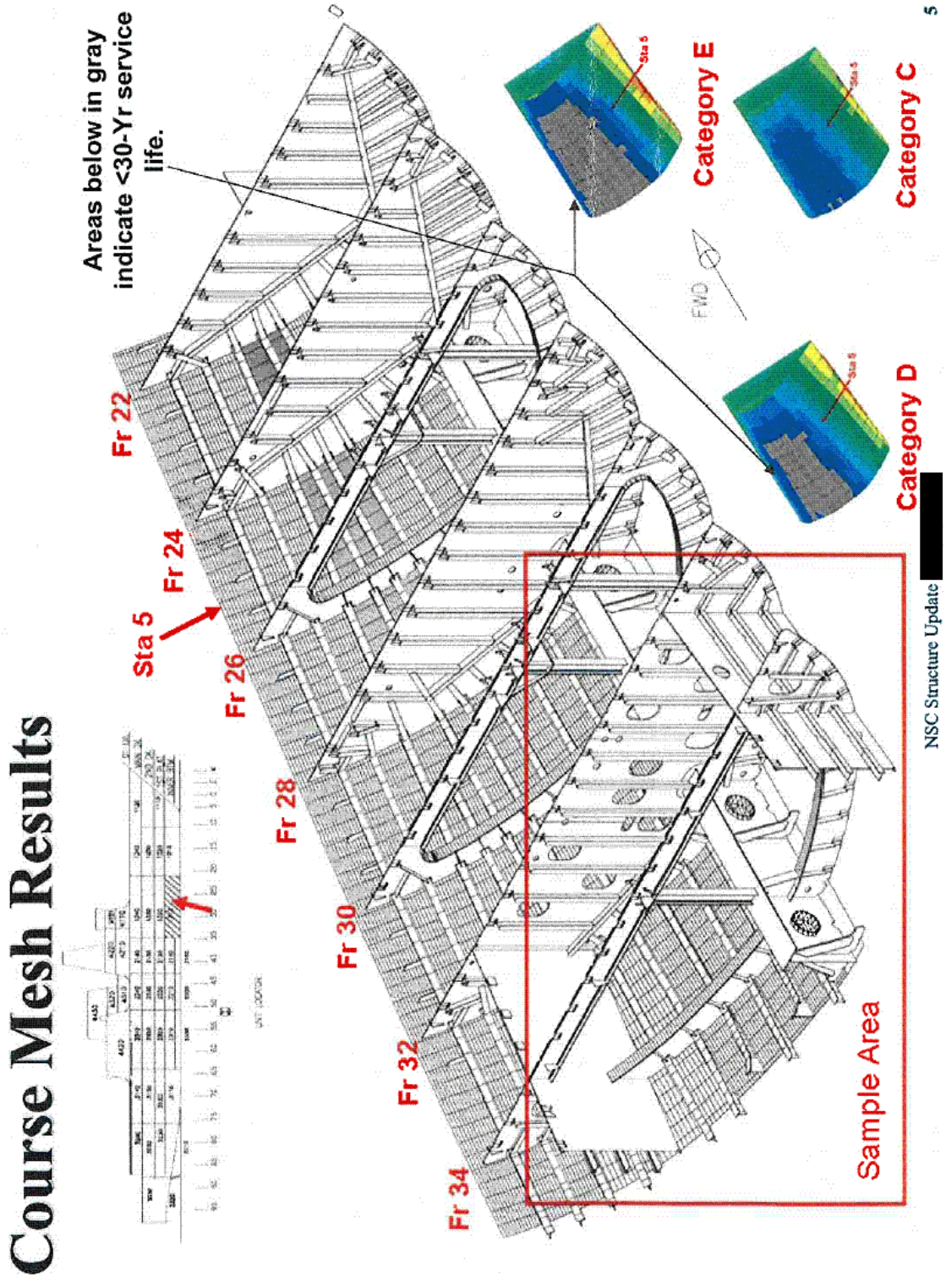
- **Other Factors: Days Underway Speed /Heading**

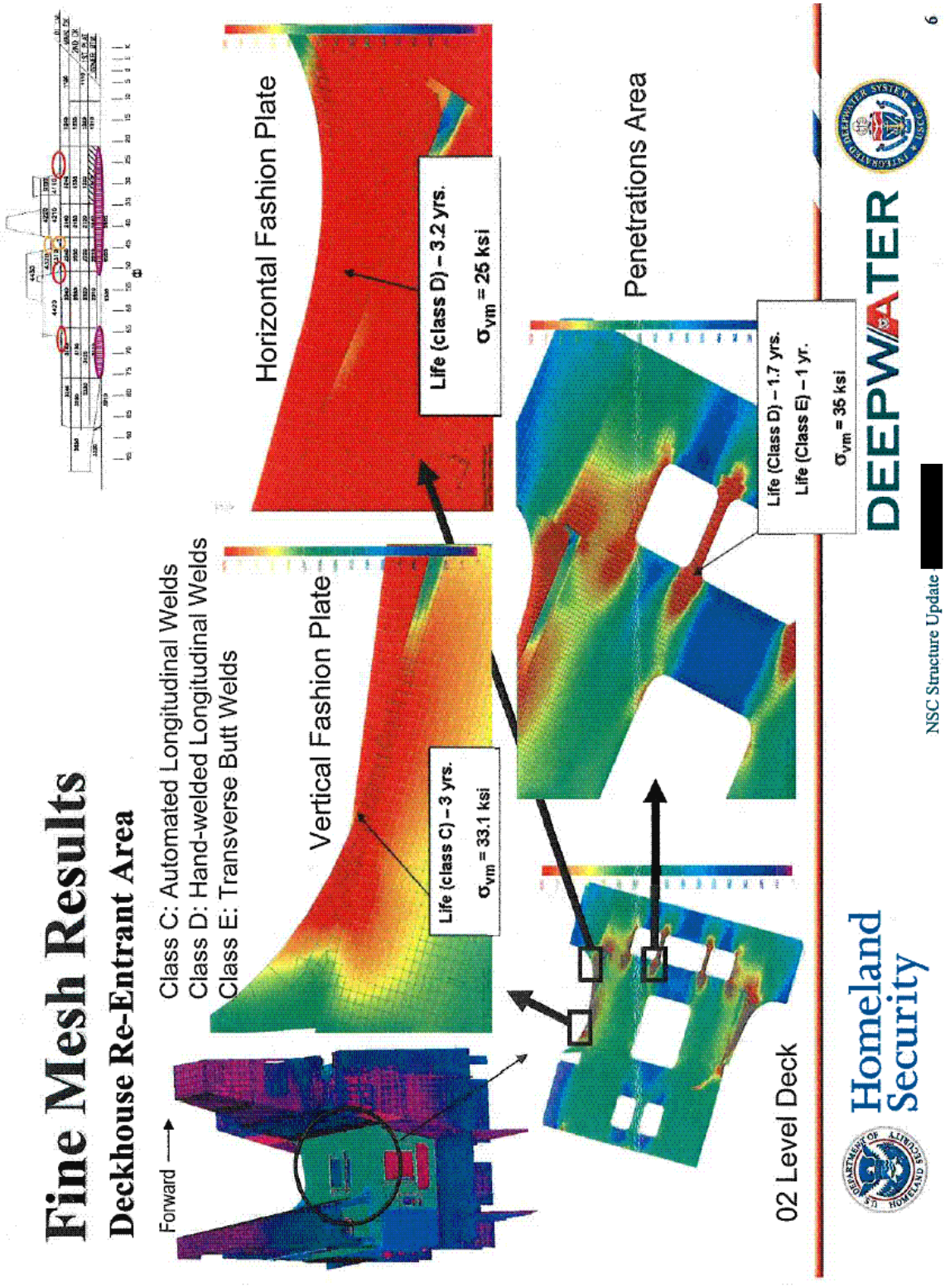


Analysis Results

- NSC design not compliant with performance requirements.
- Identified areas inadequate for 30-year ship service life,
  - Based on performance requirements for 6900 lifetime underway days.
  - Based on ICGS's "20% Reduced NSC Utility" position of 5550 lifetime underway days.
- Fatigue service life for some critical details predicted to be less than 15 years.
- Results thus far appear to confirm NSWC Carderock conclusions and USCG technical authority concerns for potential of serious consequences.




Course Mesh Results
Areas below in gray indicate <30-Yr service life.
Fr 22
Fr 24
Fr 26
Fr 28
Fr 30
Fr 32
Fr 34
Sta 5
Category E
Category C
Category D
FWD
Sample Area
NSC Structure Update
5


Fine Mesh Results
Deckhouse Re-Entrant Area
Forward
Class C: Automated Longitudinal Welds
Class D: Hand-welded Longitudinal Welds
Class E: Transverse Butt Welds
Vertical Fashion Plate
Life (class C) – 3 yrs.
σ_{vm} = 33.1 ksi
Horizontal Fashion Plate
Life (class D) – 3.2 yrs.
σ_{vm} = 25 ksi
Penetrations Area
Life (Class D) – 1.7 yrs.
Life (Class E) – 1 yr.
σ_{vm} = 35 ksi
02 Level Deck
Homeland Security
DEEPWATER
NSC Structure Update
6

Fatigue Life Summary

Performance Expectation: 30 Year Fatigue Life

Area of Concern	Model	Results - Calculated Standard Service Life (Years): Longitudinal Fillet Welds with Starts/Stops	Transverse Butt Welds	Transverse Fillet Welds	Stiffener Connections, Splices & Penetrations	Assessment
U/W Shell - **Minimum Life** Calculations for Stations 5, 8, 10, 13, 15	**Coarse Mesh**	>30	<30*	~19	~10	Transverse fillet welds to shell: Extensive failure areas. Models indicate some transverse butts between Sta 13 and 15 may have <30 year service life. *Erection-joint butt welds warrant closer look.
01 Deck Knuckle	Fine Mesh	5.8*	4.5	2.4	<2	*Longitudinal Butt Weld. Prediction of early crack initiation in longitidinal and transverse butts and fillets is potentially dangerous and unacceptable. Length of overstressed knuckle joint and proximity to fashion plate insert lead to concerns about circumfrential crack propagation.
Deckhouse Fwd (Fr 28) Fashion Plate	Fine Mesh	10.6	2.7	<<30	N/A	Prediction of early crack initiation in vertical butt welds between insert plate and side shell. Potential for serious consequences.
Aft Hangar (Fr 67) Fashion Plate	Fine Mesh	<<30	4.9	3.3	N/A	Prediction of early crack initiation in vertical butt welds between insert plate and side shell. Potential for serious consequences.
Longitudinal 12' O.C. Bulkhead	Fine Mesh	19.2	N/A	13.1	<10	Failure areas are localized at several watertight hatch insert corners.
Fr 52 Fashion Plate	Fine Mesh	18.5	7.6	<<30	N/A	Prediction of early crack initiation in vertical butt welds between insert plate and side shell. Potential for serious consequences.
Vent Penetration	Fine Mesh	>30	18.6	5.3	<<30	Failure areas do not appear large, but require corrective action.
Deckhouse Re-entrant Area and Fashion Plates	Fine Mesh	<4	<3	<2	<2	Local stresses too high for fashion plates to be effective. Large 02 level penetrations. Stresses high enough to require re-design of re-entrant area. (Stresses too high for joint life enhancement through grinding or peening.)

