DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
1000 NAVY PENTAGON
WASHINGTON, D.C. 20350-1000

17 April 2002

The Honorable Carl Levin
Chairman, Committee on
Armed Services
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

As directed by the Fiscal Year 2002 Senate Appropriations Committee Report 107-109, the enclosed report explains actions used by the Navy to address prior year shipbuilding cost growth.

Specifically, the report details the Navy's management, contractual, and budgeting actions taken to mitigate prior year shipbuilding cost growth.

Please let me know if I can be of further assistance. A copy of the Navy report is also being provided to Chairmen Inouye, Stump, and Lewis.

Sincerely,

Gordon R. England
Secretary of the Navy

Enclosure

Copy to:
The Honorable John Warner
Ranking Minority Member

DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
1000 NAVY PENTAGON
WASHINGTON, D.C. 20350-1000

17 April 2002

The Honorable Bob Stump
Chairman, Committee on
Armed Services
House of Representatives
Washington, DC 20515

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Copy to:
The Honorable Ike Skelton
Ranking Minority Member

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WASHINGTON, D.C. 20350-1000

17 April 2002

The Honorable Daniel K. Inouye
Chairman, Subcommittee on Defense
Committee on Appropriations
United States Senate
Washington, DC 20510

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Copy to:
The Honorable Ted Stevens
Ranking Minority Member

**DEPARTMENT OF THE NAVY**
OFFICE OF THE SECRETARY
1000 NAVY PENTAGON
WASHINGTON, D.C. 20350-1000

17 April 2002

The Honorable Jerry Lewis
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives
Washington, DC 20515

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Sincerely,

Gordon R. England
Secretary of the Navy

Enclosure

Copy to:
The Honorable John P. Murtha
Ranking Minority Member

# A REPORT TO CONGRESS

# on

# Prior Year Shipbuilding Account Management

Prepared by:

Deputy Assistant Secretary of the Navy for Ship Programs

Washington, DC

April 2002

Enclosure

## Table of Contents

## Requirement

The Fiscal Year 2002 Senate Defense Appropriations Report (107-109) directed that *"...$400,000,000 of the funds provided for prior year shipbuilding shall not be obligated or expended until the Secretary of the Navy provides the Appropriations Committees with a report on the specific corrective actions he plans to take to ensure that future SCN budget requests do not require additional funding in a prior year cost growth budget line."*

In accordance with the Congressional requirement, this report addresses the concerns and questions posed by the Committee. It provides background on unbudgeted cost growth in shipbuilding programs as reflected in the Department of the Navy's (DON) Prior Year to Complete funding requests; and identifies DON actions that address unbudgeted cost growth in major shipbuilding programs.

## Executive Summary

Unbudgeted cost growth in shipbuilding programs has reached an untenable level that has adversely impacted the rate at which the Navy has been able to modernize its Fleet. Detailed analysis reveals that cost growth has resulted from a multitude of factors, including:

- Underestimated non-recurring effort for lead ships;
- Growth in shipyard labor rates;
- Material inflation;
- Government and Contractor Furnished Equipment;
- Requirements and configuration changes; and
- Budget reductions/rescissions.

The Ship Cost Adjustment (SCA) process was the previous method used to address prior year shipbuilding cost increases. During times of robust ship construction, the SCA process allowed for internal adjustment of Shipbuilding Construction, Navy (SCN) funds between programs. With the consent of Congress, through the Appropriation Bill process, SCN was re-aligned from programs performing under cost to programs that were experiencing above target-cost performance, with little or no funding required from current or future budgets. However, beginning in Fiscal Year 1999, prior year shipbuilding requirements could not fully be financed within the SCA process. This has compounded over the last three years, creating a

deficit in funding required to cover above-target cost for ships currently under contract.

The DON has taken several steps to mitigate the risk of additional growth in the prior year balance. Specifically, the Department has reviewed the cost estimates and budgets of respective programs to ensure that they more adequately reflect performance risk. Further, more rigorous controls have been implemented to minimize changes in program scope. In addition, and as a last resort, the DON is prepared to eliminate or defer work as necessary to control acquisition costs. Concurrently, the DON has engaged and challenged its industry partners to improve cost performance by reengineering processes, employing lean manufacturing, and reducing overhead.

