



CONGRESSIONAL BUDGET OFFICE  
U.S. CONGRESS  
WASHINGTON, D.C. 20515

June E. O'Neill  
Director

July 28, 1995

Honorable John McCain  
Chairman  
Subcommittee on Readiness  
Committee on Armed Services  
United States Senate  
Washington, D.C. 20510

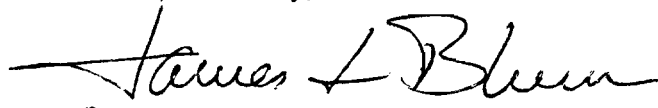
Dear Mr. Chairman:

On May 15th of this year, I provided you with preliminary findings from the Congressional Budget Office (CBO) study of issues related to submarine programs now under review by the Congress. In that earlier letter, I addressed the near-term savings that would result from a decision not to fund completion of the third Seawolf submarine. After briefly reviewing those savings, the accompanying attachment focuses on the implications of consolidating construction of all nuclear-powered ships at a single shipyard.

CBO's analysis suggests that such a consolidation could result in savings of between \$2.4 billion and \$3.7 billion (in 1996 dollars) over the life of the new attack submarine program, which is currently slated to acquire some 30 ships between 1998 and 2020. That amount is less than one contractor claims could be saved through consolidation, but more than the Navy's own estimate. Consolidation could also lead to a somewhat smaller shipbuilding work force: CBO estimates that at most some 3,300 shipyard jobs are at issue, and the reduction resulting from consolidation might be substantially less. Essential skills for producing nuclear-powered ships--many of which reside in the suppliers and subcontractors to the shipyards--would be retained whether or not production was consolidated.

CBO is continuing to explore this issue. If we can be of further assistance to you, please do not hesitate to call on me.

Sincerely,

  
for June E. O'Neill

ENCLOSURE

cc: Honorable William Cohen, Chairman  
Honorable Edward M. Kennedy, Ranking Minority Member  
Subcommittee on Seapower

AN IDENTICAL LETTER IS BEING SENT TO HONORABLE JOHN PORTER.

**SUBMARINE PROGRAM ISSUES**

**July 1995**

**U.S. Congress  
Congressional Budget Office  
Washington, DC 20515**

## SAVINGS FROM CANCELING THE THIRD SEAWOLF

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The lead ship of the Seawolf class (SSN-21) was authorized in the fiscal year 1989 budget, the second (SSN-22) in fiscal year 1991, and the third (SSN-23) in fiscal year 1992. In January 1992, President Bush announced his intent to cancel the Seawolf program and proposed rescinding funding for both the SSN-22 and SSN-23. The Congress, however, voted to retain the SSN-22 while rescinding the fiscal year 1992 funds for the SSN-23. In its place, the Congress provided an additional \$540 million to the Navy to support the submarine industrial base--funds the Navy has since applied to long-lead requirements for the third Seawolf class submarine.

The following year, the Secretary of Defense's Bottom-Up Review of military forces reported that building the third Seawolf was the most effective way to bridge the projected seven-year gap in awarding attack submarine contracts until a new class of submarines--the New Attack Submarine (NSSN)--could be designed and enter production. Industrial considerations dominated the decision. The SSN-23 is not needed today to meet force requirements: the U.S. Navy has 83 attack submarines in its 1995 forces versus a requirement of 45 to 55. The Administration argues, however, that the SSN-23 would eventually contribute to meeting a military requirement for a limited number of advanced submarines in the coming century and represents a cost-effective solution to preserving the submarine industrial base in the short run.

In its fiscal year 1996 budget, the Administration has requested \$1.5 billion to complete the third Seawolf. Navy officials have also programmed another \$70 million, starting in 2000, for outfitting and post-delivery costs for that vessel. Thus, the Administration's plan allocates \$1.6 billion over the next seven years to complete the SSN-23. That is in addition to the \$923 million provided by past Congresses as advance procurement funding for the ship.

Some of that \$1.6 billion in potential savings from canceling the SSN-23 would be offset by additional overhead costs incurred on existing contracts, the costs to shut down contractor facilities until they are again needed, and the loss of productivity when submarine production resumes. CBO estimates that such additional costs would total \$300 million to \$500 million. Thus, CBO estimates that the net savings from canceling the SSN-23 could amount to between \$1.1 billion and \$1.3 billion over the next seven years.