2.3% probability of failure at service life indicated

Homeland Security

DEEPWATER

ICGS/NGSS Participation

- Energy focused on deflecting Government technical analysis and re-interpreting contract requirements. Little interest yet displayed to partner for solutions.
- Technical response: Gradual back-peddling away from NGSS 2004 fatigue technical positions. (Performed by local subcontractor with no prior experience with structural fatigue.)
- No interest yet expressed to assume technical leadership and solve these problems or address underlying systems engineering issues.
- Regular participation in bi-weekly technical interchange meetings.
- Support or risk-based assessment adequate, no leadership initiative
- NGSS working to update Downey FEA models to validate NSWC/USCG analysis.

ICGS/USCG should consider using 3rd party

Path Ahead

- Complete NSWC-CD Analysis (Inner Bottom, Hangar Racking) — 14 Apr 06
- Issue Contracting Letter notifying ICGS of structural deficiencies — 19 Apr 06
  - (5 vs. 30 yrs)
- Establish Contracting Officers Interpretation of service/fatigue life design and production requirements — 16 May 06
  - Days Underway per Year
  - Sea Spectrum
- Initiate Risk-Based Assessment of structural details (NSC-1) — 21 Apr 06
  - Catalog structural details at risk, determine consequence of failure and assess best value mitigation
  - Determine with or without ICGS modifications to be implemented on NSC-1 and NSC-2
- Develop Technical Approach for NSC-3 and follow — 2 Jun 06
  - Using risk based assessment as a guide, develop concept studies (plate swap, details re-design, etc…)
  - Determine with ICGS modifications to be implemented on NSC-3
- Validate NSWC-CD analysis methodology — TBD
  - Use classification society (ABS, DNV, etc…)
  - Match run with USCG Legacy cutter (378 or 270)

Appendix H
Memorandum from CG-4 to G-D, *NSC Structural Design*, June 23, 2006

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

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Email: echamberlin@comdt.uscg.mil

9100
23 June 2006

MEMORANDUM

From: D.G. GABEL, RADM
CG-4

Reply to Attn of: CG-4B
CAPT Chamberlin
(202) 267-1848

To: G.T. BLORE, RDML
G-D

Subj: NSC STRUCTURAL DESIGN

Ref: (a) G-S memo 9050 dtd 29 March 2004

1. Since development of reference (a), much work has been done to analyze the structural design and fatigue life of the National Security Cutter (NSC). The Naval Surface Warfare Center, Carderock Division (NSWC-CD) analysis of the structural issues identified in reference (a) confirmed our concerns and identified other areas where the NSC structure is inadequate. I remain concerned that critical aspects of the NSC structure are not adequately designed to achieve a 30 year service life. I have weighed the merits of, and the results obtained from, each of the analysis methods presented to date to arrive at my conclusions and recommendations regarding the NSC structural design. These conclusions and recommendations, along with the basis for each of them, follow.

2. The analysis conducted by NSWC-CD used 230 days of operation in the North Pacific as an initial assumption and "bracketed" the operational profile by using 230 days in the General Atlantic as a less severe wave profile loading case. I agree with your assessment that designing the NSC to operate 230 days, on average, each year in the North Pacific would lead to an overly conservative design. Enclosure (1) is a spreadsheet that G-RCD developed to illustrate the NSC operational profile for application in subsequent fatigue life analysis calculations. By applying the current post delivery OT&E activity schedule and some basic assumptions regarding scheduled and unscheduled availabilities, I conclude the NSC will operate, on average, between 170 to 180 days per year in the Pacific Ocean north of the Equator. I therefore recommend that no less than 170 days per year, on average, in the Pacific Ocean north of the Equator, with the associated and appropriate sea spectra, be used as the operational profile for fatigue design calculations.

3. Based on this operational profile, I recommend the NSC be designed to the following permissible stresses based on American Association of State Highway and Transportation Officials (AASHTO) category D and E details (permissible stresses for other categories of details can be provided as needed):

Subj: NSC STRUCTURAL DESIGN 9100
23 Jun 2006

	For Category E Details			For Category D Details	
Station	Strake Area	Non Strake Area	Station	Strake Area	Non Strake Area
5	6.5 KSI	7.4 KSI	5	8.2 KSI	9.3 KSI
8	6.6 KSI	7.6 KSI	8	8.4 KSI	9.6 KSI
10	7.4 KSI	8.5 KSI	10	9.6 KSI	10.8 KSI
13	7.3 KSI	8.3 KSI	13	9.3 KSI	10.5 KSI
15	6.6 KSI	7.6 KSI	15	8.4 KSI	9.6 KSI

The structural areas outlined in reference (a) and others identified by the NSWC-CD independent analysis are inadequately designed for these permissible stress levels. I note that improvement in the fatigue life performance of many of the existing welded joints can be achieved by post weld treatments such as ultrasonic peening.

4. I have concluded that using the 378-foot WHEC class as a benchmark to determine a maximum permissible stress range for the NSC is invalid for a number of reasons. Through discussion with NAVSEA and NSWC-CD, we have learned that when the Navy selects a hull to use as a benchmark they select a hull with a proven fatigue life - free from structural problems – with an operational profile that is substantially identical to the hull under design. Enclosure (2) details a variety of fatigue failure problems documented on the 378-foot WHEC class. Because of these well documented early fatigue failures, and because the proposed operational profile for the NSC is very different from the historical usage profile of the 378-foot WHEC class, the 378-foot WHEC is not an appropriate choice for a benchmark hull. There is no other hull in the Coast Guard's inventory that would provide a suitable benchmark for the NSC.

5. I have also concluded that the simplified analysis based on DNV classification standard No. 30.7 "Fatigue Assessment of Ship Structures" that you recently provided for my review cannot be assumed to be valid for use with the NSC. This standard was developed specifically for large container ships, bulk carriers and tankers - ships that are very different in configuration and in the way they are loaded relative to the NSC. The analysis that was developed makes use of long term stress range distributions represented by Weibull distributions. Weibull shape parameters for container ships, bulk carriers and tankers have not been validated to represent the long term stress distributions of the NSC. The DNV classification notes present two methods for fatigue life calculations - a simplified method intended to give a good indication if fatigue is a significant criterion for design, and a direct analysis approach that will reliably calculate fatigue lives of large container ships, bulk carriers and tankers. The simplified methodology employed in your analysis was intended only to provide an indication if fatigue should be a criterion for the structural design and is not appropriate for determining the design permissible stress level for the NSC.

6. In summary, there is no appropriate Coast Guard hull to be used as a benchmark for the NSC design. This leaves as the only viable analysis alternative: (1) developing an operational profile based on expected use; (2) developing a lifetime fatigue bending moment histogram; (3) completing a finite element analysis to determine expected fatigue life; and (4) implementing the

Subj: NSC STRUCTURAL DESIGN 9100
23 Jun 2006

necessary changes to achieve the intended service life. I recommend that you employ the operational profile described in paragraph 2 and detailed in enclosure (1) to determine the appropriate wave loading distribution, and the permissible stress levels of paragraph 3 to determine the adequacy of design details. Use of this analysis method will pinpoint the areas of the NSC design identified in reference (a) and others identified by NSWC-CD that need to be addressed to achieve a 30 year fatigue life. As always, my staff and I stand ready to provide any further assistance you may require.

#

Enclosure (1) NSC Operational Profile Spreadsheet from G-RCD
(2) Documented reports of 378-foot WHEC fatigue problems

Copy: G-CCS, G-L, G-R, G-P, CG-2, G-RC, CG-8, CG-4B, CG-45

Appendix I
Memorandum from G-SDW to G-DPM, *Status: WMSL Structural Design Deficiencies*, January 4, 2005

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

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Email: gregory.sabra@dwlcgs.com

JAN 9050 - 4 2005

MEMORANDUM

From: J.F. Rodriguez
G-SDW

Reply to Attn of: G-SDW
LT Sabra
571-218-3428

To: G-DPM

Subj: STATUS: WMSL STRUCTURAL DESIGN DEFICIENCIES

Ref: (a) G-S memo 9050 dtd 29 Mar 2004
(b) NSWCCD-65-TR-2000/25, Fatigue Design Guidance for Surface Ships

1. This memo updates the status of structural deficiencies identified in reference (a) and provides further recommendations to correct the WMSL structural design. In the past several months, changes to the design have been accomplished which improved the structural strength of the vessel, but despite these improvements, several issues remain which degrade the operational capability and reduce the cutter service life to less than 30 years.

2. The hull fatigue analysis completed by ICGS makes the following key assumptions that reduce the predicted fatigue life of the WMSL by an order of magnitude (i.e. from 50 years to 5 years or less):

a. In their fatigue analysis, ICGS assumed a wave encounter profile based on the WMSL CONOPS and a homeport in Alameda CA, where North Pacific wave data was diluted 2:1 to represent the significantly milder sea conditions of the U.S. West Coast. Standard US Navy design criteria uses the North Atlantic wave encounter profile because this produces the most conservative design approach, and is valid for an entire class of ship operating anywhere in the world. The ICGS fatigue analysis is only valid if all eight WMSL's are home ported in Alameda, and each cutter never exceeds the Performance Specification or CONOPS for days underway, transit speeds, or sea conditions during their entire 30 year service lives.

b. In their fatigue analysis, ICGS improperly assigned the AASHTO fatigue categories defined by reference (b). This substantially underestimates the calculated stresses at the design critical points (stress concentrations) and results in an inflated fatigue life. A quick review of the WMSL design and reference (b) clearly illustrates several locations in the ship structure that should be assigned fatigue categories C, D and E. ICGS, however, has only assigned fatigue categories A, B, C, and a few D to the design.

JAN - 4 2005

Subj: STATUS: WMSL STRUCTURAL DESIGN DEFICIENCIES 9050

3. The following paragraphs summarize the unresolved structural concerns and provide our recommendations to address them. These issues are listed in order of priority:

a. **Strength Deck Stringer Plates**: The vent penetration openings in the 01 level stringer strake remain the most serious concern with the WMSL design. The inadequate fatigue strength will results in cracks which could propagate and cause the hull girder to fail. This problem is worsened with the penetrations required for the helicopter ASIST system which will be located slightly inboard the vent penetrations.
Recommendation: Move the ventilation ducts at Frame 53 inboard to the AMMR uptake space, eliminating the vent penetrations in the 01 level stringer, and specify that the stringer strake plating be capable of absorbing 35 ft-lbf of energy at -120 °F when measured in accordance with ASTM A673/A673M-04. It is common practice to provide crack arrestors in the shear and stringer strakes of military vessels over 300 ft in length to prevent cracks from propagating through the hull. Mechanically fastened seams or impact resistant and notch tough welded strakes of HY-80 steel plate are the normal means of preventing crack propagation. Also, revise CCM Sort 123 to read; *"Openings in the uppermost strength deck stringer strake such as for large piping (4 inch diameter pipe or larger), access, ASIST equipment, and vent ducts within the 3/5-length amidships are not permitted. Smaller cable openings shall be kept to a minimum. Openings in other stringer plates shall be avoided."*

b. **Superstructure Re-entrant Design:** ICGS has not has not provided a valid fatigue analysis of the superstructure re-entrant design. There is a significant risk of cracks developing in the superstructure that could propagate into the strength deck. In a worst case scenario, these cracks could lead to hull girder failure similar to that described above.
Recommendation: Install two expansion joints in the superstructure, specifically one at the aft end of the forward superstructure block and one at the forward end of the helicopter hangar.

c. **Shell Fashion Plates:** The ICGS fatigue analysis demonstrates that the fatigue characteristics of the shell fashion plates are marginal even with the incorrect assumptions described in paragraph 2. Also, the fatigue analysis did not consider secondary loads or the fact that the fashion plates above the deck are not stiffened. It is our assessment that the fatigue characteristics of the current fashion plates are inadequate and that any cracks arise that could propagate and lead to hull girder failure.
Recommendation: Upgrade the fashion plate material and the shear strake plating within the 3/5 length amidships to HY 80 plating as per the previous recommendation. Independently contract the Naval Surface Warfare Center Carderock Division to perform a strength and fatigue analysis of the fashion plates in accordance with reference (b).