With regard to estimating, the DON has embarked on a bottom-up review with regard to the estimating process in order to ensure that the risk of factors such as low rate production, labor availability, and inflation are more appropriately reflected. In addition, the DON is exploring various alternatives to help ensure the establishment of more realistic target prices, with aggressive sharelines and contractual incentives that will better facilitate on-target performance.

From a budgetary standpoint, the DON is striving to more effectively balance and reconcile budget and program scope prior to contract award, pre-pricing deferred or descoped work for later inclusion should cost performance allow. Further, as with the execution of current contracts, strict guidance has been issued to the Program Managers (PMs) to minimize the issuance of contract changes, and the Chief of Naval Operations (CNO) has reestablished the Ship Characteristics Improvement Panel (SCIP) to review and approve configuration changes that require additional funding.

Management of shipbuilding cost growth is a top priority; this issue has received the highest level of attention within the Department. If the President's Fiscal Year 2003 budget (PB03) request for prior year shipbuilding of $645 million is fully supported by Congress, the outstanding balance for prior year shipbuilding programs through Fiscal Years 2004-2007 is approximately $1.6 billion. This report identifies in more detail the causal factors for past SCN cost growth, and summarizes the management actions taken to mitigate the risk of further cost growth.

## Background on the Prior Year Shipbuilding Cost Growth

Unbudgeted cost growth in shipbuilding programs has reached an untenable level and has adversely impacted the Navy's ability to recapitalize and modernize the Fleet. Prior Year Completion (PYC) budget shortfalls resulted from a multitude of factors, including:

- Underestimated non-recurring effort for lead ship design and production startup;
- Budget reductions/rescissions;
- Growth in shipyard labor rate projections due to:
  - Navy shipbuilding procurement rates which never materialized,
  - Impacts for future direct and indirect wage disputes;
- Contractor Furnished Equipment and material cost due to higher inflation rates than established indices;
- Government Furnished Equipment cost growth due to lower than projected procurement rates and concurrent development costs;
- Requirements and configuration changes due, in part, to computer obsolescence that occurs during the five to seven year shipbuilding construction cycle;
- Change order under funding compared to empirical execution requirements; and
- System engineering cost increases to achieve combat system integration, fleet interoperability, and open systems architecture requirements.

The SCA process was the previous method used to address prior year shipbuilding cost increases. During times of robust ship construction, the SCA process allowed for internal adjustment of SCN funds between programs. With the consent of Congress, through the Appropriation Bill process, SCN funds were re-aligned from programs performing under cost to programs that were experiencing above target-cost performance, with little or no additional funding required from current or future budgets. However, beginning in Fiscal Year 1999, prior year shipbuilding requirements could not be fully financed within the SCA process. This situation has compounded over the last three years, creating a deficit in funding required for ships under contract.

Table 1 is a summary of the DON completion of prior year shipbuilding requirement across all major shipbuilding programs as reflected in the PB03 request. The total prior year requirement since Fiscal Year 2001 is $3.546 billion. Through

Supplemental Appropriation and the Special Transfer Authority in Fiscal Year 2001, and the PYC funding in Fiscal Year 2002, the total remaining funding requirement was reduced to $2.221 billion in Fiscal Years 2003-2007. PB03 requests $645 million in PYC funding in Fiscal Year 2003.

| Program | FY01 | FY02 | FY03 | FY04-07 | FY01-07 |
|---|---|---|---|---|---|
| LPD | 140 | 173 | 243 | 864 | 1420 |
| NSSN | 119 | 227 | 276 | 543 | 1165 |
| CVN | 106 | 169 | 0 | 0 | 275 |
| CVN RCOH | 97 | 0 | 0 | 0 | 97 |
| DDG | 125 | 144 | 126 | 168 | 563 |
| T-AGOS | 10 | 0 | 0 | 0 | 10 |
| SSN ERO | 0 | 16 | 0 | 0 | 16 |
| Total | 597 | 729 | 645 | 1575 | 3546 |

Table 1- Prior Year Shipbuilding Requirement ($M)

**Prior Year Cost Growth Contributors**

An explanation of the major contributors associated with the prior year shipbuilding bill is as follows:

***Lead Ship Design and Production Startup***

The Navy and industry cost estimates have been less accurate for new start shipbuilding programs, or programs requiring significant baseline upgrades, than for ships in steady state production. This is due in part to the challenge of accurately estimating the non-recurring engineering and production labor required to concurrently design and build new start ships and major combat system baseline development efforts. As a result, the Navy has experienced significant cost growth in ship detail design SCN funding on lead and initial follow ships due to higher than expected design, system engineering, integration and test costs at shipbuilders and combat system prime contractors.