Navy officials claim that offsetting costs that can be estimated would range from \$700 million to \$1.0 billion. (They also suggest the possibility of even more costs, such as claims for environmental cleanup liabilities, but do not estimate their amount.) One significant area of difference between CBO's and the Navy's analyses is the Navy's claim that it will have to pay higher overhead costs on future contract work at Electric Boat if the SSN-23 is canceled. Navy officials estimate those costs at \$130 million to \$340 million. CBO did not deduct such costs from its estimate of

savings from canceling the SSN-23, because their amounts and even whether they will be incurred at all depend on future decisions of the Administration and the Congress. They differ from higher overhead costs on existing Electric Boat contracts, which CBO did include.

### CONSOLIDATING NUCLEAR-POWERED WORK AT NEWPORT NEWS

Another issue is the potential for longer-term savings from consolidating construction of all nuclear-powered ships at a single yard. In practical terms, that yard would be Newport News Shipbuilding and Drydock Company (Newport News), which has the facilities to build both aircraft carriers and submarines as well as conventionally powered ships.

Consolidating the production of nuclear-powered ships at Newport News would generate long-term savings. It would eliminate the cost of maintaining excess shipbuilding capacity at Electric Boat, which has no commercial business or other Navy programs (other than a limited number of SRAs--selected restricted availability maintenance activities) to share the costs of its yard and facilities. Consolidation would also reduce somewhat the contractual costs of building and overhauling Navy aircraft carriers.

Newport News has provided the Congress with an estimate that such savings could amount to \$7 billion to \$10 billion.<sup>1</sup> Those amounts, however, include anticipated future price inflation. Adjusted by CBO to constant 1996 dollars (as are all other costs in this analysis), Newport News's estimates of savings range from \$5.5 billion to \$6.9 billion.

In rebuttal to the Newport News analysis, Navy officials presented their estimate of the effect that consolidation would have on the cost of building nuclear-powered ships. They agree that consolidation would result in some savings, but suggests that those savings would amount to \$0.8 billion to \$1.8 billion (in 1996 dollars), with the most likely set of assumptions yielding a savings of \$1.3 billion.<sup>2</sup> Those estimates are for 24 submarines through 2012.

To develop its own estimate of the savings from consolidation, CBO estimated production costs for the NSSN program under two alternative sets of assumptions. The first assumes that Electric Boat would build all submarines for that program; the second assumes that all nuclear-powered construction would be

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1. Newport News Shipbuilding and Drydock Company, *Congress Should Require Competition as the Basis for Determining Which Shipyard Will Build the New Attack Submarine* (May 1, 1995), p. 1. Based on additional information supplied by Newport News to CBO, it appears that the higher value of \$10 billion is associated with a 30-ship program. The lower estimate of \$7 billion in savings may be associated with costs through 2012 for 24 ships.
  2. Admiral B. DeMars, Vice Admiral G.R. Sterner, and Rear Admiral R.E. Frick, *Report on Navy Submarine Acquisition Plan and Assessment of Shipbuilder Proposed Alternative Plan* (Report to the Assistant Secretary of the Navy for Research, Development, and Acquisition, May 1, 1995), p. 2.

performed by Newport News. For this exercise, CBO assumed that the costs of materials and components bought from lower-tier suppliers would be the same whoever built the submarine. Thus, the focus is on shipyard costs. As a starting point for the exercise, both shipyards were assumed to be able to build the submarine with equal efficiency. Labor requirements and therefore shipyard costs were assumed to decline as more ships were built and the producer accumulated experience. Then, successive factors were introduced into the analysis to represent the effects of consolidation on production costs.

If production was consolidated at Newport News, savings could result from a combination of several factors. The first of those is lower wage rates. Available information, including data from the Bureau of Labor Statistics, suggests that wage differences between the Groton area and the Newport News area range from 10 percent to 30 percent, depending on the measure. Recent contract negotiations at both yards suggest that a difference of at least 10 percent will prevail until 1999. To be conservative, CBO assumed that labor rates at Newport News would average 5 percent less than those at Electric Boat over the entire course of the NSSN program. That wage difference alone would generate a savings of about \$23 million a ship or a total of nearly \$0.7 billion over the 30-ship program.

