

**SHIPYARD INFRASTRUCTURE OPTIMIZATION
PROGRAM**

HEARING

BEFORE THE

SUBCOMMITTEE ON SEAPOWER

AND

SUBCOMMITTEE ON READINESS AND
MANAGEMENT SUPPORT

OF THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED SEVENTEENTH CONGRESS

SECOND SESSION

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SHIPYARD INFRASTRUCTURE OPTIMIZATION PROGRAM

TUESDAY, MAY 10, 2022

UNITED STATES SENATE,
SUBCOMMITTEES ON SEAPOWER AND
READINESS AND MANAGEMENT SUPPORT,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

The Subcommittees met, pursuant to notice, at 2:44 p.m. in room SD-350, Dirksen Senate Office Building, Senator Mazie Hirono (Chairman of the Subcommittee) presiding.

Committee Members present: Hirono, Kaine, Blumenthal, Peters, Cramer, Sullivan, Wicker, Fischer, Ernst, Scott, and Hawley.

OPENING STATEMENT OF SENATOR MAZIE HIRONO

Senator HIRONO. This hearing will come to order. We will momentarily be joined by Senator Kaine and other Members. We are, as you know, in the midst of voting.

I would like to welcome our witnesses to the hearing this afternoon: Mr. Frederick Stefany, Principal Civilian Deputy Assistant Secretary—that is a mouthful. Welcome, Mr. Secretary—Assistant Secretary of the Navy for Research, Development, and Acquisition; Vice Admiral William Galinis, Commander of Naval Sea Systems Command; Rear Admiral Troy McClelland, Program Executive Officer for Industrial Infrastructure; and Ms. Diana Maurer, Director of Defense Capabilities and Management for the Government Accountability Office (GAO). Thank you for your service to the Nation and for the truly professional service of the men and women under your command.

I also want to recognize our Ranking Member, Senator Cramer. I also want to recognize Senator Kaine and Senator Sullivan, and I appreciate my colleagues' willingness to hold this joint Readiness and Seapower hearing on this very important subject.

We stand at a crossroad today. The Nation's shipyards are in dire need of modernization to ensure we can maintain the current fleet and the fleet of the future. I am encouraged that the Navy has finally gotten serious about investing in this critical infrastructure that has been neglected for too long.

In Hawaii we are all proud of Pearl Harbor Naval Shipyards' contributions to our fleet's readiness, and I want to be sure that the yard receives the resources it needs to keep our fleet in fighting shape. I look forward to hearing from you this afternoon about how the fiscal year 2023 budget supports this plan.

The Navy has begun a once-in-a-generation program to modernize its shipyards under the Shipyard Infrastructure Optimization Program, or SIOP. This 20-year program to improve the shipyard infrastructure is an effort that has been sorely neglected for many years, and we have to get it right. We are relying on the digital twin modeling and simulation effort to develop the most efficient and productive layout for operations at the four public shipyards.

Last year, for example, we had to add \$250 million to fund the dry dock at the Portsmouth Naval Shipyard due to unexpected ballooning of the estimated cost. We need to understand what steps the Navy has taken to make sure we have better cost estimates of the projects we are undertaking. This will be important as the Navy turns to the dry dock replacement at Pearl Harbor Naval Shipyard, which is the next dry dock to be constructed and will require significant dredging and filling to extend the existing dry dock.

We also need to understand how the Navy is structuring the SIOP effort to improve the efficiency of the shipyards to deal with the ship maintenance challenges that are facing the Navy today.

SIOP is not limited to just the dry docks. It also extends to optimizing the work on the shipyards through production facilities and other improvements to misaligned configurations, and this is why I have been so focused on the warfront production facility at Pearl Harbor. This project is important to the workforce there, and I want to ensure the Navy remains committed to it. We need to be able to maintain the fleet we have if we are ever to reach the fleet size the Navy has identified as required to respond to future threats. SIOP's success is critical to that goal.

We want to help and we would ask the Navy to consider how the program could be accelerated without impacting availability. So I look forward to hearing today how we can work together to make sure SIOP is a fully successful effort.

Now I turn to Senator Cramer for his remarks.

STATEMENT OF SENATOR KEVIN CRAMER

Senator CRAMER. Thank you, Chairwoman Hirono, as well as Chairman Kaine and Ranking Member Sullivan for agreeing to hold this hearing jointly to discuss a range of important naval shipyard issues that cross our Subcommittee jurisdictions, and let us face it—it is not just the issue of the day. It is the issue of the day with regard to the future of the Navy.

As I think about our naval shipyards it is striking to me how intertwined they are with our Nation's history. In other words, they are really old. Even before our independence. For example, Norfolk Naval Shipyard, near and dear to Senator Kaine's heart, of course, was first established in 1767 under the British flag as Gosport Shipyard and seized 7 years later during the Revolutionary War. There is not even a Senator that old anymore, is there?

In the 1790s, the USS *Chesapeake*, one of the first six U.S. Navy ships authorized and funded by Congress, was built there. Later, the first dry dock in the Western Hemisphere opened in 1833, known as Dry Dock 1, and now a historic national landmark. It is

still in use today. Think about it. It is 189 years old and still used to maintain naval vessels.

Suffice it to say, our four public shipyards all have storied histories and they are truly national infrastructure. Each is over 100 years old and showing its age. The poor condition of these shipyards is having a serious negative effect on fleet operations today and the bill has come due. This is not a future problem. It is here now and one we must work together to solve.

So while there is a lot to discuss, and I appreciated Chairwoman Hirono's opening comments and much of what she had to say, I plan to focus my questions on how Congress can help in terms of authorities, workforce development, and funding. On the last point, I am hopeful the bipartisan group of Senators working on the Shipyard Act, many of whom are in the room today, will be able to get it done. I look forward to the testimony of our witnesses.

Thank you, Madam Chair.

Senator HIRONO. Thank you.

Now I would like to turn to Senator Kaine, the chair of the Readiness Subcommittee. Senator Kaine?

STATEMENT OF SENATOR TIM Kaine

Senator Kaine. Thank you, Chair Hirono. Readiness Subcommittee meetings are fun, Seapower Subcommittee meetings are fun, but this is really exciting, this joint meeting, and I want to thank the chair and I want to thank the witnesses for being here today and for your dedicated service to the country.

You have got some friendly faces around the dais when it comes to support for our Navy's shipyards, but at the same time the Navy has some significant challenges on its hands regarding the implementation of SIOP, especially the ability or inability to be on time, on budget.

There is no doubt that these are necessary investments. The condition of our shipyards, both in terms of infrastructure and workforce, given that the age of the shipyards was indicated by Senator Cramer, do require a lot of resources and support. We have to do our part here in Congress.

When we look at how the Navy has executed SIOP projects to date, I have some concerns and I also see some positives. On the concerns side, how do we ensure that the Navy can even program the average \$1 billion per year in budget requests over the next 20 years? The dry dock replacement at Portsmouth—that is the Portsmouth in Maine, not Virginia—was originally estimated by the Navy to cost \$250 million. Then the cost doubled, and then it increased another \$250 million as a result of a sole-source contract. So today my particular interest in hearing from you is how we have implemented the lessons learned from Portsmouth for the rest of the SIOP portfolio.

It is not all bad news. The Navy has invested well over the statutorily required 6 percent capital investment program since 2011. That is a real positive. The work of the GAO has never been more important than it is today, so I am glad to have Ms. Maurer here testifying again before the committee. I look forward to hearing her insights on how the Navy can better execute construction projects,

modernize its capital equipment, and otherwise optimize shipyard operations.

So Madam Chair, thanks again for leading the charge on this hearing to discuss our shipyards in detail.

Senator HIRONO. Senator Sullivan?

STATEMENT OF SENATOR DAN SULLIVAN

Senator SULLIVAN. Yes. Thank you, Madam Chair, and I want to thank you and Senator Kaine and all my colleagues for conducting this hearing. It is a very important hearing, and to Senator Cramer's discussion of history, I actually was just talking to Senator Hirono as we walked down to the vote on the latest movie on Midway. I do not know if anyone has seen that movie but it is quite a good movie.