The government's share of production-related cost growth is predominately the result of not achieving efficiencies that were anticipated in bid pricing, overestimated learning curve savings, shipbuilding industry difficulty in hiring and retaining skilled workers, and unanticipated strike impacts. The major difficulty in a new start program estimate is incorporating concurrent changes to the ship design baseline.

Historically, ship construction has been aggressively programmed and budgeted, and does not reflect the budget risk of "unknown unknowns". Additionally, the anticipated number of ships under construction projected to absorb industry overhead has not met projections and has caused budget shortfalls.

For example, the estimated production effort for the lead ship of the LPD 17 program has increased due to additional production work scope identified during the course of detail design, revised cost estimates based on shipbuilder performance to date, and learning curve assumptions adjusted to reflect changes to the anticipated LPD 17 class procurement profile. Furthermore, the LPD 17 program experienced lead ship cost growth, which can, in many cases, be traced, to insufficient research and development funding to adequately reduce risk associated with developmental efforts. The best example was the non-recurring costs for the LPD 17 lead ship design development of the three-dimensional Computer Aided Design (3D CAD) design tool. Since 1999, the LPD 17 lead ship delivery schedule has been adjusted by 24 months as a result of design delays. Unfamiliarity and other problems with the 3D CAD tool, insufficient design resources, and the complexity involved have contributed to a significant increase in design costs. The DON's investment in CAD has been significant although the anticipated savings in design/production have been less than expected to date.

***Reductions and Rescissions***

This category of budget shortfalls includes the contribution of reductions to shipbuilding budgets by the following fiscal actions:

- DON fiscal adjustments;
- Office of the Secretary of Defense fiscal adjustments; and
- Congressional direct and indirect (*pro rata*) reductions to the SCN account.

The Department of Defense budget development process has effected the management of the DON's shipbuilding budget. A recurring issue in ship cost estimating and budgeting was the use of Office of Management and Budget/Office of the Secretary of Defense (OMB/OSD) indices for forecasting and budgeting shipbuilding labor and material inflation. The DON used one set of escalation indices for inflation adjustments to ship construction contracts; these are specified in the terms and conditions of each contract and based on the industry standard. OSD rates were based on the OMB Gross Domestic Product (GDP)

implicit price deflator, a very broad economic indicator that has included all U.S. goods and services, to develop out year inflation adjustments that are applied to the bottom-line for each appropriation, and subsequently spread across programs by the DON. Since the Department is obligated by the terms and conditions of the shipbuilding contract, there have been no means available to recoup these adjustments after a ship was appropriated. Differences between lower OSD projected rates and higher actual shipbuilding inflation experience have resulted in budget shortfalls and prior year requirements. When inflation adjustments are excessive, the result could be a PYC funding shortfall. If this situation develops and additional funding is not made available, then there may be no choice but to reduce program scope to stay within the budget and run the risk of delivering a ship that does not meet operational requirements.

***Labor Rates and Material Inflation***

This category includes the contributions to PYC cost due to labor rate, material inflation, and unanticipated overhead burden changes. Labor rate increases may result from new labor agreements, higher than expected overhead costs for health benefits and insurance, worker's compensation, fuel and energy escalations, and changes in business base assumptions. DON cost engineers use the shipbuilder's Forward Pricing Rate Agreement (FPRA) that is negotiated annually between the DON and the shipbuilder to project labor rates during ship construction. The FPRA contains employment and labor rate projections based on the shipyard's business plan for future years. The labor rates reflect such items as the shipbuilder's forecast of employment skill and trade mix, wages, and benefits specified in current union agreements, projected out year costs, and inflation adjustments. DON shipbuilding budgets are based on the FPRA projections adjusted to reflect the impact of current and future DON workload forecasts for the shipyard and inflation forecasts. However, the unexpected loss of planned workload at a shipyard during the three to seven years from contract award to ship delivery will result in overhead cost increases. While shipyards have made significant progress in reducing fixed costs to remain competitive, hourly overhead costs continue to increase as workload declines.