Shifting the NSSN program from Electric Boat to Newport News would reduce the amount of overhead charged to each submarine because Newport News's

total overhead would be spread over more programs. CBO estimated that would result in a direct saving of \$40 million a submarine or \$1.2 billion for the entire program. In addition, adding the NSSN program to Newport News's workload would provide an indirect savings of another \$0.6 billion on carrier construction and overhaul work by reducing the overhead rate on those programs as well. Against those savings, CBO estimates that transferring the design work from Electric Boat to Newport News could add \$100 million to the cost of the lead ship. (The Navy report places that cost at \$180 million to \$235 million.) Combining the above yields net savings from consolidation of \$2.4 billion over the life of the program (see Table 1). That total does not take into account the \$1.1 billion to \$1.3 billion saving that CBO estimates would result from canceling the third Seawolf.

Newport News also argues that it could build the NSSN more efficiently (that is, with fewer labor hours per ship) than Electric Boat. Newport News's rationale is that its workforce would benefit from practicing the same or similar tasks in building carriers as well as submarines. Including Newport News's estimate of that cost advantage would add \$1.4 billion to savings. CBO has included that amount in the higher of the estimates shown in Table 1. However, CBO has no basis to confirm the Newport News contention that it would be the more efficient producer. Navy officials assert just the opposite: that mixing construction of different vessels at a single yard has led in the past to loss of productivity. Another issue is that the last submarine under construction at Newport News will be delivered in 1996, well



TABLE 1. ESTIMATE OF SAVINGS FROM CONSOLIDATING ALL NUCLEAR-POWERED SHIP CONSTRUCTION AT NEWPORT NEWS  
(In billions of 1996 dollars)

	Savings for First 24 Ships	Savings for Entire 30-Ship Program
<b>Likely Savings</b>		
Labor Rate Reduced by 5 Percent	0.6	0.7
Lower Overhead on Submarines	0.9	1.2
Lower Overhead on Other Navy Work	0.5	0.6
Cost to Transfer Ship Design to Newport News	-0.1	-0.1
Subtotal	1.9	2.4
<b>Other Possible Savings and Costs</b>		
Additional Cost to Reconstitute the Labor Force at Newport News	-0.1	-0.1
Increased Labor Productivity at Consolidated Yard	1.1	1.4
Subtotal	1.0	1.3
<b>Savings From Consolidation, Including All Factors</b>		
Total	2.9	3.7

SOURCE: Congressional Budget Office.

NOTE: Negative numbers indicate costs.

before construction ends at Electric Boat. CBO assumed that an additional \$100 million may be needed to restart production at Newport News. If the productivity differential--offset by the one-time additional reconstitution cost--is included, total savings from consolidating the 30-ship NSSN program would increase to \$3.7 billion.

Care must be taken when comparing reported estimates of savings. The Navy group's estimates of \$0.8 billion to \$1.8 billion refer to a 1998-2012 time period and are based on the production costs for 24 submarines, not 30. For 24 submarines, CBO's estimates of consolidation savings range from \$1.9 billion to \$2.9 billion, depending on whether Newport News's efficiency claim is adopted (see Table 1).<sup>3</sup> Also, both the Navy and Newport News include the third Seawolf (SSN-23) in their analyses, while CBO treats it as a separate issue. Adding the \$1.1 billion to \$1.3 billion in savings that CBO estimates would result from canceling the SSN-23 would bring its combined savings to between \$3.0 billion and \$4.2 billion, as compared with the Navy group's estimates of \$0.8 billion to \$1.8 billion and Newport News's claim of \$5.5 billion in savings.<sup>4</sup>

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3. CBO's estimates are based on buying three ships every two years (a 1-2-1-2 pattern), whereas the Navy's estimates assume two ships are bought each year after 2003. Adjusting for that difference in schedule would alter the comparison somewhat.