It has got a scene where the shipyard, I believe that was in Hawaii, did a miraculous job of bringing the carrier, the *Yorktown*, back online to go fight in the Battle Midway and was decisive. So the shipyard point, about what Senator Cramer was talking about, really made history in that critical battle that was one of the most important in World War II, one of the most important battles in our Nation's history. So that is how important this topic of discussion is.

As has already been noted, the average of naval shipyard facilities is over 60 years old, and the average dry dock age is approaching 100 years old, and we have seen the readiness of shipyards weaken as decisions were made to prioritize shipbuilding over ship maintenance. When initially developed, the Shipyard Infrastructure Optimization Plan had a bill of \$21 billion over 20 years. That number has already increased in the last few years, and that is the topic I hope we can discuss in detail today.

Additionally, according to the GAO, the Navy cannot currently complete all required maintenance for aircraft carriers and submarines with our existing dry dock capabilities. So how can we balance these necessary capital investments with the existing maintenance requirements? I think we find ourselves in a challenging situation as it relates to operational demands, ship maintenance, and the conditions of the fleet, not to mention the challenges in the U.S. Indo-Pacific Command (INDOPACOM) theater and a look at where China is with regard to its shipbuilding and maintenance capabilities.

Another issue that I think impacts the Joint Force is maintenance on conventionally powered ships. Delayed overhauls of surface combatants that escort nuclear aircraft carriers also impact readiness. I believe one option in that regard is to conduct lower-level maintenance at smaller private shipyards to free more space for more complex maintenance overhauls at our larger private shipyards. I hosted the Secretary of the Navy a couple of years ago to our shipyard in Ketchikan, Alaska, which has enormous capabilities and is looking to do a lot of work for the U.S. Coast Guard. We have another shipyard in Seward, Alaska, that just completed almost \$11 million worth of work on the USNS Grasp, a Navy rescue and salvage vessel. The work was delivered on time, on budget, and received outstanding feedback.

So this is an all-hands-on-deck need, and I think there are shipyards across America, including in my state, that can participate and help out with regard to the challenges.

Thank you. I look forward to hearing our witnesses.

Senator HIRONO. Thank you, Senator Sullivan, and I thank him for suggesting that we all go to see the new Midway movie, because it really highlights the importance of our public shipyards.

We will start this hearing by hearing from Secretary Stefany first. Please proceed.

STATEMENT OF FREDERICK STEFANY, PRINCIPAL CIVILIAN DEPUTY ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT, AND ACQUISITION

Mr. STEFANY. Yes, ma'am. Thank you. I will be reading a statement for all three of us from the Navy.

Chairwoman Hirono, Chairman Kaine, Ranking Members Cramer and Sullivan, distinguished Members of the Subcommittees, on behalf of myself, Vice Admiral Galinis, and Rear Admiral McClelland, thank you for the opportunity to appear before you today to discuss the Department of Navy's Shipyard Infrastructure Optimization Program, better known as SIOP.

Modernized and ready shipyards are generators of fleet readiness and are the strength of our national security. We appreciate the strong support this Committee, and particularly these subcommittees have shown for infrastructure optimization efforts to date. We are committed to maintaining transparency throughout the planning and execution of the Department's SIOP investments.

As mentioned, SIOP is a once-in-a-century opportunity to revitalize our Nation's four public shipyards, ensuring that these critical national security facilities are properly positioned to meet current and future needs of the Navy. It is about modernizing aging facilities, equipment, and dry docks that have served our fleet for generations, and doing that modernization without disrupting our current maintenance that supports the readiness of today's fleet.

We also need to upgrade these facilities and equipment to support new classes of ships, such as the *Ford* aircraft carrier and the *Virginia* Block V submarines, while at the same time making the shipyards more efficient and more effective at maintaining all our ships. We need to bring them up to modern standards and ensure they are resilient to climate change. All of this will take years of consistent funding, construction, and leadership at all levels.

Informed by a complete Future Years Defense Program (FYDP), the fiscal year 2023 budget includes our strongest SIOP funding since the program was established. It includes \$1.7 billion for the program in fiscal year 2023, with a sustained commitment of \$8.3 billion across the FYDP.

In fiscal year 2023, the request will support modernization of capital equipment and will enable advanced planning activities and required environmental assessments. The 2023 funds will also enable critical military construction (MilCon) projects such as the start of the replacement of Dry Dock 3 at Pearl Harbor, Hawaii, and the continuation of multi-mission Dry Dock 1 in Kittery, Maine, and Dry Dock 8 saltwater systems in Portsmouth, Virginia,

as well as the planning for the multi-mission dry dock at Bremerton, Washington.

Multiple Navy commands play key roles in SIOP planning and execution. For example, the Navy Facilities Engineering Systems Command, or NAVFAC, builds and maintains the shipyards, the Naval Sea Systems Commands operates the shipyards, and the commander of the Naval Installations Commands hosts all of those activities.

To ensure disciplined oversight while maintaining uninterrupted support to the fleet, the Navy is treating SIOP as if it is a major defense acquisition program. We have established a program executive officer for industrial infrastructure late last year, we are developing an overall SIOP acquisition strategy, and we are developing individual master plans with cost, schedule, and performance measurement baselines for each of the shipyards to measure our progress as we go.

We understand that for SIOP to succeed we must properly plan and execute SIOP work without impacting the shipyard's ability to execute their mission. Balancing SIOP's needs with that of the fleet and the shipyards is, and will continue to be, critical and an iterative process involving all stakeholders. We are committed to working as a team to ensure the program is ruthlessly executed to avoid impacting fleet operations or ship maintenance periods, and conversely, that ship maintenance availabilities do not impact downstream SIOP projects.

We believe improved SIOP governance, combined with consistent funding, will focus and accelerate this critical long-term initiative. It will enable the Navy to sustain nuclear-powered warships we have now and the ones that we are building for the future fleet, strengthening maritime dominance in defense of our Nation.

With that we look forward to your questions. Thank you.

[The joint prepared statement of Mr. Frederick J. Stefany, Vice Admiral William J. Galinis, and Rear Admiral Troy McClelland follows:]

JOINT PREPARED STATEMENT BY FREDERICK J. STEFANY, VICE ADMIRAL WILLIAM J. GALINIS AND REAR ADMIRAL TROY MCCLELLAND

Distinguished Members of the Subcommittees, we are pleased to appear before you today to discuss the Department of the Navy's Shipyard Infrastructure and Optimization Program (SIOP). SIOP is a once-in-a-century opportunity to revitalize our Nation's public shipyards, ensuring that these critical national security facilities are properly positioned to meet the future needs of the Navy Fleet. With the strong support of this committee and the Congress, SIOP efforts continue to mature, creating momentum as a cross-organizational initiative committed to predictable delivery of critical infrastructure for the four public shipyards. Funding provided in the Fiscal Year 2022 Consolidated Appropriations Act will ensure that priority projects are completed in time to serve the first *Virginia*-class mission need date in fiscal year 2027 and that other crucial planning and design efforts are completed to support the Navy's future nuclear submarine and aircraft carrier force.

BACKGROUND

The Navy's four public shipyards—Norfolk Naval Shipyard (NNSY), Portsmouth Naval Shipyard (PNSY), Puget Sound Naval Shipyard and Intermediate Maintenance Facility (PSNS), and Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility (PHNS)—are pillars of our national defense. The average age of the naval shipyard facilities and related infrastructure is over 60 years while the average dry dock age is approaching 100 years. Shipyard facilities, equipment, and their

workforce have served the Fleet for generations, and we could not afford to build them from scratch today.

The Navy established SIOP in 2018 to take a holistic approach to recapitalization of the four public shipyards. SIOP integrates all infrastructure and capital equipment investments to support nuclear fleet maintenance requirements and improve maintenance capabilities by expanding shipyard capacity and optimizing shipyard configuration. From the beginning, SIOP has led the Navy in depot infrastructure transformation efforts and has become a model for all domains seeking to improve their infrastructure capabilities. The program consists of three primary Lines of Effort (LOE) in support of the four public shipyards:

1. Construct and recapitalize dry docks, including necessary investments to sustain certification requirements.
2. Recapitalize and reconfigure infrastructure towards optimization.
3. Modernize capital equipment.