Additionally, Government Furnished Equipment (GFE) systems have historically been major drivers of engineering change orders and cost growth for Navy warships. This condition is attributable to Diminishing Material Sources (DMS), technology obsolescence, and the need for highly integrated, complex combat systems to meet emerging mission requirements.

For example, loss of work at General Dynamics Bath Iron Works and Northrop Grumman Ingalls due to the restructuring of the LPD 17 and DD(X) programs has significantly impacted labor rates at both yards on the Fiscal Year 1998-2001 DDG Multi Year Procurement (MYP). The reduced workload, combined with wage and benefit increases from new union agreements resulted in higher than expected labor rates at General Dynamics Bath Iron Works and Northrop Grumman Ingalls on the prior year DDGs. The cumulative effect of these small overhead absorption differences due to shifts in procurement rates multiplied by the eighteen DDGs under contract at any time has contributed to the PYC shortfall.

The LPD 17 program has experienced rate increases for both Avondale and Bath Iron Works (BIW), as compared to rates proposed in 1996 for LPDs 17, 18, and 19. These increases are caused in part by schedule slips, diminished shipbuilding workload, unionization at Avondale, strike and revised labor agreement at BIW, and Avondale Sealift program delivery extensions.

***Government/Contractor Furnished Equipment***

The effect of reduced shipbuilding procurement rates is an equally profound cause for higher than expected GFE cost. When the average unit costs for GFE systems were projected for ship budgets, they were based on higher ship procurement rates in future budgets that never materialized. As the DON transitions from 12-15 new construction ships per year to five to seven ships per year in the current FYDP, GFE system unit costs have increased. GFE costs for ships and systems in production for an extended period are increasing due to production inefficiencies and lack of competition from DMS. As a result, the DON pays a premium to procure this equipment and sustain the vendor base during ship production.

Contractor Furnished Equipment (CFE) cost growth also contributes to the PYC requirement. These cost increases are predominately due to underestimated subcontract material, and low rate procurement due to very low rates of ship production. They are also due to decreased quantities from reduced shipbuilding profiles, production changes from developmental testing, actual versus budgeted cost of subcontract material, and DMS. As an example, the VIRGINIA class program experienced growth in the projected cost of shipbuilder furnished material estimated in 1997. This is due to two factors. First, the actual material cost escalation in the specialized submarine

industry has exceeded the inflation rate the Department of Defense allows in budgets; and second, the low submarine build rate results in component costs that are higher than expected.

The DON is also managing the evolution from GFE to CFE procurements to leverage new commercial off the shelf technologies and provide industry with increased configuration control. In the interim, fewer quantities result in higher unit costs for GFE, and the DON is incurring more costs to transition to newer, more capable CFE.

***Requirements, Change Orders, and Configuration Changes***

This contributor includes the cost of procuring, integrating, and installing new equipment associated with new, unfunded requirements levied after contract award but required before ship delivery. Entities causing these changes include:

- Warfighting performance changes desired by the Navy warfare sponsor;
- Changes in statute such as environmental requirements; and
- Regulatory changes imposed by governmental and non-governmental groups such as the U.S. Coast Guard and the American Bureau of Shipping.

Although unbudgeted cost growth is due to multiple factors over several years, the program managers have temporarily addressed immediate funding requirements from SCN cost elements such as the engineering change order cost element. In addition, execution of contract changes beyond the scope of what was recognized during the planning and budgeting process has impacted the ability of programs to remedy government responsible defects.

Some of these changes reflect the reality that over the long duration of ship construction (e.g., five years for a DDG, eight years for a carrier), some portion of specified equipment will be unavailable due to a change in model, delayed or halted production, or often the specified equipment is simply obsolete and no longer supported.

## Actions to Address Prior Year Ships Cost Growth

The DON considers management of shipbuilding cost growth as a top priority and has given the highest level of attention to the issue. The Department has taken several steps to mitigate the risk of additional growth in the prior year balance. Specifically, the Department has reviewed the cost estimates and

budgets of respective programs to ensure that they more adequately reflect performance risk. Further, more rigorous controls have been implemented to minimize changes in program scope. In addition, and as a last resort, the DON is prepared to eliminate or defer work as necessary to control acquisition cost. Concurrently, we have engaged and challenged our industry partners to improve cost performance by reengineering processes, employing lean manufacturing, and reducing overhead.