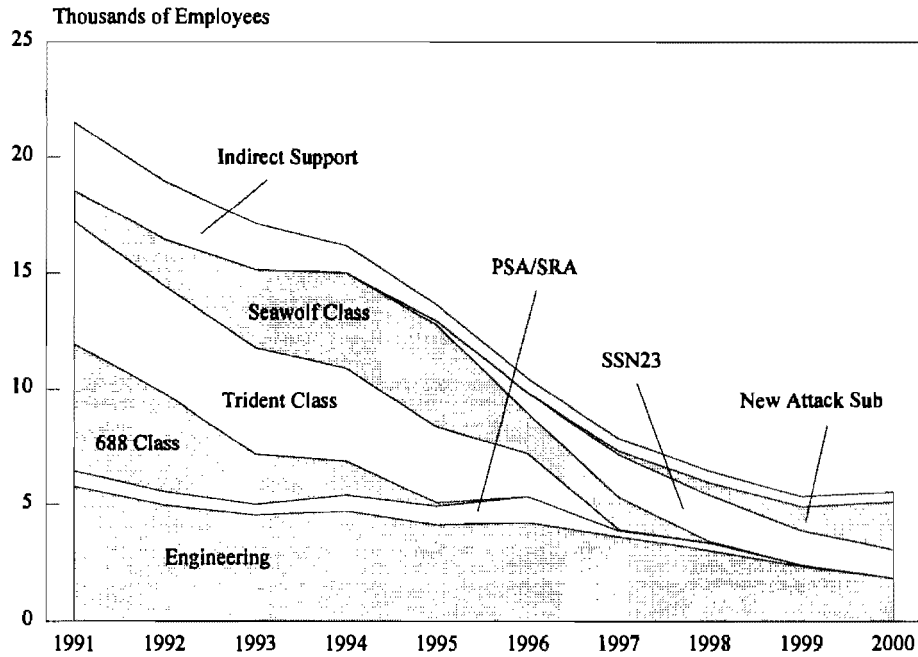
4. As previously noted, the higher end of Newport News's range of savings is for the entire 30-ship program and is not directly comparable to the Navy's estimate.

## EFFECTS OF CONSOLIDATION ON SHIPYARD EMPLOYMENT

Employment at the nuclear-capable shipyards has been declining for some time and will fall still more in the next five years. Electric Boat's employment level, which exceeded 22,000 in 1992, is estimated at 15,250 in 1995, a decline of nearly 7,000. By 1998, Electric Boat expects to have reduced its workforce to only about 6,000-- and that estimate assumes that it will receive the contract for the third Seawolf submarine this year (see Figure 1).

Newport News has also downsized significantly. At the end of 1990, employment at that shipyard was around 28,000. Current employment is 19,700, a decline of more than 8,000 workers. The shipyard projects that employment will reach the 15,500 level by the end of next year, when the last of the 688-class submarines under contract at Newport News will have been delivered (see Figure 2). Thus, the two nuclear-capable shipyards appear to be headed toward a combined employment level of 21,000 to 22,000 in the near term, contrasted with some 50,000 workers in the 1980s. Those declines in employment are the result of past decisions not to fund new submarines over the 1992-1995 period. They will occur regardless of what the Congress decides about the new attack submarines, the first of which will not generate significant shipyard employment until after 1998. (Lower-tier vendors will be the major beneficiaries of long-lead funding provided this year and next, in anticipation of a 1998 start for that program).