Dry dock recapitalizations must be completed to accommodate the configuration of the future force platforms. Along with the dry dock recapitalizations, the modernization and equipment recapitalization elements of SIOP are essential to meeting and subsequently reducing the timelines associated with completing maintenance and modernization work; maximizing the operational availability of these platforms in support of fleet requirements. Our shipyard re-capitalizations also must integrate with ongoing and planned carrier and submarine maintenance availabilities. SIOP activities are closely tied to each shipyard's planning and execution of ongoing and future availabilities for the current nuclear force and are scheduled to balance the needs of the shipyards to conduct ongoing work with the needs of the shipyard recapitalization work.

FISCAL YEAR 2023 BUDGET REQUEST

The Navy's fiscal year 2023 budget demonstrates our commitment to SIOP by requesting \$1.7 billion for the program in fiscal year 2023, and requesting a total of \$8.3 billion across the Future Years Defense Program (FYDP) to fund the three LOEs. Combined with the SIOP funds enacted by Congress in fiscal year 2021 and fiscal year 2022, this FYDP request will enable critical Military Construction (MILCON) projects (\$6.1 billion) such as the replacement of Dry Dock (DD) 3 at Pearl Harbor, Hawaii; Multi-Mission Dry Dock #1 Extension in Kittery, Maine; and Dry DD 8 Saltwater System in Portsmouth, Virginia to proceed on pace to meet fleet requirements. The request will support modernization of Capital Equipment (\$679 million) and will enable advanced planning activities, required environmental assessments, and program management (\$1.5 billion). These additional investments will facilitate program oversight, proper planning and cost development of projects to better inform future budget estimates.

PROGRAM GOVERNANCE

To ensure disciplined oversight of cost, schedule and performance within the program, while maintaining uninterrupted support to the Fleet, the Navy updated its reporting relationships and established a Program Executive Office Industrial Infrastructure (PEO II), aligned with Naval Facilities Engineering Systems Command (NAVFAC), and reporting directly to the Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN (RD&A)). Additionally, the Program Management Office that previously reported to Naval Sea Systems Command (NAVSEA) has been realigned to report directly to PEO II.

The PEO and program office are implementing agile acquisition methodologies to coordinate the programmatic execution of this complex effort, similar to those the Navy employs for major defense acquisition programs (MDAPs). The Navy is establishing an overall SIOP Acquisition Strategy (AS) and Acquisition Program Baselines (APBs) for each shipyard that will be the guiding documents for managing SIOP program execution. These documents will establish threshold and objective parameters for the overall cost, schedule, and performance of SIOP execution at each shipyard. The PEO also remains integrated with NAVSEA and the Naval Sustainment System—Shipyards (NSS-SY) efforts to improve shipyard performance.

Whereas SIOP is a holistic, Navy-wide approach to upgrading the shipyards' physical infrastructure and capital equipment, NSS-SY is focused on improving and standardizing the shipyards' business practices to improve the on-time delivery of submarines and aircraft carriers out of maintenance. Like SIOP, NSS-SY assigns Flag Officers from across the Navy to address functional areas affecting execution and performance in our public shipyards. Specific focus areas include planning, material procurement, engineering, waterfront execution, facilities, information tech-

nology, and Fleet partnership. NSS–SY has established target metrics to manage the duration of current nuclear force availabilities through processes, workflows, and procedural improvements. The opportunities for facility improvements identified will be utilized to achieve the overall SIOP efficiency targets that, enabling the Navy to better balance funding decisions associated with facility improvement and construction projects in a fiscally constrained environment.

SIOP FIVE-YEAR PLAN

With the start of the SIOP efforts in 2018, the Navy developed rough order of magnitude estimates for the duration and cost of the three Lines of Effort across the four public shipyards. An initial detailed SIOP “next five-year plan” with higher fidelity schedules and costs estimates was provided in the fall of 2021, and in April 2022, the Navy updated the SIOP next Five-Year Plan to include measurable near-term goals, known project costs, project sequencing to deconflict with required maintenance availabilities and environmental planning timelines. The Navy is aggressively implementing lessons learned from recently awarded projects for upcoming efforts to include acquisition, design, cost estimation, and organizational and process changes. The Department has also re-assessed construction and procurement timelines to effectively implement SIOP activities, while executing ongoing and planned submarine and aircraft carrier maintenance availabilities.

Line of Effort 1: Construction and Recapitalization of Dry Docks

Construction and recapitalization of dry docks must be completed to accommodate the size and systems of future forces platforms such as the USS Gerald R *Ford*-class aircraft carriers and *Virginia*-class submarines. The first construction project for dry dock recapitalization was awarded last year for the construction of two new dry docks at PNSY. Construction is on schedule to support the *Virginia*-class maintenance availabilities planned for these new dry docks at the shipyard in fiscal year 2027. Upgrades to DD 8 at NNSY are scheduled to award this fiscal year to support future *Ford*-class availability, and renovations to DD 4 at the shipyard are scheduled to be completed next year. The dry dock work, along with all other SIOP activities, are closely tied to each shipyard’s planning and execution of ongoing and future availabilities in order to balance the needs of the shipyards’ ongoing work with the needs of the shipyard recapitalization work.

The DD 3 replacement project at PHNS remains on track to award in fiscal year 2023. The Draft Environmental Impact Statement for DD 3 and the Waterfront Support Facility was released in February and is on schedule to issue a Record of Decision during the fall of this year. Both projects are critical to readiness of our Pacific Fleet.

Planning and early design work is underway for the Multi-Mission Drydock at PSNS to accommodate a *Ford*-class aircraft carrier mission need date in fiscal year 2034, with a final configuration decision expected this year on the type and extent of the drydock work needed to support the *Ford*-class aircraft carriers.

Line of Effort 2: Recapitalization and Reconfiguration of Infrastructure for Optimization

Recapitalizing and reconfiguring infrastructure towards optimization relies on extensive master planning, informed by industrial modeling and simulation, for each shipyard to determine the optimum infrastructure configuration and process workflow necessary to sustain ongoing ship maintenance. The Navy has completed the first phase of modeling and simulation at all the shipyards, and is on track to complete the first shipyard Area Development Plan (ADP)—or master plan—at PHNS in fiscal year 2022. The second ADP was awarded for PSNS in March 2022 and is planned to complete by end of fiscal year 2023. Integrating industrial modeling and simulation with infrastructure master planning is a first for the Navy in maximizing its investment in SIOP. The ADPs will include investment requirements to recapitalize shipyard infrastructure towards optimization, as well as a phasing plan to minimize the impact of SIOP implementation on critical shipyard operations.

Line of Effort 3: Modernization of Capital Equipment at Public Shipyards

The goal of the SIOP capital equipment program is to replace antiquated and outdated equipment to enable maintenance of critical components, improve efficiency, reduce costs, and to establish new industrial capabilities to achieve fleet readiness. This includes vital pieces of equipment to include industrial plant equipment, reactor-servicing equipment, and collateral equipment. The \$679 million requested for capital equipment modernization across the FYDP in the President’s fiscal year 2023 budget request for SIOP will give our shipyards the equipment they need to fulfill their mission.

IMPROVEMENTS TO COST ESTIMATING

The Navy is continuing to improve confidence in SIOP costs and schedule targets, extrapolating data and methodology from ongoing projects to those in design and acquisition. Since inception of the program in 2018, the focus has been on providing dry dock capability and enabling industrial optimization analysis. The initial projects include PNSY DD improvements, planning and development of the PHNS DD 3 replacement and improvements in the NNSY DD 8 Saltwater System for CVN 78. To improve cost and schedule fidelity, we have incorporated industry best practices for mega projects including early third party cost estimate evaluation, improved cost and schedule management, early contractor involvement and industry engagement. As a result, the confidence factor is high for the costs of the PNSY DD project, and confidence in the cost of the PHNS DD project is increasing now that the design is 60 percent complete. Additionally, the first SIOP master plan at PHNS is mature and enabling a more comprehensive development of cost and schedule for future projects.

INTEGRATION WITH PLANNED AVAILABILITIES

Integral to SIOP's success is being able to start and complete projects on time. To that end, the program works closely with both the Fleet and NAVSEA, which operates the shipyards, to properly deconflict planned submarine and aircraft carrier availabilities and to keep all parties apprised of the status of on-going and planned SIOP work.