For future work, the measures taken to mitigate the risk of cost growth are more robust. The DON has embarked on a bottom-up review of the estimating process in order to ensure that the risk of factors such as low rate production, labor availability, and inflation are more appropriately reflected. In addition, we are exploring various alternatives to help ensure the establishment of more realistic target prices, with sharelines and contractual incentives that will better facilitate on-target performance.

From a budgetary standpoint, we are striving to more effectively balance and reconcile budget and program scope prior to contract award, pre-pricing deferred or descoped work for later inclusion should cost performance allow. In addition, change order funding levels have been budgeted in the PB03 request based upon maturity of the program and empirical execution rates, not an arbitrary percentage level. For both the execution of current and future contracts, strict policy has been issued to the PMs to minimize contract changes.

These specific initiatives are discussed below in more detail, and have been categorized into three major discussion areas: managerial, contractual, and planning/programming/budgetary.

***Managerial***

The DON is examining and revalidating all major ship class cost and schedule baselines in conjunction with shipyard workload. The DON has funded ship programs to the most realistic cost estimate and revised future ship program estimates based on actual prior year returns. Additionally, the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) has instituted a policy of funding all applicable acquisition programs to the Cost Advisory Improvement Group (CAIG) independent cost estimate.

The DON is closely managing contract configuration baselines in order to control contractor performance. For example, to

limit the amount of additional growth work for a Refueling Complex Overhaul (RCOH), the DON is closely monitoring earned value data to assess contractor performance relative to the budget for the base work package. The DON is also monitoring the cost and schedule performance for the Ship's Force Work Package and the Work Assist Teams, along with quarterly reviews with all Participating Acquisition Resource Managers (PARMS) for technical, cost, and schedule issues. We have also fenced off a portion of the Emergent and Supplemental pool as a reserve for potential changes in labor rate mix, overhead percentage, and efficiency. This gives us better visibility into the impact of major cost drivers on our growth pool, and allows us to track our spending against our projected growth-spending plan.

The Assistant Secretary of the Navy for Research, Development and Acquisition (ASN(RDA)) has issued a policy that clarifies existing guidance regarding the authority of PMs to approve program changes that increase the costs above the program baseline. Specifically, the policy states that PMs may only use "change order" funds to remedy government responsible deficiencies in the areas of safety, contractual defects, unavailable contractor furnished equipment, testing and trial deficiencies, and statutory or regulatory changes. This policy is targeted to ensure that requirement growth or "requirements creep" that result in a change and/or cost growth is arrested. Under this new policy, any change to the configuration of a ship under construction that requires the direct application of additional funding, requires the approval of the CNO's SCIP and funding to finance the impact of the approved configuration change. In the past, some PMs attempted to pay for requirements growth out of existing budget, which added unacceptable risk to program execution and contributed to the prior year shipbuilding requirements.

The CNO established the SCIP to ensure that an executive decision process is used to oversee ship configuration control, Naval ship characteristics and requirements, ship survivability, Fleet modernization, undistributed budget marks to ship programs, future Naval capabilities, and shipbuilding program cost growths. The CNO's SCIP executive decision process incorporates the resource, acquisition, and requirement communities of the DON.

Consideration is also being given to the scheduling of government work and its impact on overhead rates on shipbuilding contracts. In the past, contracts were awarded on specific requirements of individual programs with limited consideration

given to the impact of that work on a shipyard or even on an industry-wide basis. In select situations, this can lead to resource and facility loading conflicts between contracts. Occasions arose where shipbuilders were expected to ramp-up to peak levels of labor that are difficult to achieve followed by significantly reduced labor demands. This creates a "peak and valley" situation at the shipyard and usually results in inefficient labor productivity from the affected trades due to worker layoff and retraining cycles. This situation frequently exists at Northrop Grumman Newport News (NGNN) and requires constant Navy and industry management to resolve schedule conflicts and better balance workload between Navy requirements for carrier new construction, major refueling overhauls and shorter term depot level maintenance availabilities. By promoting workload stability, minimizing the number of concurrent new starts at a yard, and incentivizing shipbuilders to reduce overhead rates and tailor facilities and headcount to capacity levels more in-line with the DON's long-term shipbuilding plan, the DON can beneficially influence industry performance.