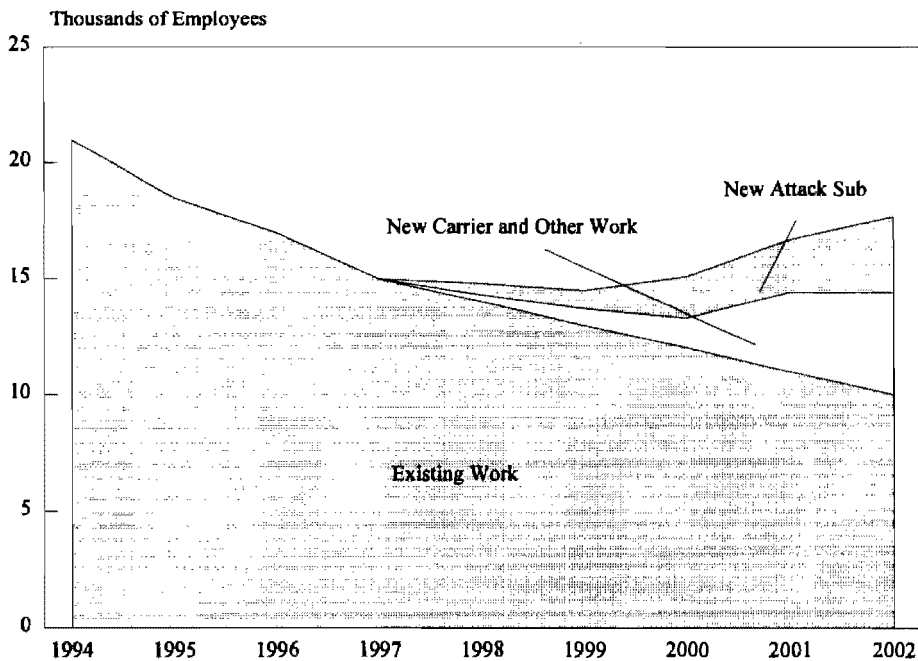
**FIGURE 1. EMPLOYMENT AT ELECTRIC BOAT**



SOURCE: Congressional Budget Office based on information from General Dynamics.

NOTES: Seawolf Class includes SSN21 and SSN22. SSN23 is shown separately.  
PSA/SRA=Post Shakedown Availability/Selected Restricted Availability.

**FIGURE 2. EMPLOYMENT AT NEWPORT NEWS SHIPBUILDING**



SOURCE: Congressional Budget Office based on information from Newport News Shipbuilding.

The new attack submarine, if produced at a rate averaging 1.5 ships a year, is expected to generate shipyard employment of some 7,000 to 7,500 once production stabilizes. At the higher acquisition rate of two ships a year, annual shipyard employment derived from the attack submarine program would fall in the 9,500 to 10,000 range. (Additional employment would be generated among the lower-tier suppliers and subcontractors as well, but CBO did not estimate its amount.)

Including employment from the NSSN program, from carrier construction and overhauls, from limited commercial work at Newport News, and from engineering design and support activities, CBO projects that total nuclear-powered shipyard employment would be likely to fall within the range of 18,000 to 23,500 by around 2007. If submarines are bought at the rate of two a year and both yards remain active producers, combined employment will approach 23,500. Consolidation would reduce that amount by some 3,300. If submarines are bought at the rate of only 1.5 ships a year, however, and their production is consolidated at Newport News, employment might approach its lower value of 18,000 in the coming decade.<sup>5</sup>

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5. If Newport News secures additional contracts for commercial or conventionally powered Navy ships beyond the limited work this analysis included, that factor would add considerably to this projection.

Construction and overhaul of aircraft carriers employs many of the same skills as submarine construction, although not in the same amounts or proportions.<sup>6</sup> Obviously, different numbers of workers would be required at different times for particular tasks, and careful work scheduling would be needed to smooth requirements and avoid alternatively training and laying off particular categories of workers. But those results at least suggest the potential for a consolidated shipyard operation to provide a steadier source of work for specialized and complex skills and therefore a more secure industrial base.

In contrast, keeping two active yards that can build nuclear-powered vessels would result in a somewhat larger qualified labor force, although the difference--3,300 jobs at most--is small in the context of the overall reduction in shipyard employment that is already occurring in the industry. It would also retain the potential for awarding new attack submarine contracts through a limited form of competition if and when annual purchases increased to two a year. The form of competition would be limited because provision would have to be made for a minimum award to each producer--perhaps one submarine every other year--to keep both in the competition over the long run.

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6. John Birkler and others, *The U.S. Submarine Production Base* (Santa Monica, Calif.: RAND, 1994), p. 137. The RAND study credits Newport News with the analysis underlying this conclusion.