The Navy is working to better plan and execute maintenance—both to deliver submarines and aircraft carriers back to the fleet on time and to allow for SIOP to execute its critical mission on schedule. Efforts such as the Performance to Plan (P2P) that uses metrics and machine learning to better plan and execute maintenance availabilities and the NSS-SY that is focused on maximizing the productivity of the naval shipyard's engineering and production workforce are working in tandem to increase the Navy's on-time deliveries.

Taken independently, SIOP, NSS-SY, and P2P will each greatly improve the Navy's ability to plan and execute aircraft carrier and submarine maintenance. Together, these three initiatives represent a substantial improvement in how the Navy plans and executes nuclear-powered warship maintenance.

CONCLUSION

SIOP remains committed to accelerating its efforts to the greatest extent possible to provide the infrastructure and equipment our Navy needs, while ensuring it does not disrupt or interfere with the shipyards' mission to repair, maintain, and modernize the Navy's nuclear fleet. The program is aggressively and rapidly applying lessons learned and industry best practices where appropriate. SIOP understands that to succeed it must have continuous open communication with all stakeholders to properly plan and execute its work without impacting the shipyards' ability to execute their mission. Balancing SIOP's needs with that of the fleet and shipyards is, and will continue to be, an iterative process. We commit to working as a team to ensure the program is executed as expeditiously as possible without impacting fleet operations or ship maintenance.

Senator HIRONO. Thank you. I would like to hear from Ms. Maurer.

STATEMENT OF DIANA MAURER, DIRECTOR, DEFENSE CAPABILITIES AND MANAGEMENT, GOVERNMENT ACCOUNTABILITY OFFICE

Ms. MAURER. Thank you very much. Good afternoon, Chairwoman Hirono, Chairman Kaine, Ranking Members Cramer and Sullivan, and other Members and staff. It is good to be back before both subcommittees today.

Over the past 5 years we have issued a series of reports about the poor condition of infrastructure at the Navy's shipyards. The 37,000 skilled artisans who overhaul and repair carriers and submarines often perform that work in facilities that are in poor condition, using equipment that is well past its expected service life.

As was mentioned, the shipyards were built well over a century ago to repair wind- and steam-powered ships. Their layout is far from efficient to maintain nuclear-powered vessels. Moving the people, equipment, and parts necessary to repair a submarine is like trying to drive the century-old streets of Boston.

Perhaps most significantly, the Navy does not have enough dry dock capacity to meet the future maintenance needs of the fleet. In 2017, we found that the Navy lacked a comprehensive plan for addressing these significant problems. The Navy, to its credit, developed the SIOP, created a program office to manage it, and kept Navy leadership informed of its progress. In late 2019, we took an in-depth look at the SIOP. We thought it was a decent first step, essentially a series of plans to improve each of the shipyards, and at that time the Navy estimated it would take 20 years and spend about \$21 billion to implement its planned improvements.

We found that initial cost estimate was unrealistically low. Among other things, that \$21 billion price tag did not factor in inflation and did not include the cost to improve underlying utilities. We recommended the Navy improve its cost estimates to help manage the program and provide Congress the information that you need to help make funding decisions, and those recommendations are still open.

Fast forward to today. The Navy has refined its plan, identified resource needs, and enhanced leadership engagement. This provides a reasonable framework for eventually improving shipyard infrastructure. But the realities of the shipyards have not significantly changed since our 2019 report.

In a report that we issued yesterday, we found that overall facility conditions at all four shipyards remains poor and among the lowest across the entire depot enterprise. The average age of equipment has increased and most is beyond its expected service life. The backlog of facility restoration and modernization projects has grown to about \$7 billion. Plus the Navy faces some very real time pressures. *Ford*-class carriers and expanded payload *Virginia*-class submarines will need dry dock capacity that the Navy currently does not have. It remains to be seen how the Navy will specifically address these problems. Its proposed actions are complex and are many years away from being fully implemented.

We have a number of concerns about SIOP implementation. First, the Navy's estimated date for completing the individual shipyard plans has slipped to the end of 2024. As a result, we do not yet know the full details of what the Navy will upgrade and optimize, how long that will take, or what it will cost.

Second, as was mentioned, the estimated cost for the first three dry dock improvements projects have grown from just under \$1 billion to nearly \$6 billion. That does not bode well for the future cost of the 11 other planned dry dock projects.

Third, we are concerned that these increasing dry dock costs could crowd out other planned improvements. Dry docks should be a top priority but they are not the only priority. Mr. Stefany, Admiral Galinis, and Admiral McClelland understand these challenges and have committed to addressing them. Maintaining that top-level support will be vital because this effort will span many administrations and many Congresses.

GAO will continue our independent oversight of shipyard improvements. Later this month we will start our next review, focusing on the Navy's cost estimates and schedule for SIOP projects. Our continued oversight will help inform Congress and enhance the Navy's efforts to improve its shipyards, which are vital for ensuring naval readiness.

Madam Chairwoman and Mr. Chairman, thank you for the opportunity to testify this afternoon. I look forward to your questions. [The prepared statement of Ms. Diana C. Maurer follows:]



United States Government Accountability Office

Testimony

Before the Subcommittees on
Readiness and Management Support
and Seapower, Committee on Armed
Services, U.S. Senate

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NAVAL SHIPYARDS

Ongoing Challenges Could Jeopardize Navy's Ability to Improve Shipyards

Statement of Diana C. Maurer, Director, Defense
Capabilities and Management

GAO Highlights

Highlights of GAO-22-105993, a testimony before the Subcommittees on Readiness and Management Support and Seapower, Committee on Armed Services, U.S. Senate

Why GAO Did This Study

The poor condition of infrastructure at the Navy's four public shipyards directly affects the readiness of the aircraft carrier and submarine fleets they are charged with maintaining. These conditions also affect the Navy's ability to support the national defense. In response, the Navy developed a plan to address the shipyards' infrastructure deficiencies, called the Shipyard Infrastructure Optimization Plan. The Navy estimates it will require \$21 billion and 20 years to implement the plan.

This statement summarizes (1) the Navy's actions to address the shipyards' infrastructure challenges and (2) remaining challenges the Navy faces in implementing the SIOP. It also discusses the Navy's progress in implementing GAO's prior recommendations.

This statement is based on previously published work from 2017 through May 2022 on Navy maintenance, the condition of Naval shipyards, and the Navy's Shipyard Infrastructure Optimization Plan.

What GAO Recommends

GAO made nine recommendations in prior work cited in this statement. The Navy concurred with these recommendations and has fully implemented five of them. The Navy should continue taking steps to address the remainder of these recommendations, particularly those to develop more accurate cost estimates for the SIOP.

View GAO-22-105993. For more information, contact Diana Maurer at (202) 512-9627 or maurerd@gao.gov.

May 10, 2022

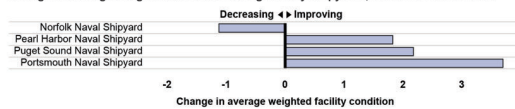
NAVAL SHIPYARDS

Ongoing Challenges Could Jeopardize Navy's Ability to Improve Shipyards

What GAO Found

The Navy has taken several actions to improve its public shipyards in recent years. In 2018, the Navy began a 20-year, \$21 billion effort to modernize and optimize its shipyards, known as the Shipyard Infrastructure Optimization Plan (SIOP). The Navy has also implemented some GAO recommendations in its efforts to improve shipyards, such as creating a program office to manage the SIOP. In addition, the Navy invested in shipyard infrastructure above the minimum level set by Congress. Finally, the average condition of facilities at Navy shipyards has improved at three of the four shipyards from 2016 to 2020.

Change in Average Weighted Condition Rating at Navy Shipyards, Fiscal Year 2016 - 2020



Source: GAO analysis of service facility condition data. | GAO-22-105993

However, the Navy faces a number of remaining challenges to improving the infrastructure at the shipyards.