2

JAN - 4 2005

Subj: STATUS: WMSL STRUCTURAL DESIGN DEFICIENCIES 9050

d. **Hangar Racking Strength:** In analyzing the hangar racking strength, ICGS incorrectly assumed zero rotation at the frame ends, which resulted in the selecting a smaller frame size than what is actually required. Also, there is large opening in the aft hangar sloping bulkhead for helo control station which was not reflected in the analysis. Additionally, dead loads were not considered in the analysis, which is standard practice. By not properly addressing these deficiencies, cracks in the hangar structure will develop and require continual repair and eventual replacement of structural members.
Recommendation: Independently contract with Naval Surface Warfare Center Carderock Division to perform a hangar racking analysis. Revise the structural design based on the results of this new analysis.

e. **Hole Control:** Progress has been made by relocating some holes in the longitudinal bulkheads, however several access openings remain in key areas where the shear and bending stresses will be greatest. ICGS has not provided a shear flow analysis to demonstrate that the loads in the longitudinal bulkheads generated from hull bending or dry-docking can be safely transferred into transverse bulkheads 44, 64, and 70. There is a significant possibility that the longitudinal bulkheads will fail where they intersect the transverse bulkheads because of a significant reduction in shear area in the longitudinal bulkheads due to the inappropriate location of many doors.
Recommendation: Independently contract Naval Surface Warfare Center Carderock Division to perform a shear flow analysis to determine if sufficient shear area exists to transfer the shear loads from the longitudinal to the transverse bulkheads during both worst case operational profiles and dry-docking. Incorporate doubler plates or relocation of openings according to the shear flow results.

f. **01 Knuckle:** Concern remains that the 01 level structure near the knuckle at Frame 27 has not been properly designed for the resultant eccentric loading and fatigue. A U.S. Navy DDG 51 class ship with a similar knuckle in the 01 level experienced deck buckling, which required a very expensive back fit.
Recommendation: Independently contract Naval Surface Warfare Center Carderock Division to perform a strength and fatigue analysis of the structure in way of the 01 level knuckle at Frame 27 and recommend design changes required.

g. **Reduction Gear Structure:** In their analysis of the structure supporting the reduction gears, ICGS improperly modeled the stanchions as infinitely rigid, and the vibration results from this analysis are very close to the tolerances for the reduction gear. If the deflection of the inner-bottom is greater than what is allowed by the reduction gear manufacturer, this will clearly be a warranty issue.
Recommendation: ICGS should re-run their analysis with no fixivity provided by the stanchions. Changes to the inner bottom design required to meet the tolerances for vibration of the reduction gear should be implemented.

3

JAN - 4 2005

Subj: STATUS: WMSL STRUCTURAL DESIGN DEFICIENCIES 9050

4. Over the past several months, my subject matter experts, along with your program office, have worked to reach resolution on these issues. I believe we have exhausted all paths to resolving the issues within the IPT structure and the requirements of the contract. Further progress will require direction from the program office to the contractor or an acceptance of the risks outlined in this memo. My subject matter experts and I are ready to reengage the issues when a course of action is determined.

#

4

Naval Surface Warfare Center
Carderock Division
West Bethesda, MD 20817-5700

NSWCCD-65-TR–2006/07 August 2006

Survivability, Structures, and Materials Department

Technical Report

Structural Assessment of the US Coast Guard National Security Cutter (NSC)

by

David P. Kihl, Robert W. Michaelson, John E. Atwell,
and Gabriela R. Wolford

NSWCCD-65-TR–2006/07 Structural Assessment of the US Coast Guard National Security Cutter (NSC)

Structural Concerns

The NSC hull structural has some very peculiar arrangements, namely the large port and starboard vent penetrations located in the stringer strakes near midships, heavily penetrated longitudinal bulkheads, and abruptly terminating structure such as the Assist track and deckhouse longitudinal bulkhead transitions into girders. Even so, hull girder collapse and first failure loads are found to be greater than anticipated lifetime operational loads with a margin of 1.6. Be that as it may, the finite element models show very high stress levels that must be adjudicated both from a maximum primary stress point of view, and from a fatigue point of view as well.

Comparing the permissible fatigue stress levels with those generated from the finite element models indicates that there are several areas of concern that have insufficient fatigue strength to endure 30 years of operation in the General Atlantic. Being a more severe operating environment, this situation only worsens for Northern Pacific operations. The goal of attaining a 40-year calculated fatigue life for Northern Pacific operations is unachievable without structural modifications and/or operation restrictions.

Of greatest concern is the insufficient fatigue life of the hull girder using the MAESTRO finite element results and the AASHTO Category E detail, shown in Figure 46. This assessment indicates the hull section moduli are too small to adequately carry the hull girder bending loads for 30 years in the General Atlantic, let alone North Pacific. Seeing as the hull is already under construction, options at this point are limited to assessing alternative/restrictive operating scenarios to lower the fatigue loads instead of modifying the structure. Follow-on ships may be impacted. Once the hull is sufficiently sized, the other areas of concern can be addressed individually. Caution should be exercised, however, to consider a large enough area so that fixing a local stress concentration does not inadvertently cause problems in neighboring areas.

For example, the stringer strake vent penetration opening geometry could be modified to lower stress concentrations associated with this detail. This could be done by changing the corner radii, coaming, and/or surrounding insert plate. Although a thicker insert plate will lower the stresses of the opening within, it will worsen the stresses at the transverse butt weld connecting the insert plate to the deck plate. It is uncertain though whether geometry changes alone would sufficiently reduce the opening stress concentrations to permissible levels.

The Assist track seems to abruptly terminate at a transverse frame. The finite element models show very high stresses at this termination. Structural modifications that gradually dissipate the track stresses into the surrounding deck plate beyond the transverse frame would improve this situation.

The main longitudinal girder (see Figure 51) located under the 01 Level just under the forward section of the deckhouse, tends to show very high stress levels. It is speculated that the 01 Level deck knuckle located just forward of this region, when subjected to overall hull girder bending, produces in-plane loads and eccentrically-induced bending moments into the deck plate. The girder, being the main load carrying member in this region, carries a lot of these loads that show up as the highly stressed area just aft of the transverse bulkhead located directly under the forward face of the deckhouse.

The deckhouse re-entrant structure has some very high stress levels in major openings. In addition, longitudinal bulkheads in the deckhouse transition into deck girders, creating locations of very high and concentrated stress.

Conclusions and Recommendations

Presumably, the NSC design was intended to meet Navy criteria (NAVSEA, 1976; ABS 2004). However, it is not known whether certain structural design documents have been merely recommended or required for use in the design of the NSC, but there seems to be parts of given documents that are followed and other parts that are ignored. For example, Naval Vessel Rules (ABS, 2004),[3] which reflect naval ship design data sheets and related procedures, do not permit openings in the uppermost strength deck stringer strakes within the middle three-fifths of the hull. This area, as well as the uppermost strength deck sheer and turn of the bilge strakes are generally reserved for crack arrest strakes that divide the hull cross-section into four pieces. Crack arrest strakes are made of high toughness deck plate, historically HY-80, that is a sixteenth of an inch thicker than surrounding plate. Alternatively, the hull girder envelope plating can be made entirely of a high-toughness material (EH-36) in lieu of HY-80 crack arrest strakes, except that the EH-36 material in the stringer, sheer, and bilge strake would be one-eighth of an inch thicker than surrounding plate. The NSC has neither (HY-80) crack arrest strakes, nor high-toughness (EH-36) steel hull girder envelop.

At the beginning of this effort, the USCG specifications requested an evaluation for 30- and 40-year fatigue lives. It is unclear whether a specific service life was specified to the design agent, or simply alluded to. Either way, it seems that fatigue life expectations have not been met, and suspected structural concerns are justified, as the structural issues are genuine.

Maximum lifetime bending moments are shown to be within first failure and ultimate collapse moments with a margin of at least 1.6. Fatigue analyses, based on coarse and fine mesh finite element models and a 2.3% probability of failure (crack initiation), for General Atlantic and North Pacific operations show fatigue cracks will initiate well before the ship reaches its 30-year service life. Certainly, exclusive North Pacific operations are unattainable, as fatigue lives in the range of a few years are expected.

Although these analyses are based on universal RAOs, results are not expected to change significantly even if model test RAOs had been available for the NSC. Further, even though the structural drawings did not contain enough detail to unequivocally associate a particular site (structural detail) of interest with a particular *S/N* curve, appropriate *S/N* curves were assigned and used, usually along with a neighboring *S/N* curve, reflecting a slightly different weld quality. The point is that one could challenge a particular choice of *S/N* curve, but ship structure is basically composed of longitudinal welds, transverse welds, and three dimensional welded connections and there is little latitude to significantly improve the present situation. Follow-on efforts should better define the weld quality of structural details identified and investigated herein so that a single *S/N* curve could be more confidently assigned. Also, the fatigue assessments could only be conducted at stations where the bending moment fatigue histograms were generated, and bracket the fatigue behavior of the sites of under evaluation. Improvements

[3] The Naval Sea Systems Command and the American Bureau of Shipping (ABS) are collaborating to develop and implement a set of Naval Vessel Rules. These rules will potentially be used in the design, construction, maintenance and modernization of non-nuclear naval combatant ships.

in interpolating the fatigue behavior could be realized by generating bending moment fatigue histograms at each station; but again this is unlikely to significantly improve the present situation.

At this point, with the lead ship under construction, other operational scenarios can be considered to extend the service life of the ship; possibly allowing for rotating the ship in and out of severe conditions to average out the fatigue damage accumulation. Follow-on ships can benefit by structural modifications to bring stresses closer to the permissible fatigue stress values before implementation.

U.S. Department of Transportation
United States Coast Guard

Memorandum

Subject: G-D/G-S ROLES AND RESPONSIBILITIES

Date: 28 June 2001
5200

From: Program Executive Officer, Integrated Deepwater System
Assistant Commandant for Systems

Reply to Attn. of: G-D
CAPT D. Lloyd
7-0749

To: Commandant

Via: (1) Chief of Staff
(2) Vice Commandant

1. As directed by the Vice Commandant in a similar G-S/G-A Roles and Responsibilities Memorandum of 16 April 2001, representatives from G-S and G-D met to clearly define roles and responsibilities of the two directorates in implementing the Integrated Deepwater System.

2. The magnitude of the changes contemplated in new assets, upgraded legacy systems, and business processes and their direct connection to the Coast Guard's Strategic Plan mandate continuous engagement and coordination between acquisition, operating, and sustaining elements of the Service. Additionally, the Acquisition Plan requires a strategic partnership between the Coast Guard and the Systems Integrator. Teamwork marked by seamless coordination and cooperation is essential to success. The Program Executive Officer's Charter reinforces this by stating that the PEO will aggressively use cross-functional and integrated process teams. **G-S and G-D will work together with other support and operating elements of the Coast Guard as part of a multi-disciplinary Integrated Product and Process Development (IPPD) approach to the Integrated Deepwater System.**

3. **G-S is the Coast Guard's sustainment and systems logistics agent.** G-S is responsible for establishing and providing policies, standards, guidelines and best practices for overall engineering, maintenance, supply, transportation, and other elements of integrated logistics to be used in the development of Coast Guard assets and platforms. G-S is also directly responsible for sustaining all operational assets and for providing expertise and credible advice in core integrated engineering and logistics competencies. For the Deepwater acquisition, G-S shall partner with G-D from program inception to provide technical engineering, sustainment, and logistics expertise as well as source/selection criteria.