The DON has challenged their industry partners to improve cost performance. ASN(RDA) has personally met with the shipbuilding corporate leadership to explain the urgency of the PYC issue and the impact that PYC has on present and future ship procurement rates. ASN(RDA) has also appealed to the shipbuilders to focus their management attention on arresting the shipbuilder's share of the PYC requirement. The shipbuilders have taken a variety of measures to alleviate cost growth. BIW built a land-level facility that enables them to more efficiently and completely outfit ships on land vice in the water. The land level facility will provide efficiencies in workload and workforce structure for future year ships that prior year ships did not have. In addition, Northrop Grumman Ingalls has invested heavily in facilities improvements targeted at improving productivity as well as implementing "lean manufacturing" techniques.

NGNN plans to achieve cost-savings through the "lean manufacturing" initiative that it developed on the aerospace side of the house and is beginning to utilize on the shipbuilding side. NG predicts, through parametric projections, an approximate $2.0 billion savings over the next ten years through efficiencies gained by the acquisition of Newport News Shipyard. NG's experience in limiting infrastructure costs through specialization in the aerospace sector increases the likelihood of generating these savings.

The DON has also experienced unacceptable cost growth for mature GFE systems that are supplied to shipbuilding programs. The DON is encouraging ship PMs to "fix price" budgets for mature GFE. This policy provides pressure for more realistic estimating and budgeting of GFE. The practice is being instituted internal to the DON's acquisition process through contractual language within Ship Program Directives between the shipbuilding PMs and the GFE system providers.

Further, the DON is investigating other potential mitigation measures to reduce future cost and schedule risk, such as:

- Pursue common architecture across platforms;
- Joint industry/Navy study to better understand new technologies and integration/interoperability challenges and associated cost drivers; and
- Evolutionary transformation vs. revolutionary approach to warfighting upgrades (e.g., DDG baseline upgrades, decision to restructure from DD-21 to DD(X)).

Prior to the PB03 submission, ASN(RDA) re-evaluated the PYC estimates to ensure that no further programmatic action could be taken without severely impacting mission capability.

***Contractual***

The DON is exploring various alternatives to ensure that shipbuilding contracts have more realistic target prices, aggressive sharelines, and contractual incentives such as stepped sharelines and event based incentives to better facilitate on-target performance. Instituting such measures will provide an incentive to the shipbuilders to bid realistically and provide increased cost control measures. Enhanced use of award fees in shipbuilding contracts is also being considered.

For example in the recently released DDG 51 program MYP request for proposal, the program is using a four-year MYP with a progressive shareline that will provide the government with increased program stability and improved pricing, while still providing ship profile flexibility through the available option ship pricing. Shipbuilder incentives to control cost and deliver DDG 51 on/under target include:

- Improved Shipbuilder Undertarget Shareline Incentive based on realistic bids;

- Improved Random Ceiling for higher and tighter range of bids;
- Restructured incentive and award fee structure maximizing incentive for delivery (the shipbuilder earns 100% if ship is delivered on or before the contract specified date);
- Cost performance (paid as a percentage after ship delivery based upon subjective evaluation of shipbuilder's pursuit of cost reduction initiatives); and
- Quality (based on contractor's effort to identify and correct quality control problems and to identify/pursue innovations to improve quality).

The shareline imposes greater risk to the shipbuilders when compared to the traditional 50/50 over target shareline. The contractor's risk increases because the competitive pressure to bid low still exists, but the cost growth penalty is greater on the progressive shareline than the traditional 50/50 shareline.

In addition to the contractual incentives cited for the DDG 51 MYP contract, the Navy has provided contract performance and contract award criteria incentives in place to promote better cost performance. Examples of these cost incentives include:

- Increased emphasis on "Proposal Cost Realism" as a dominant award criteria for "cost-type" ship system and shipbuilding development contracts;
- Increased emphasis on the cost performance portion of "Past Performance" award criteria for shipbuilding contracts; and
- Increased use of Cost Plus Incentive Fee contract structures for developmental shipbuilding contracts compared to Cost Plus Award Fee contract structures.

Both DD(X) and VIRGINIA Class programs are using unique teaming arrangements and contract structures between their two builders, respectively, that will inhibit the potential of predatory pricing. In general, the teaming allows for a win-win by both potential prime contractors, while ensuring the most beneficial competition occurs prior to any down selection.

