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August 7, 2009

The Honorable Edward M. Kennedy  
Chairman  
The Honorable Mel Martinez  
Ranking Member  
Subcommittee on Seapower  
Committee on Armed Services  
United States Senate

Subject: *Defense Acquisitions: Additional Analysis Needed to Capture Cost Differences  
Between Conventional and Nuclear Propulsion for Navy's Future Cruiser*

The National Defense Authorization Act for Fiscal Year 2008 requires that any budget request for construction of a new class of major combatant vessels will be for one with an integrated nuclear power system, unless the Secretary of Defense submits notification to Congress that it is not in the national interest to do so. The Navy's Next Generation Cruiser—CG(X)—is subject to this legislation. In response to a congressional request, GAO reviewed the Navy's analysis of options for CG(X), including cost estimates related to building nuclear and conventional cruisers. GAO examined (1) the design concepts included in the CG(X) Analysis of Alternatives, (2) how each ship design concept addresses threats that cause capability gaps for maritime air and missile defense, and (3) how the Navy's methodology and assumptions affect its estimates of the relative costs for conventional and nuclear cruisers. To accomplish this, GAO analyzed CG(X) program documents, interviewed Navy and Department of Defense officials, and assessed the effect of alternative methodologies and assumptions on cost estimates. This letter is an unclassified summary of the classified report.

In the CG(X) Analysis of Alternatives, the Navy identified six ship design concepts. These concepts include developing new designs as well as making modifications to previous hulls. For example, two concepts are based upon making modifications to the DDG 1000 Zumwalt-class destroyer and another concept is based upon making modifications to the DDG 51 Arleigh Burke-class destroyer. The ship design concepts vary in both capability, including the sensitivity of the radar and number of missile cells, and propulsion system. The variability is based on whether the concept uses a previous hull or is a new design. The Navy analyzed two new cruiser design concepts, one with a conventional propulsion system and one with a nuclear propulsion system. Both included the most sensitive radar and highest number of missile cells of all the concepts.

The sensitivity of the radar on each ship design drives the ability of that ship to address threats that cause capability gaps for joint forces. The Navy developed a minimum performance standard that each alternative would need to meet to address the gap. As the radar sensitivity level increases, the capability gaps against these threats diminish because the radar's ability to meet the performance standards improves.

The draft cost analysis—which has not yet been approved within the Navy—includes a life-cycle cost estimate and a break-even analysis. The Navy estimated the life-cycle costs for 19 nuclear cruisers and 19 conventional cruisers using the 2007 price of crude oil. Then, in the break-even analysis, the Navy calculated the price of crude oil at which the cost of 19 nuclear cruisers equals the cost of 19 conventional cruisers. Using this analysis, the Navy determined that if oil prices behaved similarly to the past 35 years, the nuclear cruisers would be cheaper than the conventional cruisers. The Navy’s analysis does not include: (1) present value analysis to adequately account for the decreasing time value of money, (2) alternative scenarios for the future price of oil, and (3) an examination of how a less efficient conventional propulsion system would affect its cost estimates. By incorporating present value analysis, as required by Department of Defense guidance, and future oil projections from the Department of Energy’s Energy Information Administration, we found that the life-cycle cost of the conventional cruisers would be less than the nuclear cruisers. This demonstrates the sensitivity of the cost estimates to different assumptions, underscoring the need for more rigorous analysis before reaching conclusions about the alternatives.

### Recommendations for Executive Action

We recommend that the Secretary of Defense require that the Navy (1) before finalizing Phase 2 of the Maritime Air and Missile Defense of Joint Forces Analysis of Alternatives, include present value analysis, alternative fuel scenarios, and analysis on the effect that a less efficient conventional propulsion system has on the cost estimates and (2) include present value analysis and alternative fuel scenarios in any future analyses of the trade-off between conventional and nuclear propulsion.

### Agency Comments

The Department of Defense provided us with restricted comments on our report. In its comments, the department agreed with the recommended actions. However, it disagreed with several of GAO’s underlying analyses.

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If you or your staff have any questions about this report, please contact me at (202) 512-4841.



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