4. **G-D is the Coast Guard's acquisition agent for the Integrated Deepwater System.** G-D is responsible for establishing and providing the processes, policies and procedures for acquiring the Integrated Deepwater System in accordance with program baselines. G-D is

Subj: G-D/G-S ROLES AND RESPONSIBILITIES

responsible for delivering major new or upgraded platforms, C4ISR systems, and the associated Integrated Logistics System. G-D will manage program risks by balancing cost, schedule and performance demands. For the Deepwater acquisition; G-D shall partner with G-S from program inception to use established policies, standards, guidelines, architecture, and best practices in the development of the IDS. G-D will facilitate partnering efforts between industry and government members.

5. Where policies, standards, guidelines and best practices do not exist, or innovation is desired, G-D and G-S will collaborate with other support and operating elements of the Coast Guard as well as the Systems Integrator to develop innovative solutions and deliver supportable programs in accordance with the Coast Guard Strategic Plan and program baselines.

6. The Financial Resource Management Manual (FRMM) provides responsibility guidance concerning the administration and control of Allotment Fund Codes (AFC) 41, 42, 43 and 45. Although in need of updating to reflect the G-S and G-D organizations, the FRMM identifies existing G-S organizational elements as the AFC managers for these 4X accounts. These FRMM required 4X AFC administration and control responsibilities shall be retained within G-S. Consistent with these responsibilities, G-S and G-D will collaborate and develop as necessary any AFC related process changes to support the Deepwater Program.

7. These overarching guidelines will be used as a framework for developing detailed program plans.

Approve J H Collins Disapprove _____

Date 7/27/01

P. M. STILLMAN
G-D

V/R
R. F. SILVA
G-S

2

MEMORANDUM OF AGREEMENT
BETWEEN THE
UNITED STATES COAST GUARD
AND THE
AMERICAN BUREAU OF SHIPPING
ON
COAST GUARD CUTTER CERTIFICATION PLAN

PURPOSE

This Memorandum of Agreement (MOA) establishes guidelines for a cooperative agreement between the United States Coast Guard and the American Bureau of Shipping (ABS) for the development, implementation and maintenance of a Cutter Certification Plan (CCP).

BACKGROUND

Development of a Cutter Certification Plan for Coast Guard vessels, which will be used in the certification of Coast Guard DEEPWATER vessels, has been recognized as being of high value, and of mutual benefit for both ABS and the Coast Guard. Efforts under this agreement will produce a comprehensive repository of naval engineering and military requirements. That body of consensus requirements, along with broadened commercial practices, can contribute significantly to the success of the Coast Guard's shipbuilding program being executed under revised Acquisition Reform procedures. It also provides access for the Coast Guard to proven processes and experienced resources for standards maintenance, technical plan review and field survey that can be engaged on an as-needed basis.

INTENT

The Cutter Certification Plan will be written to be applicable to Coast Guard surface ships including those designed using combatant standards; specifically, the National Security Cutters and vessels with missions similar to current High Endurance Cutters, Medium Endurance Cutters and Patrol Boats. The Cutter Certification Plan will address, in an integrated framework, the requirements for certification of these vessels. The Cutter Certification Plan will be a generic ship requirements matrix, accompanied by a tailored set of ABS Rules, commercial standards and a collection of military-unique appendices. The Cutter Certification Plan consists of the following elements: An evaluation matrix, certification matrix, implementation guide,

maintenance guide and historical files. Taking these elements together, the Cutter Certification Plan will cover all functional areas of Coast Guard DEEPWATER cutters, and address all aspects of verification, validation and certification.

PARTIES TO THE AGREEMENT

The principal signatory parties to this agreement within each organization are the Vice Commandant of the United States Coast Guard and the President of the American Bureau of Shipping.

AUTHORITY

46 U.S.C. § 3316 and 14 U.S.C. §§ 93(e) and 93(h).

AGREEMENT

1. ABS and the Coast Guard will jointly conduct a comprehensive review and screening of existing Coast Guard vessel requirements, and will develop the proposed Cutter Certification Plan.

2. Based on initial screening, ABS, with the Coast Guard jointly participating, will recommend where the existing ABS Rules can be applied directly, where they can be applied with tailored modifications, where commercial standards can be applied, where ABS proposes application of a new rule to be developed by ABS, and where ABS proposes a military-unique appendage document be provided.

3. Commandant (G-S) will conduct the necessary discussions within the Coast Guard to gain agreement with the proposed Cutter Certification Plan in each functional area, and agreement with the referenced standards.

4. Where called for, Commandant (G-S) will manage the process of producing and providing Coast Guard unique appendage documents. ABS will participate where appropriate in order to ensure consistency.

5. In the spirit of this cooperative effort, Coast Guard concurrence will be sought for any new ABS Rules applicable to Coast Guard vessels developed by ABS.

6. In addition to identifying the appropriate standards to be applied, ABS and the Coast Guard will, to the extent possible, concur in all verification and validation requirements contained in the Cutter Certification Plan. This includes, selection of the designated certification agent(s) for specific actions, except as otherwise provided herein.

7. Though it is intended for the Cutter Certification Plan to, as much as possible, be a consensus document, the Coast Guard will retain ultimate technical accountability and will have final approval authority for its content, as exercised by Commandant (G-S).

8. Historical files regarding the content and implementation experience of each section of the Cutter Certification Plan will be maintained by ABS. The Coast Guard and ABS will have free and open access to the historical files, and will participate in periodic reviews of the worth and success of the initiative.

9. The Cutter Certification Plan project is a Coast Guard / ABS joint effort. As such, leadership is shared by Project Managers from each organization. Mr. Rubin Sheinberg, Chief of the Naval Architecture Branch at the Engineering Logistics Center, will be the Project Manager for the Coast Guard. Mr. Jim Stamm, Principal Engineer at the ABS Government Operations Office, will be the Project Manager for the American Bureau of Shipping. They will work together to accomplish the project's goals while each manages their cognizant organizational resources, including the finances and personnel required to execute their portion of the agreement.

FUNDING

Entry into this agreement does not create any obligation or liability on the part of the government to fund ABS participation in the above activities, or cover any incidental expenses. Conversely, ABS is not obligated to fund Government participation in the above activities or cover any incidental expenses incurred by the Government. Where necessary, the requirement to support shared research projects in focused areas will be investigated and determined on a case by case basis.

IMPLEMENTATION

It is intended that this Cutter Certification Plan will be applied in its entirety to the vessels being acquired under the DEEPWATER Replacement Project. It is also intended that the Cutter Certification Plan concept will be applied to future Coast Guard vessel acquisitions. It is the Coast Guard's intent that ABS Rules as modified by the Cutter Certification Plan will form a central part of the standards to be applied in the hull, mechanical and electrical areas of Coast Guard vessels. Furthermore, where ABS Rules are identified in the Certification Plan, ABS will be the designated certification agent for those Rules. The decision to build or maintain vessels in ABS Class will be subject to the overall acquisition and life cycle support strategies as determined by the Coast Guard.

ABS is free to promote the use of the Cutter Certification Plan within the U.S. Shipbuilding community as a top-level gauge for ship concepts U.S. Shipbuilders may pursue for export. The Coast Guard will identify the specific restrictions applicable to: 1) classified information; 2) areas where it is desired to control or deny foreign transfer of sensitive technology, and 3) Deepwater Industry team proprietary information.

PERIOD OF PERFORMANCE

The specific core deliverable of this project, the Cutter Certification Plan, shall be delivered to Commandant (G-ADW) no later than 15 December 1999.

TERMINATION

This MOA may be terminated by one party only upon written notice to the other party. Termination will occur sixty days after written notice is given.

This MOA is effective immediately upon signature by all parties.

James C Card

VADM James C. Card, USCG
Vice Commandant of the United States Coast Guard

DATED: June 9 1999

Robert D Somerville

Robert D. Somerville
President, American Bureau of Shipping

DATED: 9 JUNE 1999

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

2100 Second Street, SW
Washington, DC 20593-0001
Staff Symbol: G-D
Phone: (202) 345-3101

4335
May 19, 2006

Integrated Coast Guard Systems (ICGS)
Attn: Dr. Leo Mackay
President, ICGS
1530 Wilson Boulevard, Suite 400
Arlington, VA 22209

Subject: AWARD TERM DETERMINATION FOR CONTRACT HSCG23-02-C-2DW001, BASE PERIOD

Dear Dr. Mackay:

In accordance with Contract HSCG23-02-C-2DW001 as modified, I am forwarding, via the Enclosure, my decision on your performance during the base period.

Any questions on the above should be directed to Ms. Denise Randolph, Chief, Deepwater Contracts, at (202) 475-3040 or via the letterhead address.

Sincerely,

P. M. STILLMAN
Rear Admiral, U.S. Coast Guard
Award Term Determining Official
Integrated Deepwater System

Enclosure: (1) Award Term Determining Official's Decision

Copies to:
USCG (Denise Randolph, Award Term Evaluation Board Members, Mary Johnson, Pam Bible, RDML Blore, Joe Milligan, CAPT Anderson)
ICGS (Jamie Anton, Kevin O'Neill)

U.S. Department of Homeland Security
United States Coast Guard

Commandant
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AWARD TERM DETERMINING OFFICIAL DECISION
CONTRACT HSCG23-02-C-2DW001

Introduction
In accordance with the Deepwater Contract, DTCG23-02-C-2DW001, acting as the Award Term Determining Official, this documents the process I used and my assessment of Integrated Coast Guard Systems' performance in the base contract period. I have assimilated the recommendation of the Award Term Evaluation Board (ATEB), ICGS' self-assessment and their response to the ATEB's report, prior award term performance assessments, program management execution assessed through the enterprise's balanced scorecard and its reports, and the performance monitor reports in the areas of operational effectiveness, total ownership cost, and customer satisfaction.

Methodology
Attachment J-30 to the contract specifies categories and criteria to be employed in reaching this determination. Accordingly, in conjunction with the performance based nature of the contract, the performance of ICGS was evaluated in three categories: operational effectiveness, total ownership cost, and customer satisfaction. The award term plan stipulates that operational effectiveness is more important than total ownership cost which is more important that customer satisfaction. I chose to evaluate operational effectiveness with an objective weight of 50%, total ownership cost weighted at 30%, and customer satisfaction weighted at 20%.

Assessment
The award is based upon the following assessments in principal categories; detailed amplification is provided in the following pages for each category of evaluation.

Operational Effectiveness:	Good
Total Ownership Cost:	Good
Customer Satisfaction:	Marginal
Overall Assessment:	Good

The ATEB recommended an overall evaluation of Good. "Good" is defined as the Contractor's overall performance record supporting the ability to manage risks and actually deliver as planned. Within the factors over which it has control, the contractor has made positive contributions to maximize operational effectiveness and minimize total ownership cost. Customer satisfaction rating metrics are consistent with these performance end-states.

CONTEXTUAL FACTORS BEARING ON THE DETERMINATION

Change Management
In reaching this determination, salient factors warrant consideration. The impact of change management bore heavily upon the initial period of contract execution. Although change is a common factor in major system acquisitions, the scope of change in this case was significant

Encl: (1)

AWARD TERM DETERMINING OFFICIAL DECISION
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across the Deepwater system in that it is magnified by our system of systems acquisition strategy. This was manifest through two areas - the system revisions and requirement changes related to the impact of 9/11, coupled with the Coast Guard's assumption of homeland security responsibilities. Concurrently, government induced annual changes in the implementation plan through appropriated funding levels which varied from the contracted plan necessitated adjustments in both asset sequencing and quantity. Operational tempo of legacy assets due to the global war on terrorism further induced changes in the proposed plan with a shift of funds into the sustainment of legacy assets. Acceleration of the design and production of key surface and aviation assets into the base term caused the need for increased program management and frequent workload adjustments, as well as further changes in the Implementation Plan. Inclusion of assets into the deepwater system induced change. The assimilation of the C130 J missionization and the HITRON contract further advanced the potential capabilities of the system.