## RISKS OF CONSOLIDATING PRODUCTION

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Consolidating production of nuclear-powered vessels at Newport News and therefore eventually closing General Dynamics' Electric Boat facility is not a decision to make without appropriate consideration of the risks involved. The Navy, while agreeing that consolidation would offer some savings, argues that those risks outweigh the expected savings. Navy officials cite several arguments to support their position. Keeping two yards that are qualified and equipped to build and maintain nuclear-powered vessels provides a hedge against the possibility of losing the services of a shipyard (for example, from a natural disaster). It also retains the potential for a future competition between the two shipyards and permits production of submarines to be expanded if needed. The Navy furthermore asserts that Electric Boat is the nation's premier facility for designing nuclear submarines. There is also the risk that the promised savings will not be realized because of factors not considered in the analysis. Each of those arguments deserves individual consideration.

### Two Yards Are Better Than One

Everything else being equal, CBO would concur that having two nuclear-capable shipyards is better than having only one. The possibility of losing the services of a single yard through some sort of accident or natural disaster, while remote, cannot

be ruled out entirely. A more important consideration is that two shipyards offer the potential for competition, at least for submarine construction, and competitive pressure can be a factor not only in restraining acquisition cost, but also in promoting advances in submarine design. If consolidation took place, the Navy would have limited leverage in its dealings with Newport News.

The prospective decline in new ship construction is at the root of the Navy's problem. Shipyard employment is declining by half from Cold War levels, and future construction plans offer little prospect for improvement in the next 20 years. Future submarines may not be bought in large enough numbers to support two producers with competitive bidding procedures. Under such circumstances, consolidation offers attractive savings that weigh heavily during a period of declining defense and acquisition budgets. Another way to support private shipyards would be to assign more overhaul, repair, and modification work to them. Although overhauls do not use all the skills and facilities needed for new construction, they could provide an alternative that would stabilize workforces at both yards. But such a step would shift the problem to the public shipyards, which perform most of these activities for submarines if not for carriers. Two of the six public shipyards that support the submarine force have been earmarked for closing, and a major shift of work to the private sector would create pressure for further consolidation of the public yards.



### Surge Capacity

The argument that keeping two yards provides a capability to expand production should be given little weight. In the first place, shipbuilding is not something one turns on or off in a crisis. Building a nuclear submarine takes six years in peacetime. Most international conflicts will be resolved long before the first added submarine enters the water. Second, Newport News alone could build at least four submarines per year, twice the highest rate the Navy is now considering for the new attack submarine program. Assuming that the average expected life of a submarine is 30 years, the capacity to build four submarines a year would support a steady-state force of 120 attack submarines--a fleet exceeding that of the later Cold War years (a maximum of about 100 ships).

### Electric Boat's Design Capabilities

Currently, firms are seeking to better integrate manufacturing considerations into their designs at an early stage in the process. That argues for a single facility responsible both for design and production of the ship. But it does not make the case for Electric Boat's having a unique capability to perform that function. Although Electric Boat has a long record of achievements in advancing submarine technology, the mainstay of the current attack submarine fleet--the Los Angeles class--was

designed by Newport News, which is also responsible--together with Electric Boat--for the newer Seawolf design. Both firms have the capability today to design new submarines, and in future years, talented engineers and designers will gravitate naturally to whoever has the contracts.

#### Uncertainty of Savings Estimates

The savings estimates presented by the Navy, CBO, and Newport News are all built on a number of assumptions. One major assumption common to all three analyses is that Newport News will continue to build and overhaul nuclear-powered aircraft carriers. The Navy, however, is reportedly examining alternatives to the Nimitz class carrier that Newport News builds today, including the alternative of smaller, conventionally powered carriers that other yards could compete to build. If the volume of Navy work at Newport News declined significantly, the prospective savings the shipyard could offer on the new attack submarine program would decline as well.

Another uncertainty is the innovations that Electric Boat is introducing in submarine construction techniques and practices as part of its "design/build" approach. Electric Boat believes those innovations will offer significant savings in construction costs. CBO believes that construction practices and manufacturing

tools, such as computer-aided design and manufacturing, are sufficiently similar at Newport News that it could benefit from such innovations as well. If that is not true, however, Electric Boat might prove to be a more efficient producer, which would partially offset the economies of scale Newport News realizes through its larger business base.