- The backlog of facility restoration and modernization projects—those intended to restore, renovate, or replace buildings or components—has increased by over \$1.6 billion in the last 5 years.
- The average age of capital equipment has continued to increase. More than half the equipment at the shipyards is past its expected service life.
- The cost of dry dock projects has doubled and may grow further. In 2018, the Navy estimated that it would need \$4 billion to modernize its 17 dry docks. However, the Navy reports that the cost of just the first three dry dock projects has grown by over \$4 billion. This is on top of costs not included in the initial SIOP estimate—such as inflation, utilities, environmental remediation, and historical preservation—which could add billions.
- Initial SIOP schedule goals have slipped. Detailed shipyard investment plans will not be complete until fiscal year 2025, 3 years later than planned.
- Completely implementing the SIOP will involve funding well above the levels allocated in recent years for shipyard infrastructure; as well as significant planning and sustained management attention over 20 years.

Addressing the remaining GAO recommendations could assist the Navy in reaching its goals of improved shipyard capacity and performance. For example, developing accurate cost estimates will help the Navy articulate its resource needs to fully implement the SIOP. This includes optimizing facilities and replacing aged equipment in addition to the dry dock improvements already underway. GAO will continue to monitor and assess this multi-year effort, including the Navy's cost and schedule estimates for the SIOP.

Chairman Kaine and Chairwoman Hirono, Ranking Members Sullivan and Cramer, and Members of the Subcommittees:

Thank you for the opportunity to be here today to discuss our work related to the conditions at the Navy shipyards and the Navy's plan to improve them.

The Navy's public shipyards are critical to maintaining the readiness of its fleet of nuclear aircraft carriers and submarines, and supporting ongoing operations around the world. The four shipyards—Norfolk Naval Shipyard in Virginia, Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility in Hawaii, Portsmouth Naval Shipyard in Maine, and Puget Sound Naval Shipyard and Intermediate Maintenance Facility in Washington—provide the Navy with the capability to perform depot-level maintenance on ships, emergency repairs, ship modernization, and ship deactivations.

The Navy is working to rebuild its readiness while also growing and modernizing its aging fleet of aircraft carriers, submarines, and surface ships. A critical component of rebuilding Navy readiness is implementing sustainable operational schedules, including a carefully orchestrated cycle of maintenance, training, and operations for the entire fleet. Completing maintenance on time is integral to this effort. The Navy's plan to grow the size of the fleet also depends on ships receiving sufficient and timely maintenance to remain operational so that they can reach their expected service lives and remain in the fleet.

In 2017, we reported that the Navy's shipyard infrastructure, including dry docks, facilities, and capital equipment, was in poor condition.¹ Because of this, the shipyards had not been fully meeting the Navy's operational needs. For example, we found that during fiscal years 2000 through 2016, the shipyards had inadequate facilities and equipment, which led to maintenance delays. These delays contributed in part to thousands of lost operational days—days when ships were unavailable for operations—across the Navy's submarine and aircraft carrier fleets. Further, we found that the shipyards would not be able to support almost a third of planned depot maintenance periods for the current fleet of aircraft carriers and submarines over the next 2 decades. We recommended that the Navy develop a plan to improve the shipyards' infrastructure and incorporate

¹GAO, *Naval Shipyards: Actions Needed to Improve Poor Conditions that Affect Operations*, GAO-17-548 (Washington, D.C.: Sept. 12, 2017).

results-oriented practices, such as goals and metrics, in its efforts. The Department of Defense (DOD) agreed with our recommendations.

This statement provides information on the status of the Navy's efforts to improve the shipyards. Specifically, it summarizes (1) the Navy's actions to address the shipyards' infrastructure issues and (2) the remaining challenges the Navy faces in addressing those issues.

The statement is based on reports we issued from 2017 through May 2022 examining Navy maintenance challenges, shipyard conditions and performance, and the Navy's plan to improve the shipyards.² To perform our prior work, we analyzed Navy documentation and data on shipyard facility condition, backlogged facility projects, and equipment age, among others; reviewed Navy and DOD guidance; and conducted interviews with Navy officials. The reports cited throughout this statement contain more details on the scope of the work and the methodology used to carry it out. This statement also includes selected updates as of April 2022, as appropriate, based on Navy data, documentation, and discussions with Navy officials.

We conducted the work on which this testimony is based in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

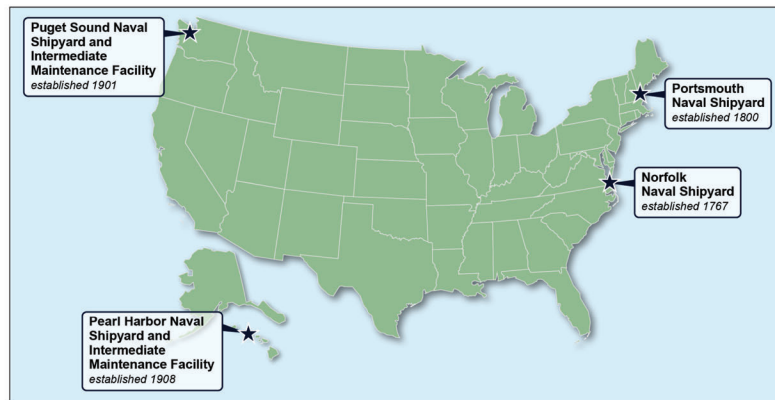
Background

The Navy's public shipyards are highly industrialized, large-scale operations that provide maintenance for ships and submarines. These shipyards are essential to national defense and to fulfill the Department of Defense's (DOD) legal requirement to maintain a critical logistics capability that is government owned and operated. The purpose of this capability is to support an effective and timely response for mobilization, national defense contingency situations, and other emergency requirements.

²A list of related unclassified products is provided in the Related GAO Products pages at the end of this statement.

The naval shipyards were originally designed to build wind- and steam-powered ships, and range in age from 114 years to 255 years (see fig. 1). As we have reported, the shipyards' age, residual configuration for the shipbuilding mission, and poor condition reduces their efficiency for their modern-day mission of repairing nuclear-powered ships and submarines.³

Figure 1: Map of Navy Shipyards as of April 2022



Source: Map Resources and GAO analysis of Navy documents. | GAO-22-105993

The naval shipyards perform depot-level maintenance, which involves the most comprehensive and time-consuming maintenance work, including ship overhauls, alterations, refits, restorations, nuclear refuelings, and inactivations—activities crucial to supporting Navy readiness.⁴ The Navy

³GAO-17-548.

⁴The Naval shipyards may also perform some "intermediate level" maintenance which is work generally occurring while a ship is pier-side and on tether, meaning that the ship is capable of ending the maintenance period at any point and getting underway within 4 days.

performs this maintenance during periods designated in its Optimized Fleet Response Plan, an operational schedule of maintenance, training, and deployment periods for the entire fleet. The plan is designed to maximize the fleet's operational availability to combatant commanders while ensuring adequate time for training personnel and maintaining the ships. We reported in 2016 that successful implementation of the Optimized Fleet Response Plan depends, in part, on the shipyards completing maintenance on time so that maintenance delays do not reduce the time that ships are available for training and operations.⁵

Delays in shipyard maintenance directly affect the Navy's readiness by hindering its ability to conduct training and operations with its ships. For example, in August 2020 we reported that maintenance delays on aircraft carrier repairs from fiscal year 2015 through 2019 had resulted in a total of 1,128 days of maintenance delay-days that ships were not available for operations.⁶ This is the equivalent of losing the use of more than 0.5 aircraft carriers each year. During the same timeframe, maintenance overruns on submarine repairs resulted in a total of 6,296 days of maintenance delay. This was the equivalent of losing the use of more than three submarines each year.

We also reported in 2019 that the naval shipyards lack sufficient dry dock capacity. Because of this, the Navy could not support 68 of the 218 maintenance periods—almost a third—that aircraft carriers and submarines would require through 2040.⁷ Specifically, several of the Navy's 17 dry docks will become obsolete after the Los Angeles class submarines are retired because they will be too small or will lack the appropriate shore-side support to accommodate newer classes of submarines. In addition, no dry dock at any of the naval shipyards can currently support repairs to the Ford class aircraft carrier, even though the Navy accepted delivery of the first ship of that class in 2017.

⁵GAO, *Military Readiness: Progress and Challenges in Implementing the Navy's Optimized Fleet Response Plan*, GAO-16-466R (Washington, D.C.: May 2, 2016).

⁶GAO, *Navy Shipyards: Actions Needed to Address the Main Factors Causing Maintenance Delays for Aircraft Carriers and Submarines*, GAO-20-588 (Washington, D.C.: Aug. 20, 2020).