Time Factor
The system of systems approach to the enterprise and the duration of its implementation also warrants consideration. It was proposed and awarded as a twenty year program with a stable funding base of $500M per year in FY 2002 dollars, ($17B total in then year dollars, including government funds). The revised, fully built-out, post 9/11 Implementation Plan was defined by the Coast Guard and approved by the Administration and Congress resulting in a twenty-five year/$24B enterprise. This base award term assessment evaluates 14% of the full implementation period (42 months of a possible 300 program months) and 12% of the capital investment ($3.267B appropriated to date of the $24B enterprise). In many respects, this is a marathon.

With the opportunity to evaluate forty-two months of performance and the expected maturity of the system over that timeframe, prudence is required. It takes time for capital assets to be built and made ready for full operational capability. Major aviation and surface assets are in production and have not yet reached the field. Nevertheless, the analysis of both operational effectiveness and total ownership cost permits appropriate insight tied to contractual performance outcomes and outputs specified in the contract. Positive trends are evident in all performance areas, providing further insight regarding attained performance as well as long term performance of the system.

After weighing all of the aforementioned factors, I agree with the ATEB's assessment of "Good" and have decided that ICGS has earned another 43 out of a possible 60 months for the next award term.

AWARD TERM DETERMINING OFFICIAL DECISION
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OPERATIONAL EFFECTIVENESS

The ATEB recommended a combination adjectival rating of Good/Marginal due to a split vote (6 Good and 6 Marginal). I conclude that a rating of "Good" is appropriate in this performance category. ICGS made positive contributions to maximizing operational effectiveness with the 123 WPB conversion program being the principal exception. Overall, risks were mitigated and with the exception of the 123 WPB noted above, the contractor delivered as planned in that the total performance of the system was 3% below the proposed performance of the system. Responsiveness and flexibility were noted in accelerating the HH-65C, the OPC and FRC, assimilating the HITRON contract and the C-130J missionization into the enterprise; these efforts were within scope but outside the implementation plan for the base period.

The operational effectiveness modeling assessments confirm that the Deepwater program is early in the implementation plan. At the mission level, the employment of the Deepwater Maritime Operational Effectiveness Simulation (DMOES) model indicates no significant improvement or degradation in the Deepwater system performance. Positive Government Performance Results Act (GPRA) results were noted in 4 of 6 Coast Guard mission outcomes. Employing the Center for Naval Analyses Integrated Deepwater System Asset Assessment Tool (CIAAT) at the system level, a reduction of 3% surveillance capability was noted in comparing the adjusted proposed system against the performance baseline. This was due directly to the 13% deficit in total WPB hours germane to delays of the 123 WPB program. I note that the causality of the deficit is shared by both ICGS and the Coast Guard. Employing CIAAT for evaluation of the fully built out system, the results are noteworthy in depicting significant positive improvement in both total patrol and total prosecute measures. These are leading indicators tied to the future performance of the system. Assuming full implementation of the system, the Coast Guard will experience positive gains in operational effectiveness. The lack of substantive improvement in operational effectiveness modeling and analysis is also due to the government's redirection of investment into sustainment of existing surface and aviation assets. The production of both the Maritime Patrol Aircraft (MPA) and Vertical Take-off Unmanned Aerial Vehicle (VUAV) were delayed as a result; both were potential core contributors to the contractor's proposed solution and plan for systematic improvement in operational effectiveness.

It is important to note that the successful Command, Control, Communication, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) upgrades of legacy surface assets and shore command centers are not depicted in either of these modeling results. This program was marked by excellent contractor execution and alacrity in field employment. This upgrade is seen as a "substantial force multiplier" by the operator and its operational impact has fully supported this assessment. The same holds true for the acceleration of the HH-65C helicopter. This re-engined airplane shows superlative promise as borne out by enhanced reliability and safety during its Katrina employment and mission prosecution to date. There are simply not enough airplanes in the field to impact operational effectiveness modeling at this point in time.

The conversion of the 123 WPB was terminated at eight vessels; all forty-nine were originally scheduled for upgrade. It was determined by the Coast Guard that the vessel did not meet the requirements of the post 9/11 operating environment and that the Fast Response Cutter's

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production should be accelerated. However, the performance of the contractor in the 123 WPB program was a disappointment and marginal in multiple respects during implementation. The conversion schedule was marked by delay, hull deformation was experienced, structural concerns came to light (which should have been identified in the design phase) and logistics support has been deficient. Operational restrictions continue limiting the utility of the 123 platform.

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TOTAL OWNERSHIP COST

The ATEB recommended a rating of "Good" in the category of Total Ownership Cost (TOC) and I concur with their recommendation. The performance assessment of TOC indicates that it has not exceeded the performance baseline during the base term. Positive developments in risk mitigation have been noted in TOC control efforts. Under-funding during the initial years of the enterprise and redirection of the Implementation Plan by the government has impacted performance. For those factors over which the contractor had control, results and trends indicate that TOC is a maturing performance outcome, and habits of cost control have been put in place.

Reduction in TOC recommendations totaling $376M were identified during the base period through a partnership between ICGS and the Coast Guard. Although funding levels did not permit full implementation, the trend is positive. Commonality of equipment and systems across domains has been implemented with the potential of $240M in potential savings over systems implementation. Earned Value Management System (EVMS) quality and utility has matured systematically over the base term. Process and fidelity evaluations denoted noteworthy improvement. An aggregate Cost Performance Index (CPI) of .97 over 126 separate contract line items is an output measure of TOC control. Variance at completion serves as a strong leading indicator of cost control.

A request for equitable adjustment has been received and must be negotiated. Including the NSC which holds the largest potential for cost increase, EVM projects a 12% variance over the entire enterprise. If the NSC is excluded, a variance of $4.7M is identified on $984M, less than 1%. Over the base term, 20 contract line items have been closed at a total value of $252M with a combined underrun of $2.7M. Competition has been independently evaluated as adequate in subcontract administration. The ICGS "Open Business Model" is working; there are areas for improvement and the contractor has adopted the recommendations (from the Coast Guard's independently contracted study) for improvement during the base term. The construct of teaming arrangements warrants consideration as they reduce the amount of competition available within the program and may increase not only the acquisition cost but TOC as well. Continued focus is a necessity.

Revised post 9/11 requirements and the capability changes attendant to maritime security have not simplified the assessment of the performance of the contractor to minimize TOC. The outcome of aggregate TOC to date indicates success; however, it is early. This performance factor warrants the continued focus by both the Coast Guard and ICGS. Clarity on TOC during the design phase is a must. The recognition of logistics as a core cost driver warrants an improved effort by ICGS during design. EVM variance analysis in the Contract Performance Reports need improved justifications and warrant the continued attention of ICGS. As TOC challenges grow in scope and impact, it is essential that ICGS continues to partner to attend to cost control in management, design, production, and utilization of the system and its assets. For each area of improvement, the Coast Guard shares responsibility for TOC control. The seeds have been planted for success. There is more work to be done.

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CUSTOMER SATISFACTION

The ATEB recommended a rating of Marginal for customer satisfaction. Inconsistent performance outputs, principally through the use of surveys of both operator and Coast Guard management, provided input for this determination. I concur with the Marginal assessment. I recognize that inputs beyond the survey instruments are appropriate to adequately evaluate this performance category.

Results of the field survey support the Marginal rating. Field surveys indicated a lack of satisfaction with the 123 WPB. Although the trend indicates improvement, the operator is disappointed and understandably so. ICGS has tried to be responsive to this input, but challenges have endured.

Initial results from the aviation community regarding the HH-65C indicated a lack of satisfaction. This was directly tied to sparing and logistics support. The government shares the ownership for the initial dissatisfaction in logistics. ICGS has made noteworthy strides in providing initial spares with requisite funding; their execution of the HH-65 re-engining effort as been excellent.

Survey results of Coast Guard leadership and program management personnel provide further insight. Leadership surveys depict general satisfaction with some downward trends. Program management personnel have shown a systematic improvement over time. Matrix personnel, representing stakeholders, are not so positively inclined. These trends are not surprising and do not necessarily establish a correlation with actual ICGS performance. Change is not always conducive to the health of acquisitions and their performance. The base term was replete with change. In a cost constrained funding environment where TOC and design-to-cost efforts are undertaken, tradeoffs become essential. With a system of systems further influencing these dynamics where sub-optimization in some areas is deemed appropriate, attitudes and culture tend to collide with survey results. These results should be viewed accordingly.

With change, one should look to evidence of responsiveness by the contractor in evaluating customer satisfaction. During this base term, ICGS was highly responsive and flexible to adjust to the needs of the Coast Guard. In the surface arena, the design efforts of the FRC and OPC were accelerated into the base term. In the aviation arena, ICGS successfully assimilated the C-130J missionization effort into the enterprise employing a design-to-cost approach. They successfully competed and expeditiously implemented the re-engining of the HH-65 helicopter in order to address a critical safety and operational need. They assimilated the execution of the HITRON contract in order to insure continuity in this critical program. The C4ISR upgrades to the District Seven command center were successfully accelerated at the request of the Coast Guard.

In the area of the Deepwater systems management, ICGS has shown responsiveness and improvement. Award fee determinations have shown steady and focused improvement over the entire base term with recent attainment of an excellent evaluation and a score of 100% in all objective measures. This has been marked by a consistent effort to improve the integrated product data environment with a 40% improvement in customer satisfaction metrics, a

AWARD TERM DETERMINING OFFICIAL DECISION
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disciplined and persistent effort to certify and train IPT members attaining compliance in 96% of the applicable measures of success, and systematic improvement in Contract Data Requirements List (CDRL) acceptance rates.

It is evident that the contractor has made a concerted effort to engage in learning and process improvement. Risks have been identified and mitigated; however, residual salient concerns still require disciplined attention. The structure of the NSC and service life assessments must be brought to successful closure. Logistics challenges with the 123 WPB must be successfully resolved. The FRC design must be further refined with the necessary focus on design-to-cost and capability.

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SUMMARY

After considering the input of all appropriate contributors, I determine that an award term extension of 43 months has been earned commensurate with an overall assessment of "Good". As noted in the performance category summary sheets and in compliance with attachment J-30 of the contract, the following determinations apply:

Operational Effectiveness: Good
Total Ownership Cost: Good
Customer Satisfaction: Marginal

For purposes of my evaluation and consistent with the J-30 which indicated that Operational Effectiveness is more important that Total Ownership Cost which is more important that Customer Satisfaction, I have weighted each category in the following manner:

Operational Effectiveness: 50%
Total Ownership Cost: 30%
Customer Satisfaction: 20%

Using my award term incentive determination separately for each category based upon consideration of all inputs from contributing parties and my analysis summarized in the preceding summaries, my award was based on the following:

	Formula			
	#1	*#2 = #1 * 60 months*	*#3*	*#2 * #3*
	Weight	Months possible of 60 available	ATDO Score	Months earned
Operational Effectiveness	50%	30	76%	22.8
Total Ownership Cost	30%	18	73%	13.14
Customer Satisfaction	20%	12	60%	7.2
TOTALS	100%	60		**43.14**

A continued focus on people, partnership, and performance define the foundation for long term success. Excellence is not an event but an enduring habit. Effective cost control, integrated logistic systems and support, and platform effectiveness define the center of gravity ahead. The need is real and the time is now. Accordingly, I determine that an award term incentive of 43 months, with an adjectival rating of "Good" has been earned.