***Planning, Programming, and Budgeting***

In PB03, the Department successfully instituted engineering change order (ECO) budgeting levels for future ships that more appropriately reflect the level of maturity and historical change order execution rates for shipbuilding programs. As part of its Budget Estimate Submission and review process with OSD and OMB, the DON successfully defended these change order budget

increases, and intends to maintain these increased funding levels to more accurately reflect empirical performance. By basing the ECO budget on program maturity and empirical data, a more accurate estimate of cost was generated. For example, the DDG 51 program ECOs are budgeted to five percent of the basic cost of construction in PB03. This five percent level is commensurate with the change order risk to a mature program and is contrasted with the DD(X) lead ship that is budgeted to ten percent, with the follow ship budget at eight percent.

Separately, the CNO has reorganized the respective warfare resource sponsors, which should improve the programming process. Specifically, the CNO is subsuming the former Deputy CNO for Space and Information Warfare (N6) into the Office of the DCNO for Warfare Requirements and Programs (N7). This organizational structure will combine the offices responsible for programming GFE systems for ship platforms with the offices responsible for the ship platforms themselves. Historically, the lack of an integrated programming organization has contributed to GFE requirements growth that has inaccurately been reflected in programming and budgeting requests.

ASN(RDA) has tasked the Navy's independent cost estimators for shipbuilding programs to review the major assumptions, methodologies, and processes employed for development of cost estimates for Acquisition Category I ship programs and associated warfare systems. The review assesses the factors that impacted the prior year programs including DDG 51, VIRGINIA Class, LPD 17, and CVN 76. The review will also include an analysis of the historical accuracy of the initial program estimates versus current programmed cost over the duration of each program. The key risk factors being assessed include an analysis of how closely OSD inflation indices and contract change orders align with reality of how all-major shipbuilding programs are executing. In addition, the risks associated with rate/workload fluctuation, concurrent development of ship and design tools, production techniques, ship systems, and other factors affecting cost are being evaluated. As a result of the analysis, recommendations will be made regarding notional changes in policy, processes, and methodology.

It is essential to properly fund programs prior to negotiating the contract to execute construction of the ship. To do this correctly, the technical risk associated with a new start program must be adequately addressed. Previous budgets have funded many shipbuilding programs without adequately reflecting the execution risk in the programming and budgeting

process. Moreover, PMs have accepted "program manager's challenges" of reduced program funding due to unproven acquisition reform initiatives. To alleviate this situation for new start shipbuilding programs, the Department intends to expand the use of research, development, test and evaluation (RDT&E) prototyping of high-risk ship systems. This approach will allow a spiral design process to enable informed tradeoffs between technical performance, cost, and schedule.

Separately, the Department intends to pursue, to the extent appropriate, lead ship budgeting in RDT&E. This fiscal policy will allow a more rigorous review process of execution cost performance and more accurate definition of costs as execution performance of concurrent development programs are fed back into the budgeting process. Further, funding the lead ship in RDT&E allows the PM to place a priority on designing a manufacturing process to efficiently produce the entire class of ships without forcing the PM to sacrifice such productivity initiatives to live within a fixed SCN budget. The first manifestation of this budgeting policy is evident in PB03 with the budgeting of the lead DD(X) ship in RDT&E funding. The DON believes that it can exercise greater year-to-year control of refined lead ship costs and use them to develop better cost estimates for follow on ships.

Concurrently, for future budgets, including PB03, the Department of Defense has adopted a process that programs will be funded to the level established by independent costs estimates. In most cases, this policy will require the DON and OSD to fund shipbuilding programs to CAIG independent estimates. In those instances where a CAIG input is not explicitly required (i.e., small or mature shipbuilding programs), the DON has the prerogative of requesting a CAIG independent analysis of the DON's independent cost estimate.

**Conclusion**

The DON has limited fiscal ability within appropriated SCN program resources to address unbudgeted cost growth issues that arise. Any unanticipated challenges with lead ship design or series ship construction programs will likely become a PYC bill since no program growth margin, management reserve, or SCN Total Obligation Authority flexibility currently exists to address emergent issues. If any cost increases over that which is currently recognized, or if the cost mitigation measures discussed herein do not yield any results, contract descoping will begin. The DON's management actions outlined in this

report and senior management attention are focused on mitigating the risk of a prior year shipbuilding requirement in future shipbuilding budgets. These steps should provide greater control of future prior year cost growth and ensure that the most accurate cost estimate is used for budgeting the required technology needed when the ship is delivered.