⁷GAO, *Naval Shipyards: Key Actions Remain to Improve Infrastructure to Better Support Navy Operations*, GAO-20-64 (Washington, D.C.: Nov. 25, 2019).

Recognizing the importance of investing in the depots, Congress passed a law in fiscal year 2007 that requires the Secretary of the Navy to invest in the capital budgets of the Navy depots a total amount equal to not less than 6 percent of the average total combined maintenance, repair, and overhaul workload funded at all the Navy depots for the preceding 3 fiscal years.⁸ In fiscal year 2008, the Navy committed to increased capital investment to comply with the law and to improve the overall material condition of these facilities.⁹ The Navy acknowledged that there has been a history of under-investment in shipyard needs.

The Navy Has Taken Actions to Improve the Shipyards since 2016

The Navy has made several positive steps to improve the shipyards since our 2017 report. For example, the Navy created an investment plan to guide shipyard improvements. The Navy also implemented a number of our shipyard infrastructure recommendations, such as creating a program office responsible for executing the Shipyard Infrastructure Optimization Plan SIOP. In addition, the Navy has been investing in shipyard infrastructure well in excess of the statutory 6 percent minimum. Finally, average facility condition at the shipyards improved from 2016 to 2020.

The Navy Created a Shipyard Investment Plan

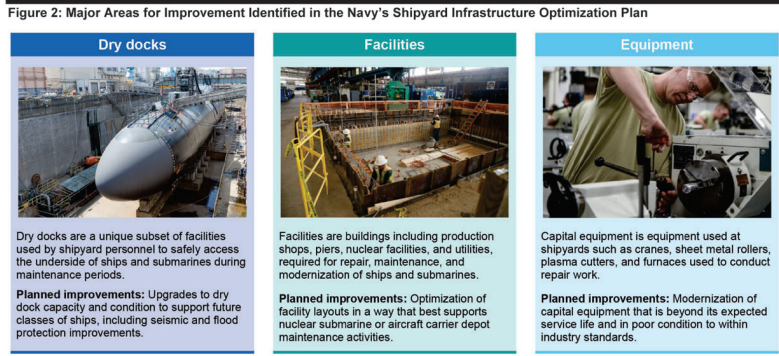
In February 2018, the Navy issued a plan to address infrastructure deficiencies at the public shipyards known as the (SIOP).¹⁰ The plan calls for the replacement or modernization of critical shipyard infrastructure—including dry docks, facilities, and a portion of capital equipment—over 20 years, at an estimated cost of \$21 billion.¹¹ The plan serves as the Navy's engineering analysis and strategy for the optimal placement of facilities and major equipment at each public shipyard, including a 20-year investment plan for infrastructure investments needed to improve shipyard performance. The plan proposes efforts to address limitations with three major facets of the public shipyards' operations: their dry docks, facilities, and capital equipment (see fig. 2).

⁸John Warner National Defense Authorization Act for Fiscal Year 2007, Pub. L. No. 109-364, § 332(a) (2006), codified at 10 U.S.C. § 2476. This is also referred to as the "6 Percent Rule."

⁹Department of the Navy, *Report to Congress on Investment Plan for the Modernization of Naval Shipyards* (Apr. 2013).

¹⁰Department of the Navy, *Report to Congress: Shipyard Infrastructure Optimization Plan* (Feb. 2018).

¹¹The Navy's plan included \$4 billion for dry dock improvements, \$14 billion for facility improvements, and \$3 billion for new equipment. It also stated that the recapitalization of shipyard equipment would take longer than the other two efforts (about 30 years) and cost an additional \$1.5 billion over those extra 10 years.



Source: GAO analysis of Navy documents; Defense Visual Information Distribution Service (photos). | GAO-22-105993

Optimal placement of facilities is important because depots are large, city-like operations, and travel times between locations ultimately affects maintenance durations. Having an investment strategy to guide planning and execution of multi-million dollar construction projects can help with addressing the scope and timing of projects, along with identifying available funding options. The Navy estimated that the plan could eventually significantly reduce travel times between maintenance activities, save 328,000 labor-days each year (about the equivalent of a submarine availability) and recover most of the maintenance periods (67 of 68 planned ship availabilities over the plan's 20-year lifecycle) it could not support.¹²

¹²An "availability" is the Navy's term for a significant maintenance period for a ship, submarine, or carrier. These maintenance periods can last months or years, and their timely completions are critical to providing the Navy's readiness. The SIOP estimated that the Navy's shortage of dry dock capacity would prevent the Navy from completing 68 availabilities – roughly one third of all availabilities – through 2040.

The Navy Has Implemented Some GAO Recommendations on Shipyards

Since 2017, we have made a total of 9 recommendations directly pertaining to shipyard infrastructure and the SIOP. The Navy has taken some action by implementing five of these recommendations. For example, the Navy:

- **Implemented a program office to manage the SIOP.** In 2017, we recommended that the Navy should conduct regular management reviews that include all relevant stakeholders to oversee implementation of the SIOP.¹³ In June 2018, the Navy created a management structure—a program management office (referred to as PMS 555)—to oversee the estimated 20-year-long process of optimizing the shipyards.¹⁴ Shortly thereafter, in September 2018, the Assistant Secretary of the Navy for Research, Development, and Acquisition stated that, though the shipyard optimization effort did not fit all the characteristics of a formal acquisition program, its size and importance required the Navy to treat it as one. As a result, the Navy designated the newly created program office as the acquisition lead for all efforts related to shipyard optimization. Naval shipyard personnel stated that a recent restructuring that organized the SIOP under Naval Facilities and Engineering Command indicates the Navy's support of the SIOP.
- **Instituted regular reporting internal to the Navy and externally to Congress.** We also recommended in 2017 that the Navy provide regular reporting to key decision makers and Congress on the SIOP's progress. In September 2018, the Assistant Secretary of the Navy for Research, Development, and Acquisition required that the SIOP program office provide regular updates to an Executive Oversight Council. In addition, in April 2020, the Vice Chief of Naval Operations required the SIOP program office to provide semiannual briefings on its progress to a Resources and Requirements Review Board, which would review the plan's requirements, resources, and execution. Furthermore, the Navy provided SIOP updates to Congress in February and June of 2020, describing specific efforts, such as military construction and capital equipment that would be needed for the plan. In addition, a mandate in the National Defense Authorization Act for Fiscal Year 2021 required the Navy to submit biannual reports

¹³GAO-17-548.

¹⁴NAVSEA Notice 5450, *Establishment of the Shipyard Infrastructure Optimization Program Management Office*, (June 5, 2018).

to Congress on the status of the SIOP through fiscal year 2025.¹⁵ Pursuant to this mandate, the Navy provided SIOP status updates to Congress in March 2020 and September 2021.

- **Improved its performance metrics for tracking maintenance delays to better capture infrastructure issues.** In 2019, we recommended that Naval Sea Systems Command establish measures for the shipyards to track facility or equipment conditions that lead to maintenance delays.¹⁶ We also recommended that they then implement those measures to identify when facility or equipment conditions lead to maintenance delays. To address those recommendations, the Navy reported in July 2019 that it changed its delay code for maintenance delays. Prior to that, the Navy had a single delay code for all facility, equipment, and tooling-caused delays. After July 2019, the Navy created 3 separate codes - one each for facility, equipment, and tooling-caused maintenance delays, which it could then use to better analyze the effects of these on maintenance throughput. This change allowed the Navy to track the causes of maintenance delays. According to Navy officials, they began generating reports using the new facility, equipment, and tooling delays codes in August 2019. The Navy has used these reports to analyze the most common causes of delays and adjusted equipment maintenance and investment plans, as appropriate.
- **Defined clear shipyard roles and responsibilities.** In 2019, we recommended that the shipyard optimization program office (PMS 555), in coordination with relevant stakeholders, establish clear roles and responsibilities for the shipyards involved in the SIOP.¹⁷ Later that year, Naval Sea Systems Command issued guidance that outlined the staffing, roles, responsibilities, and business rules for the SIOP program office, which included describing its relationships to essential

¹⁵William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, Pub. L. No. 116-283, § 346 (2021).