P. M. STILLMAN
Rear Admiral, U.S. Coast Guard
Program Executive Officer

Page 8 of 8

Department of Homeland Security
Management Directive System
MD Number: 0810.1
Issue Date: 6/10/2004

THE OFFICE OF INSPECTOR GENERAL

I. Purpose

This directive established Department of Homeland Security (DHS) policy regarding the Office of Inspector General (OIG). Any prior Management Directive and any instruction or agreement of any kind issued by or entered into by any DHS official or Component that is inconsistent in any respect with this directive is hereby superseded to the extent it is inconsistent with this directive.

II. Scope

This directive applies to all DHS organizational elements (OEs), including all employees, contractors, and grantees.

III. Authorities

A. The Inspector General Act of 1978, as amended

B. The Homeland Security Act of 2002, as amended, codified in Title 6, US Code

IV. Definitions

A. ***OE Offices*** – As used in this Management Directive, the term OE offices include all Organizational Elements offices of internal affairs, inspections, audits or Professional Responsibility. This term also includes the DHS Office of Security.

B. ***DHS Organizational Element*** – As used in this directive, the term DHS Organizational Element (OE0 shall have the meaning given to the term DHS Organizational Element in DHS MD 0010.1, Management Directives System and DHS Announcements. This includes Elements such as the Bureau of Customs and Border Protection, the United States Coast Guard, the Federal Emergency Management Agency, etc. It also includes entities that report to DHS Organizational Elements, such as National Laboratories.

V. Responsibilities

A. ***The Heads of DHS Organizational Elements*** shall:

1. Promptly advise the OIG of allegations of misconduct in accordance with the procedures described in Appendix A, and when they become aware of any audit, inspection or investigative work being performed or contemplated within their offices by or on behalf of an OIG from outside DHS, the General Accounting Office, or any other law enforcement authority, unless restricted by law;

2. Ensure that, upon request, OIG personnel are provided with adequate and appropriate office space, equipment, computer support services, temporary clerical support and other services to effectively accomplish their mission;

3. Provide prompt access for auditors, inspectors, investigators, and other personnel authorized by the OIG to any files, records, reports, or other information that may be requested either orally or in writing;

4. Assure the widest possible dissemination of this directive within their OEs. They may issue further instructions as necessary to implement this policy. Any such further instructions shall not conflict with this MD and shall be provided to the OIG immediately upon issuance;

5. Assist in arranging private interviews by auditors, inspectors, investigators, and other officers authorized by the OIG with staff members and other appropriate persons;

6. Advise the OIG when providing classified or sensitive information to the OIG to ensure proper handling.

B. ***DHS employees*** shall report suspicions of violations of law or regulation to the DHS Office of Inspector General or the appropriate OE offices, and will likewise:

1. Cooperate fully by disclosing complete and accurate information pertaining to matters under investigation or review;

2. Inform the investigating entity of any other areas or activities they believe require special attention;

3. Not conceal information or obstruct audits, inspections, investigations, or other official inquiries;

4. Be subject to criminal prosecution and disciplinary action, up to and including removal, for knowingly and willfully furnishing false or misleading information to investigating officials; and

5. Be subject to disciplinary action for refusing to provide documents or information or to answer questions posed by investigating officials or to provide a signed sworn statement if requested by the OIG, unless questioned as the subject of an investigation that can lead to criminal prosecution.

VI. Policy and Procedures

A. The OIG, while organizationally a Component of the DHS, operates independent of the DHS and all offices within it. The OIG reports to the Secretary. Under circumstances specified by statute, the Secretary, upon written notification to the OIG which then must be transmitted to Congress, can circumscribe the OIG's access to certain types of sensitive information and exercise of audit, investigative, or other authority. The DHS Inspector General is the head of the OIG.

The OIG is authorized, among other things, to:

1. Administer oaths;

2. Initiate, conduct, supervise and coordinate audits, investigations, inspections and other reviews relating to the programs and operations of the DHS;

3. Inform the Secretary, Deputy Secretary, and the Congress fully and currently about any problems and deficiencies relating to the administration of any DHS program or operation and the need for, and progress of, corrective action;

4. Review and comment on existing and proposed legislation and regulations relating to DHS programs, operations, and personnel;

5. Distribute final audit and inspection reports to appropriate authorizing and oversight committees of the Congress, to all headquarters and field officials responsible for taking corrective action on matters covered by the reports and to Secretarial officers, office heads, and other officials who have an official interest in the subject matter of the report;

6. Receive and investigate complaints or information from employees, contractors, and other individuals concerning the possible existence of criminal or other misconduct constituting a violation of law, rules, or regulations, a cause for suspension or debarment, mismanagement, gross waste of funds, abuse of authority, or a substantial and specific danger to the public health and safety, and report expeditiously to the Attorney General whenever the Inspector General has reasonable grounds to believe there has been a violation of Federal criminal law;

7. Protect the identity of any complainant or anyone who provides information to the OIG, unless the OIG determines that disclosure of the identity during the course of the investigation is unavoidable.

Further, the OIG shall:

8. Follow up on report recommendations to ensure that corrective actions have been completed and are effective;

9. Prepare a semiannual report to the Secretary and the Congress, summarizing OIG audit and investigative activities within DHS. Section 5(a) of the Inspector General Act of 1978, as amended, requires this report.

B. Allegations received by the OIG or OE offices shall be retained or referred in accordance with Appendix A of this MD. The only exception to this requirement is that the OIG and the United States Secret Service will adhere to the terms of the Memorandum of Understanding entered into between those two entities on December 8, 2003, and as may be amended from time to time.

C. ***Standards***. Audits shall be conducted consistent with the standards issued by the Comptroller General of the United States. Inspections and investigations shall be conducted consistent with the quality standards issued by the President's Council on Integrity and Efficiency (PCIE).

D. ***Questions or Concerns***. Any questions or concerns regarding this directive should be addressed to the OIG.

J.M. Loy, ADM
Deputy Secretary

Issue date: JUN 10 2004

APPENDIX A

MD 0810.1

The categories of misconduct identified below shall be referred to the OIG. Such referrals shall be transmitted by the OE offices immediately upon receipt of the allegation, and no investigation shall be conducted by the OE offices prior to referral unless failure to do so would pose an imminent threat to human life, health or safety, or result in the irretrievable loss or destruction of critical evidence or witness testimony. In such extraordinary situations, the OIG will be contacted as soon as practical, and all information and evidence collected by the OE office shall then be provided to the OIG as part of the OE referral to the OIG. The OIG will accept and retain all such allegations for investigation subsumed under this exigent circumstance exception.

- All allegations of criminal misconduct against a DHS employee;
- All allegations of misconduct against employees at the GS-15, GM-15 level or higher, or against employees in the OE offices;
- All allegations of serious, noncriminal misconduct against a law enforcement officer. "Serious, noncriminal misconduct" is conduct that, if proved, would constitute perjury or material dishonesty, warrant suspension as discipline for a first offense, or result in loss of law enforcement authority. For purposes of this directive, a "law enforcement officer" is defined as any individual who is authorized to carry a weapon, make arrests, or conduct searches;
- All instances regarding discharge of a firearm that results in death or personal injury or otherwise warrants referral to the Civil Rights Criminal Division of the Department of Justice;
- All allegations of fraud by contractors, grantees or other individuals or entities receiving DHS funds or otherwise engaged in the operation of DHS programs or operations;
- All allegations of visa fraud by DHS employees working in the visa issuance process.

In addition, the OIG will investigate allegations against individuals or entities that do not fit into the categories identified above if the allegations reflect systemic violations, such as abuses of civil rights, civil liberties, or racial and ethnic profiling, serious management problems within the department, or otherwise represent a serious danger to public health and safety.

APPENDIX A

With regard to categories not specified above, the OE offices will initiate the investigation upon receipt of the allegation, and shall notify within five business days the OIG's Office of Investigations of such allegations. The OIG shall notify the OE offices if the OIG intends to assume control over or become involved in such an investigation, but absent such notification, the OE office shall maintain full responsibility for these investigations.

Any allegations received by the OIG that do not come within the categories specified above, or that the OIG determines not to investigate, will be referred within five business days of receipt of the allegation by the OIG to the appropriate OE office along with any confidentiality protections deemed necessary by the OIG.

The OE offices shall provide monthly reports to the OIG on all open investigations. In addition, upon request, the OE offices shall provide the OIG with a complete copy of the Report of Investigation, including all exhibits, at the completion of the investigation. Similarly, the OIG shall provide the OE offices, upon request, with a complete copy of any Report of Investigation relating to its OE, including all exhibits, at the completion of the investigation. The OIG shall have the right to request more frequent or detailed reports on any investigations and to reassert at any time exclusive authority or other involvement over any matter within its jurisdiction.

Appendix O
Memorandum from the Coast Guard Chief of Staff (Acting) to the Coast Guard Engineering Logistics Center, *Inspector General Audit of the Acquisition of the National Security Cutter,* October 21, 2005

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

2100 Second Street, S.W.
Washington, DC 20593-0001
Staff Symbol: CG-82
Phone: (202) 267-2405
Fax: (202) 267-4850
Email: jawatson@comdt.uscg.mil

MEMORANDUM

From: R.S. BRANHAM
Acting
COMDT (G-CCS)

Reply to Attn of: CG-82
Capt Watson
(202) 267-2405

To: CG ELC
Thru: COMDT (CG-4) RADM, USCG 10/21/05

Subj: INSPECTOR GENERAL AUDIT OF THE ACQUISITION OF THE NATIONAL SECURITY CUTTER

Ref: (a) Government Auditing Standards, June 2003, GAO-03-673G
(b) Inspector General Act of 1978, 5 U.S.C. App. 3, § 4
(c) Department of Homeland Security Management Directive 0810.1, The Office of Inspector General

1. This memorandum provides guidance for the Engineering Logistics Center (ELC) workforce regarding the ongoing DHS Office of the Inspector General (OIG) audit of the Coast Guard's acquisition of the National Security Cutter. This guidance, derived from references (a) through (c), is provided in order to facilitate the audit and foster an effective working relationship with the OIG.

2. The OIG ordinarily initiates an audit, inspection or other review by sending an announcement letter identifying the scope, purpose and timing of the audit to the Commandant and our external audit liaison, CG-823. The announcement letter is then followed by an "entrance conference" attended by the OIG officials conducting the review and the appropriate USCG officials. The purpose of the conference is to detail the scope of the review. CG-823 schedules the entrance conference, offers the OIG team assistance in locating and retrieving needed materials and makes arrangements for interviewing USCG employees and contractors.

3. In the case of the subject audit, these general procedures were followed. However, some ELC employees have expressed concern, for whatever reason, regarding the role of CG-823 in the audit process. While in the ordinary course of events CG-823 plays a vital coordinating function, in the context of this audit, I have directed CG-832 to suspend its usual role in reviewing and organizing audit-related documentation. USCG personnel and contractors can meet with the OIG confidentially, and without providing any notification or report regarding the substance of the meeting or materials provided, or even the fact that such a meeting occurred or that materials were provided to the OIG.

4. Regardless of whether CG-82, the OIG, or the USCG employee or contractor initiates contact, it is important that the Coast Guard respond to all information and documentation requests in a timely and complete manner. If any meeting, discussion, information, or document request from the OIG involves extended periods of time that would significantly affect work productivity or cause other scheduling problems, please advise the OIG team and attempt to reach a mutually satisfactory solution. The OIG has expressed understanding of our workload demands and will seek to accommodate them.

5. Questions concerning our relationship with OIG may be directed to CG-82, Captain Watson or Mr. Mark Kulwicki (CG-823) at (202) 267-2294.

#

Copy: CG-4, CG-82, G-D, G-LGL

Appendix P
Letter from ICGS Director of Contracts to Deepwater Program Executive Officer,
***DHS Office of Inspector General Audit of Acquisition of NSC*, February 17, 2006**

INTEGRATED COAST GUARD SYSTEMS
DEEPWATER
1530 Wilson Boulevard, Suite 400, Arlington, Virginia 22209

In reply refer to:
ICGS.06.044

February 17, 2006

U.S. Coast Guard
2100 2nd Street, SW
Washington, DC 20593-0001

Attention: RADM Patrick Stillman, Commandant (G-D)

Subject: DHS Office of Inspector General Audit of Acquisition of NSC

Dear RADM Stillman:

This letter responds to a request of the DHS Office of Inspector General (OIG) that Integrated Coast Guard Systems (ICGS) and its two member companies, Northrop Grumman Ship Systems (NGSS) and Lockheed Martin Maritime Systems & Sensors (LM MS2), clarify their position regarding responses to requests for documents or interviews of employees originating with the OIG.

By way of background, on January 12, 2006 representatives of the OIG met with representatives of the U.S. Coast Guard (USCG) and ICGS. During that meeting, the OIG asked to interview two NGSS employees in connection with an on-going NSC audit. The OIG stated that it sought private interviews of the employees – interviews to which USCG personnel were not invited. The OIG further suggested that other representatives of ICGS and NGSS not be present. In addition, when requested to do so, the OIG declined to provide any information prior to the interviews regarding the scope of the audit or the topics that would be the subject of the interviews. In short, it was not clear whether the USCG was the subject of the audit and ICGS was being asked to support that audit, or whether ICGS and its member companies were the subject of the audit.

ICGS' two member companies have policies and/or procedures which govern responses to requests for interviews or documents as part of an audit or investigation of which they are the subject. Because

Appendix P
Letter from ICGS Director of Contracts to Deepwater Program Executive Officer,
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INTEGRATED COAST GUARD SYSTEMS
DEEPWATER

1530 Wilson Boulevard, Suite 400, Arlington, Virginia 22209

OIG declined to describe the scope or purpose of the NSC audit, and the ground rules outlined by the OIG differed substantially from those followed in responding to prior audit inquiries concerning the Deepwater program (including specifically, audits by the Government Accountability Office), ICGS sent a letter dated January 24, 2006 (ICGS.06.017) asking for a meeting between ICGS, OIG and USCG representatives "to discuss the scope and schedule of the audit" in order to determine whether the relevant policies were applicable and to otherwise facilitate the OIG's audit.

A meeting was held on February 1, 2006, at which the OIG stated it was not aware of the January 24, 2006 letter, but nonetheless continued to decline to elaborate on the scope of the NSC audit or alter the proposed ground rules for the interviews that it had previously requested. OIG then requested that ICGS provide a letter describing the conditions under which NGSS would make its employees available for interview. This letter is in response to the OIG's request, and was coordinated with both ICGS member companies and represents their consolidated position.

ICGS and its member companies wish to facilitate the OIG's audit objectives. At the same time, the companies have a legitimate interest in protecting their rights and interests and those of their employees in connection with the audit – about which the OIG has thus far declined to provide any information. Accordingly, the companies believe that the following guidelines are appropriate, and should apply to the current and any future OIG requests for documents or interviews.

1. OIG requests for documents or interviews should be provided in writing through the Deepwater Program Office and the ICGS Liaison Team Lead, and include the following:

    a. A description of the nature, subject(s) and purpose(s) of the audit sufficient to permit ICGS and its member companies to determine the applicability of their policies or procedures.

    b. For document requests, provide a specific description of the documents to be produced; and

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1530 Wilson Boulevard, Suite 400, Arlington, Virginia 22209

c. For employee interviews, provide the name of the individual(s) that the OIG wishes to interview, and the topics to be covered during the interviews.

2. For interviews, the employee(s) may be accompanied by representatives of ICGS, NGSS or LM MS2, as appropriate, unless the employee(s) specifically request otherwise. ICGS counsel, or counsel for NGSS or LM MS2 may also be present.

Finally, ICGS asks that it be provided a draft of any resulting audit report, and an opportunity to comment on the draft.

ICGS and its member companies believe that these procedures will make any audit more efficient, while simultaneously protecting the legitimate interests of the USCG, the companies and their employees. Please contact me if the USCG and/or OIG wish to discuss the above procedures for facilitating the OIG audit.

Sincerely,

Kevin J. O'Neill
Director of Contracts ICGS, LLC

cc: Mr. Jay Boyd (ICGS), Mr. Mark Kulwicki (CG-82),
CDR Jim Olive (CG-82), CDR Tim Cook (G-D-1),
Ms. Elaine Eder (G-LPL)

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U.S. Department of Transportation
United States Coast Guard

Commandant
United States Coast Guard

2100 2nd Street, SW
Washington, DC 20583-0001
Staff Symbol: G-OCU
Phone: (202) 267-1528

COMDTINST 3100.5A

COMMANDANT INSTRUCTION 3100.5A

Subj: CUTTER EMPLOYMENT STANDARDS

Ref: (a) Abstract of Operations Reports, COMDTINST M3123.7 (series)
(b) Naval Engineering Manual, COMDTINST M9000.6 (series)

1. PURPOSE. This Instruction provides guidelines for cutter employment and is intended to complement references (a) and (b). Enclosure (1) provides definitions. Enclosure (2) provides limits in tabular form for each cutter class. Enclosure (3) gives examples of how the employment standards are applied in various situations.

2. ACTION. Area and district commanders, commanders of maintenance and logistics commands, and unit commanding officers shall be guided by these standards in matters relating to cutters; including scheduling, management and evaluation.

3. DIRECTIVES AFFECTED. Cutter Employment Standards, COMDTINST 3100.5 is cancelled.

4. DISCUSSION. Cutter operations tempo and personnel tempo shall not exceed the limits herein. These limits are those that are supported by cutter funding (both fuel and maintenance costs) and protect the safety and well being of crewmembers. For cutter employment standards, three basic limits apply: Days away from homeport limit, underway hours limit, total operations days limit. These limits, and their use in unique circumstances, are further defined below and in the enclosures.

   a. The standards contained herein recognize several categories of cutters based on their operational tasking. The application of the various limits varies among the category of cutter:

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	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
A	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1		1		1					
B		5	5		5	5																				
C															1			1								
D	2			2																						
E																										
F																										
G																										
H																										

NON-STANDARD DISTRIBUTION:

(1) Major Cutters (e.g. Polar Icebreakers, WHEC/WMECs). Major cutters are scheduled by days away from homeport and are normally first constrained by the days away from homeport limit. Major cutters are not traditionally assigned a high readiness status during inport periods. However, if the operational need arises, high readiness time may be assigned and will be constrained by the total operations days limit. Polar Icebreakers have unique schedule requirements and constraints; these cutters cannot exceed their total operations days limit without failing to meet the minimum maintenance days required by reference (b). The underway hours limit for all major cutters is provided for information and not for scheduling purposes.

(2) Cutters assigned to a geographic area based on SAR coverage requirements and often tasked with a rapid response capability (B-2 or less, e.g. WPBs). These cutters will usually be constrained by the underway hours limit. High readiness days will also be constrained under the total operations days limit. The days away from homeport limit is normally a secondary or tertiary limit for these cutters, but may apply in unique circumstances.

(3) Cutters tasked with a mixture of underway and inport operations and rapid response (WLB/WLMs, et. al.). Total operations days will typically be the primary limit for WLB/WLMs. The underway hours limit will typically be the limiting factor for all others. The days away from homeport limit is normally a secondary or tertiary limit for these cutters, but may apply in unique circumstances.

b. Operational commanders must carefully consider all factors that impact individual cutters during scheduling. Maximum employment is not necessarily optimal employment, and it clearly reduces surge capacity during disasters and periods of short notice, high demand operations. Setting schedule targets beneath the enclosed limits is appropriate for some cutters when surge capacity is desired.

c. Where more than one limit is provided for a cutter class, all shall be considered unless otherwise specifically noted. The primary limit is highlighted in enclosure (2) for ease of use by planners. Appropriate recommendations for changes to this Instruction are encouraged and should be addressed via program managers.

5. FORMS/REPORTS. None.

Encl: (1) Definitions and Employment Guidelines
(2) Cutter Employment Standards Table
(3) Example Use of Cutter Employment Standards

Enclosure (1) to COMDTINST 3100.5A

DEFINITIONS AND EMPLOYMENT GUIDELINES

Terms and abbreviations used in Abstract of Operations (AOPS) and the CGInfo Programs are bold for reference. (e.g. u/w hours are listed as cutter "resource hours" in CGInfo). Cutters submit AOPS Reports in accordance with reference (a). Planners access this data via the CG intranet CGInfo website: http://cginfo.uscg.mil/

These standards are intended for planners use and provide limits that protect cutters and crews. There is not perfect alignment between AOPS and these Cutter Employment Standards. Application of this instruction is not a perfect science and requires some subjectivity in unusual circumstances.

Inport Homeport/Away From Homeport:

Inport Homeport (**IPHP**). The homeport is defined as an area within a 90-minute automobile driving time from a cutter's permanent berth (approximately 75 miles).

Inport Away From Homeport (**IPAFHP**). Moored outside a 90-minute automobile driving time from cutter's permanent berth.

Homeport Days. All days in which a cutter is inport homeport, and grants the crew normal liberty. Normal liberty means 12 consecutive hours falling anywhere between 1600 and 0800.

Days Away From Homeport (DAFHP) (**Away From Homeport Days**). All days in which the cutter is not in its homeport to grant normal liberty. The homeport is defined as an area within a 90-minute automobile driving time from a cutter's permanent berth (approximately 75 miles). Normal liberty spans two calendar days, but only one DAFHP day is counted for each missed liberty period (e.g. the day of arrival back in homeport is not a DAFHP if normal liberty can be granted that day).

When scheduled activity in the cutter's homeport routinely prevents normal liberty (e.g. Tailored Ship's Training Availability (TSTA) or Tailored Annual Cutter Training (TACT) in homeport), the number of days in this activity is multiplied by 0.8 to arrive at a number to be counted against the DAFHP limit.

Days spent in a shipyard more than 75 miles but less than 200 miles from a cutter's permanent berth are not counted as full Days Away From Homeport. In these instances, the number of days in the shipyard is multiplied by 0.8 to arrive at the number to be counted against the DAFHP limit.

In unique circumstances while a cutter is away from homeport and only a portion of the crew is needed onboard the cutter and the balance of the crew can work at a detachment in homeport, the days away from homeport for the cutter may be effectively decreased by the average days away from homeport for individual crewmembers. In these cases, cutter schedulers and unit commanding officers should carefully monitor this practice to ensure the entire crew has a similar number of days away from homeport.

Days Away From Home Port Limit.

This limit is the primary limit for WMEC, WHEC and WAGB cutter fleets. The DAFHP limit reserves time for crew liberty and cutter maintenance in a cutter's homeport. All days away from homeport, whether underway or inport, are counted against the DAFHP limit. Most cutter types have a DAFHP limit of 185 days; this reserves 180 days in homeport each year, which translates to 135 overnight liberties per crewmember in a four-section watch rotation.