¹⁶GAO, *Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment That Affect Maintenance Timeliness and Efficiency*, GAO-19-242. (Washington, D.C.: Apr. 29, 2019).

¹⁷GAO-20-64.

stakeholders such as the shipyards and Navy Installations Command.¹⁸

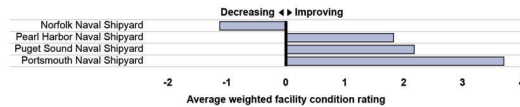
Investment Funding at the Shipyards Has Exceeded the Statutory Minimum Levels

In May 2022, we reported that the department of the Navy since 2011 invested above the statutory minimum level in its depots, and that most of that investment went to its shipyards.¹⁹ In fiscal year 2007, Congress passed a law requiring each military department to invest in the capital budgets of its depots no less than 6 percent of the average total dollar value of the combined maintenance, repair, and overhaul workload of its depots for the preceding three fiscal years.²⁰ The capital budget of a depot includes funds to modernize or improve the efficiency of depot facilities, equipment, work environment, or processes in direct support of depot operations. The Department of the Navy has met the statutory minimum investment laid out in section 2476 of Title 10, U.S. Code (section 2476), each year since fiscal year 2011, and a shipyard received less than the 6 percent level only once in the last 10 years.²¹

Shipyard Facility Condition Has Improved Since 2016

As we reported in 2022, the average facility conditions at the shipyards generally improved between 2016 and 2020 (see fig. 3).²²

Figure 3: Change in Average Weighted Facility Condition Rating at Navy Shipyards, Fiscal Years 2016 - 2020



Source: GAO analysis of service facility condition data. | GAO-22-105993

¹⁸Naval Sea Systems Command Memorandum, *Naval Sea Systems Command Shipyard Infrastructure Optimization Program, Program Management Office, PMS 555 Staffing, Roles, Responsibilities, and Business Rules* (Nov 20, 2019).

¹⁹GAO, *Military Depots: DOD Strategy for Addressing Deteriorating Facilities and Equipment is Incomplete*, GAO-22-105009. (Washington, D.C.: May 9, 2022). In addition to the shipyards, the Department of the Navy also operates Fleet Readiness Centers that provide depot maintenance for its aircraft and Marine Corps Production Plants, which provide depot maintenance for Marine Corps equipment.

²⁰Pub. L. No. 109-364, § 332, codified at 10 U.S.C. § 2476.

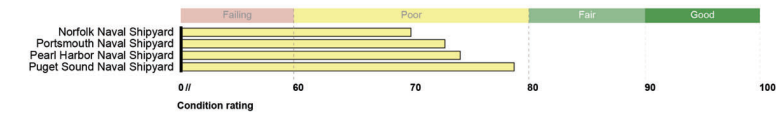
²¹Norfolk Naval Shipyard, in fiscal year 2017, received 5.9 percent.

²²GAO-22-105009.

Note: For this analysis, we weighted the condition ratings by the replacement cost of the facility, also known as the plant replacement value. This is to ensure that costlier facilities weigh more heavily in the condition ratings, so that, for example, an expensive shop plant is weighted as more important than an inexpensive guard shack. This is the same method used by the Navy to calculate its condition averages. The Navy modified its assessment methodology during this time period to provide more detailed assessments of facility condition. We were unable to determine whether this modification had an impact on changes in facility condition ratings.

However, while the condition of the shipyards' facilities generally improved, they are still among the lowest scored depot facilities across DOD.²³ All shipyards have an average facility condition that is in the "poor" category.

Figure 4: Average Weighted Condition Rating at Navy Shipyards, Fiscal Year 2020



Source: GAO analysis of service facility condition data. | GAO-22-105993

Note: For this analysis, we weighted the condition ratings by the replacement cost of the facility, also known as the plant replacement value. This is to ensure that costlier facilities weigh more heavily in the condition ratings, so that, for example, an expensive shop plant is weighted as more important than an inexpensive guard shack. This is the same method used by the Navy to calculate its condition averages.

The Navy Faces Challenges Improving Shipyard Infrastructure

Notwithstanding these positive steps the shipyards face several challenges in their ongoing efforts to improve their infrastructure. For example:

- The backlog of restoration and modernization projects intended to restore, renovate, or replace buildings or components has continued to grow in recent years, and is now over \$7 billion;
- The age of capital equipment has grown since 2016, and more than half of all shipyard equipment is past its expected service life;
- The costs of SIOP dry dock projects have more than doubled;
- The schedule for SIOP related efforts has slipped by 3 years; and
- Full implementation of the Navy's SIOP would involve funding levels beyond what the Navy has requested in recent years.

²³ We reviewed facility condition across 21 DOD depots in an earlier report; for more information about those depots, see [GAO-22-105009](#).

Implementing our remaining four recommendations could help the Navy better position itself to improve the accuracy of its funding requests and better manage the complex SIOP effort.

Backlog of Facility Restoration and Modernization Projects has Increased Since 2017

In May 2022, we reported that from 2017 to 2020, the backlog of restoration and modernization projects at the Navy shipyards has grown by over \$1.6 billion, an increase of 31 percent (see table 1).²⁴ This increase is particularly concerning given that the Navy has invested well over the statutory minimum. Despite regularly meeting that mandated investment level, the backlog of facility restoration and modernization projects at the shipyards continues to grow.

Table 1. Backlog of Restoration and Modernization Projects at the Navy Shipyards Depots (dollars in millions)

Military Service	Fiscal year 2017 (in \$millions)	Fiscal year 2020 (in \$millions)	Increase (in \$millions)	Increase (percentage)
Navy Shipyards	5,401	7,063	1,662	31
Norfolk Naval Shipyard	1,460	2,284	824	56
Pearl Harbor Naval Shipyard	1,690	1,826	136	8
Portsmouth Naval Shipyard	761	931	170	22
Puget Sound Naval Shipyard	1,490	2,022	532	36

Source: GAO analysis of military service information | GAO-22-105993

Furthermore, the Navy may have under stated those costs. We reported in 2017 that facility improvements can sometimes result in unanticipated costs that increase overall project costs. In one example, bringing a 120 year-old historic building up to modern code resulted in unanticipated costs that increased the cost of the project from \$2.5 million to more than

²⁴ GAO-22-105009. The Navy defines its restoration and modernization backlog as the estimated cost to 1) restore facilities degraded by inadequate sustainment, excessive age, natural disaster, fire, or accident, among other things; 2) renovate or replace existing facilities to implement new or higher standards or accommodate new functions; or 3) replace building components that typically last more than 50 years. The Navy calculates its restoration and modernization backlog through the Facility Readiness Evaluation System, which assesses data for all Navy installations, including the four shipyards. In the mathematical formula used to calculate total restoration and modernization backlog, configuration rating data are used to calculate modernization costs, condition rating data are used to calculate restoration costs, and facility replacement value is used as a weighting factor. Due to the methods the Navy uses to calculate the configuration rating, the restoration and modernization backlog may be under stated.

10 times that.²⁵ While not every project will involve similar additional costs, the potential exists for further unanticipated project growth.

Navy officials told us that the Navy consistently prioritizes other programs—such as weapon system acquisitions—over facility sustainment. For example, Navy officials stated that aircraft, submarine, and ship acquisition initiatives consistently receive priority over facility sustainment because of their perceived greater importance in performing the Navy's assigned missions. Depot personnel also attributed the increases in the backlog to reduced sustainment, restoration, and modernization funding.

Shipyards Capital Equipment Remains Past Its Expected Service Life

More than half of all the capital equipment used at the Navy shipyards is beyond its expected service life (see table 2). In addition, the overall average age of capital equipment at the shipyards has grown increased from 22 years in 2016 to 23.6 years in 2020.