Area Commander may exceed this limit when required to achieve a specific operational mission (e.g. lengthy polar deployment, CinC support missions, etc.) or when responding to unexpected events (e.g. dry-dock extension away from homeport). In these instances, planners shall schedule the following year so the two-year days away from homeport average is within the assigned limit. However, lost days away from homeport, for example due to weather delays or casualties in homeport, need not be made up in the following year.

Underway (**Alpha, U/W**):

Underway Hours (**Resource Hours**). Time spent underway. A cutter is underway anytime it is not moored or dry-docked, and for these purposes anytime it is anchored (or, in the case of river tenders, with spuds down or "pushed in") conducting underway operations. When anchored (or with spuds down or "pushed in") specifically for an inport mission (e.g. mid-patrol break), the vessel is not considered underway. Minor movements, such as shifting berths, which are less than one hour in duration, do not need to be considered for the purposes of these standards.

Underway Hours Limit. This limit is typically established from planning documents, mission and maintenance requirements or historic use. This value is a level of maximum utilization, to be used by operational commanders for patrol boats and other cutters when other limits are less appropriate.

The underway hours limit equals the planned funding level for each cutter and is the basis to the Headquarters' budget and fuel models. These models are used to distribute cutter fuel and maintenance money to appropriate Areas, MLCs and Districts. Maintenance support is established for an operations tempo at, but not above, the underway hours limit.

Cutters assigned to geographic areas based on SAR coverage requirements and tasked with rapid response (B-2 or less), such as WPB's are often tasked with a mixture of underway time and rapid response time. See definitions of high readiness days and total operations days, which may provide a more useful limit on fatigue when these hours are combined.

Underway Day. An underway day is a day a cutter logs underway hours and will be counted against the total operations days limit. Underway days are normally patrol days for deployed cutters or day trips from port. Minor movements, such as shifting berths, which are less than one hour in duration, would not constitute an underway day.

For the purposes of these standards, an underway day is one that impacts maintenance and cannot be counted as a maintenance day. However, the first day of a maintenance period, if

returning from underway that morning, would still be counted as a maintenance day (provided the maintenance period is not impacted). Underway time spent specifically for the purpose of maintenance during a maintenance day is considered maintenance time. However, this does not preclude the underway time from being reported in AOPS in accordance with reference (a).

High Readiness, Inport Operations, and Standby (**Bravo**):

High Readiness Hours. Time spent inport in a high readiness status that supports a particular mission, in accordance with the following:

WHEC, WMEC and WAGB	B-0 through B-6
All others	B-0 through B-2

Environmental conditions, such as inclement weather, can cause a postponement in scheduled operations. Time spent inport awaiting improvement of these conditions so that operations can be commenced or resumed is high readiness time.

High Readiness Days. Calendar days inport (homeport or away) when the cutter logs four (4) or more high readiness hours.

Inport Operations Hours (**Inport OP Hours**). The time during which a cutter is inport, yet totally committed to a particular mission. A cutter involved in inport operations would normally not get underway without terminating these operations because of the level of resources committed. Included are various evolutions such as loading and unloading supplies, ammunition and equipment, performing a mission while moored using a cutter's resources (e.g. boats, vehicles, personnel), and miscellaneous time for training, inspections, ceremonies, etc. When inport operations are conducted during a maintenance period and maintenance can still be performed, the hours are counted as maintenance hours. If the inport operations interfere with maintenance, then the hours are counted as inport operations. When there is some latitude in scheduling inport operations, they should be scheduled to minimize impact on a maintenance period.

Inport Operations Days. Calendar days in or away from homeport when a cutter logs four (4) or more inport operations hours.

Standby Hours (STBY). The time when a cutter is not in a maintenance status and is available for deployment, but the time does not fit in any of the following categories: Underway, inport operations, or high readiness hours. This time may be scheduled or simply a reflection of cutter availability.

Standby Days. Calendar days in or away from homeport, which do not meet the criteria for underway, inport operations, high readiness, or maintenance days.

Maintenance **(Charlie)**:

Maintenance Days. Calendar days in or away from homeport in which:

The cutter spends the day in a programmed maintenance status. Normally, all 24 hours (0000-2400) should be spent in programmed maintenance in order to count the day as a maintenance day. An exception is the first day of a scheduled maintenance period, which is counted as a maintenance day provided the maintenance period is not adversely impacted by the preceding activity.

An unexpected casualty to deck or engineering machinery or electronic equipment that requires changing a cutter's status to maintenance (Charlie) from Alpha or Bravo status.

An unexpected casualty to deck or engineering machinery or electronic equipment results in the cancellation or postponement of a scheduled mission (e.g. lost cutter patrol day). The necessary maintenance to correct the casualty may take less than a full 24 hours.

Not all inport days are necessarily maintenance days. Inport days may be required to directly support a vessel's assigned operational mission. Such time may be accounted for as inport operations, high readiness or standby days when appropriate.

Maintenance Hours. Time spent in a scheduled or unscheduled maintenance status either in or away from homeport.

Minimum Maintenance Days. The minimum number of days that reserve time for required cutter maintenance. It is derived from maintenance requirements listed in Chapter 81 of reference (b) or from the Operational Logistics Support Plan (OLSP) for a new cutter.

Miscellaneous:

Total Operations Days. The sum of underway days, inport operations days and high readiness days. In addition to underway days, total operations days are intended to account for the added impact of inport operations and high readiness on crew fatigue and maintenance requirements.

Total Operations Days Limit. This shall be a primary limit for most buoy tenders and a limit to be considered for cutters assigned high readiness or involved in inport operations. CGC HEALY's total operations days limit is also a design target from the WAGB 420 OLSP (and a commitment to the science community). WLB/WLM limits were originally derived from design documents during class construction and testing and updated based on data from the Buoy Tender Systems Study (BTSS). WPB limits (and all other cutters as applicable) are provided to constrain the added impact of high readiness and inport operations on crew fatigue and maintenance. Cutters not normally tasked with high readiness time for SAR response (e.g. WHEC/WMECs) will still use this limit when applicable.

Enclosure (2) to COMDTINST 3100.5A

CUTTER EMPLOYMENT STANDARDS TABLE[1]

CUTTER TYPE - CLASS		DAFHP Limit	U/W Hours Limit	Total Op Days Limit	Min Maint Days
WAGB -	420	185	3330	200	165
	399	185	3330	193	172
	290	185	3330	200	142
WHEC -	378	185	3330	200	143
WMEC -	282	185	3330	200	158
	270	185	3330	200	143
	230	185	3330	200	158
	213	185	3330	200	158
	210	185	3330	200	143
WLB -	225	185	2100	220	126
	180	185	1820	190	154
WLM -	175	185	1500	220	126
WTGB -	140	126	1800	200	126
WPB -	110	185	1800[2]	200	133
	87	150	1800	200	133
WLI -	100	165	825	200	91
	65	165	825	200	84
WYTL -	65	126	700	200	65
WLIC -	160	165	1200	200	95
	100	165	1400	200	95
	75	165	1300	200	95
WLR -	75	185	1400	200	79
	65	185	1300	200	79

1. Values given constrain operations. Highlighted values are normally reached first and are the primary limiting factor for planners.

2. Funding for additional WPB 110 u/w hours is distributed annually for counterdrug law enforcement operations. Allocation of these hours to respective Areas will be in accordance with the COMDT (G-OPL) annual law enforcement plan. Only WPB 110s with augmented MAT support may be scheduled to exceed the 1800 u/w hours limit. However, no single MAT supported cutter may exceed 2200 u/w hours without COMDT (G-OCU) approval. Other limits and minimum maintenance standards remain the same.

Enclosure (3) to COMDTINST 3100.5A

EXAMPLE USE OF THE CUTTER EMPLOYMENT STANDARDS

1. DAFHP and Maintenance Example.

   Planners have scheduled a WHEC for 100 inport maintenance days in homeport and an additional 54 maintenance days for dry-dock in a shipyard. All available shipyards are more than 200 miles from the cutter's homeport.

   This cutter can be tasked with up to a maximum of 131 additional days away from homeport (note that transit time to and from dry-dock must be considered in this schedule). This would reduce surge capacity (for hurricane disaster response, LE pulse operations, etc.) to zero. A target that would leave a 3-week surge capacity would be to schedule this cutter for 110 DAFHP.

   Note that, had the shipyard been located within 90 minutes commuting distance of the vessel's homeport (or approximately 75 miles), all 185 DAFHP would have been available for patrol or other operations away from homeport, vice 131. And the three-week surge capacity would have been subtracted from 185.

   Had the shipyard been located between 75 and 200 miles from the cutter's permanent berth, the 54 maintenance days in dry-dock would count as 43 DAFHP.

2. Average DAFHP for Individual Crewmembers Example.

   A WHEC is scheduled for a 90-day availability in a yard away from the cutter's homeport. Due to the nature of the work, only 1/3 of the WHEC crew is needed onboard for firewatches, inspections, and security functions. Working with the Area staff, the cutter arranges crew transportation and a homeport facility that allows 2/3's of its crew to perform normal administrative duties in their homeport. Periodical crew rotation is executed such that the average crewmember is away from homeport for only 30 days. The effective DAFHP for the cutter during the availability are reduced to 30. The 60 DAFHP recouped may be scheduled for other assignments.

   Note this practice needs to be closely monitored for equitability among the entire crew and coordinated between the cutter and the cutter scheduler only in unique circumstances when the entire crew is not needed aboard, such as some major availabilities.

3. Multiple Limits Example.

   A WLM 175 is scheduled for 21 more underway days (estimate 12 u/w hours per day) after completing 130 underway days (1400 u/w hrs) servicing aids, 11 days of high readiness for SAR standby (in homeport), and 19 days of inport ops (in homeport) servicing minor aids using its RHIB.

   Will this cutter exceed any schedule limits?

Total operations day limit: 21 (underway days) + 130 (underway days) + 11 (high readiness days) + 19 (inport ops days) = 181 (total operations days). This is within their total op limit of 220 days.

DAFHP limit: Even if all underway days (151) were DAFHP, they still would not exceed their 185 DAFHP limit with the remaining schedule.

Underway hours limit: In this case the cutter will exceed the underway hours limit. 12 hrs x 21 (days) = 252 hrs. 1400 hrs + 252 hrs = 1652 hrs. This would exceed the limit of 1500 underway hours.

Note: If the district planner wanted to keep a five percent surge capacity in case of a particularly hard winter with widespread navigation aid losses, the target of 1425 hours (95% of 1500 hours) for the year would force the planner to reschedule other tenders with fewer hours to cover for this one, or simply drop less critical missions.

4. Second Multiple Limits Example.

During the first half of the year, a WPB 110 (without MAT support and without supplemental funding) logs 1000 u/w hours, 60 u/w days, 45 high readiness days, 5 inport operations days, and 65 DAFHP.

For the second half of the year, this WPB can be scheduled up to 120 additional DAFHP, 90 total operations days, and 800 underway hours.

5. DAFHP and Normal Liberty Example.

After a day of underway operations, a WLB moors to a pier to off-load lighted buoys and on-load winter markers. The crew completes buoy handling and liberty is granted at 2000. They need to sail at 0700 the next morning for further operations. The day just completed would place the WLB one day closer to the DAFHP limit. This would be the case even if the vessel moored in its homeport, since less than 12 hours of consecutive liberty time were available between 1600 and 0800.

Note: If upon return to homeport, 12 hours of consecutive liberty is granted between 1600 that day and 0800 the following day; the day of return to homeport would not be counted as a DAFHP.

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Appendix R
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