Table 2: Average Age of Depot Capital Equipment by Service, as of Fiscal Year 2020

	Average Age of Capital Equipment (in years)	Capital Equipment Beyond Expected Service Life (percentage)
Naval Shipyards	23.6	57
Norfolk Naval Shipyard	12.5	63
Portsmouth Naval Shipyard	13.6	41
Puget Sound Naval Shipyard	35.6	65
Pearl Harbor Naval Shipyard	9.4	39

Source: GAO analysis of military service information | GAO-22-105993

This is still a deficiency the Navy recognizes needs to be addressed. The SIOP includes a goal of modernizing capital equipment that is past its

²⁵Originally, the building needed new windows, HVAC, and roof insulation; however, fixing the windows triggered a requirement that the Navy provide a certain level of hurricane wind and anti-terror force protection – adding \$6.8 million to the original cost. The new overall cost – \$9.3 million, up from \$2.5 million - triggered additional requirements based on the cost exceeding a certain percentage of the replacement value of the building, including flood mitigation and asbestos removal. Those requirements added \$25.4 million, for a total of \$34.7 million.

expected service life, which the Navy estimated could cost \$3 billion.²⁶ Equipment that is beyond its useful life can be inefficient and unreliable, affecting the shipyards' ability to conduct repair work. We reported in 2017 that aging equipment could be causing the Navy to incur additional repair costs for parts and labor. Unreliable equipment can also result in increased costs and re-work. For example, after it was discovered in 2015 that the analog controls on a furnace used to heat-treat submarine parts to withstand deep sea pressure were reading inaccurately, Norfolk officials were required to re-inspect 10 years' worth of parts made in that furnace to ensure that they met stringent submarine safety requirements.

Cost of Dry Dock Improvements Has Increased

The cost of the Navy's dry dock projects in the SIOP has, according to Navy estimates, grown by over 400 percent since 2018. The Navy estimated in 2018 that its effort to improve the naval shipyards would require \$21 billion over 20 years to implement. However, we reported in November 2019 that this \$21 billion estimate does not include inflation and other significant costs, such as those for utilities, roads, or environmental remediation, which could add billions to the final cost.²⁷ We reported that developing accurate cost estimates is key to successfully completing a large effort such as the SIOP, and made several recommendations to improve the SIOP's cost estimates.

In 2018, the Navy estimated that it would need to invest about \$4 billion in its dry docks to obtain the capacity to perform the 67 availabilities it cannot currently support.²⁸ This estimate included 14 dry dock projects planned over the SIOP's 20-year span. However, since 2018, the cost of the initial dry dock projects has increased. For example, the Navy's first three dry dock projects have grown in cost from an estimated \$970 million in 2018 to over \$5.1 billion in 2022, an increase of more than 400 percent. These dry dock projects are critical to the Navy's success in implementing the SIOP, as they will provide the capacity for about two-thirds of the 67 unsupported availabilities.

²⁶The SIOP covers a 20-year timeframe. Over that time horizon, the Navy plans to spend about \$3 billion on capital equipment. However, the SIOP noted that meeting its goal of recapitalizing aging equipment could take up to 30 years, for a total cost of \$4.5 billion.

²⁷GAO-20-64.

²⁸The SIOP estimated that the Navy's shortage of dry dock capacity would prevent the Navy from completing 68 availabilities – roughly one third – through 2040. The dry dock projects were a mixture of projects intended to provide capacity to perform those unsupported availabilities, and those intended to mitigate some vulnerability, such as seismic or flooding.

Given that these projects are still very early in development, the shipyard improvement program office (PMS-555) notes that additional cost increases may be necessary, raising the cost of these projects—and the SIOP in general—even more. Although the Navy's original plan in the SIOP was to improve the dry docks, facilities, and equipment of the shipyards, increasing dry dock costs could crowd out other improvements. Navy officials told us that there is a possibility that the SIOP could eventually pivot to focusing efforts on the dry docks, given the increasing cost of the projects. If that occurs, the Navy would not realize some of the proposed benefits of the SIOP – such as reduced travel time and labor days. However, the Navy has not yet released an updated cost estimate for the SIOP that would take these increases into account. In a September 2021 report to Congress, the Navy stated that an update to the program's cost estimate will not be issued until they complete detailed investment plans for each shipyard—about 8 years after publishing the original SIOP and more than a third of the way through its 20-year duration.²⁹

The Schedule for Completing Initial Shipyard Plans Has Slipped

As we reported in May 2022, the Navy's effort to complete detailed shipyard investment plans has been delayed by 3 years, which could affect the SIOP's schedule.³⁰ In order to guide infrastructure investment at the shipyards, the Navy plans to complete an Area Development Plan (ADP) for each location. These ADPs are intended to guide the key improvements at each shipyard, using modeling information developed as part of the shipyards' data collection efforts. In a 2021 report to Congress, the Navy stated it would complete the ADPs by fiscal year 2021. However, in a September 2021 update of that report, the Navy stated the ADPs would be complete four years later, in fiscal year 2025.³¹ According to the Navy, funding constraints have led to a slip in completion of the optimization analysis and associated ADPs for each shipyard. While Navy officials told us that these new timeframes will not affect the completion of key projects – such as the dry docks – they could delay construction of other facilities resulting in a reduction in the Navy's ability to perform its mission.

²⁹Department of the Navy, *The Shipyard Infrastructure Optimization Program (SIOP): President's Fiscal Year 22 Budget 5 Year Plan*, September 2021.

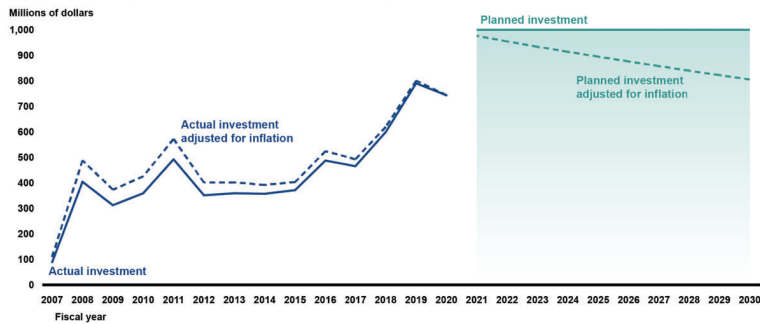
³⁰GAO-22-105009.

³¹According to the September 2021 update to the SIOP, additional funding could accelerate completion of the ADPs for each shipyard into the beginning of fiscal year 2024.

Full Implementation of SIOPI Would Involve Funding Above Recent Levels

Full implementation of the Navy's SIOPI would involve funding levels beyond what the Navy has requested for shipyard infrastructure in recent years. In the SIOPI's 2018 release, the program estimated a cost of about \$1 billion per year until its completion. While the SIOPI does not project yearly funding requirements, we reported in 2022 that the Navy's facility investment has been under that level every year since 2007, although the Navy's investment levels have climbed since it published the SIOPI (see figure 5).³² We found that funding the original SIOPI would equate to an increase of more than 40 percent over the next five years when compared to the Navy's average over the previous five years. Any cost growth would further increase that gap.

Figure 5: Navy Shipyard Actual and Planned Investment in Depot Infrastructure Improvements



Source: GAO analysis of Department of Defense data. | GAO-22-105909

Note: Proposed shipyard investments from fiscal year 2021 - 2030 are based on the Shipyard Infrastructure Optimization Program's \$21 billion cost estimate over 20 years. Proposed investment amounts are adjusted for inflation and expressed in 2020 dollars using the U.S. Gross Domestic Product Price Index from the U.S. Department of Commerce, Bureau of Economic Analysis.

³² Department of the Navy, *The Shipyard Infrastructure Optimization Program (SIOPI): President's Fiscal Year 22 Budget 5 Year Plan*, September 2021. Navy officials have told us that The update states additional funding could accelerate completion of the ADPs for each shipyard into the beginning of fiscal year 2024.

The Navy Has Not Yet Implemented Some of GAO's Recommendations to Improve its Shipyard Infrastructure Efforts

Addressing GAO's prior recommendations could assist the Navy in reaching its goals of improved shipyard capacity and performance. For example, in 2017, we found that the Navy's plan was missing important elements needed to achieve results, such as analytically-based goals and metrics for improvement and a full identification of the shipyards' resource needs.³³ As a result, the Navy risked continued deterioration of its shipyards, hindering its ability to efficiently and effectively support Navy readiness over the long term. We recommended that the Secretary of the Navy develop a comprehensive plan for shipyard capital investment that established (1) the desired goal for the shipyards' condition and capabilities; (2) an estimate of the full costs to implement the plan, addressing all relevant requirements, external risk factors, and associated planning costs; and (3) metrics for assessing progress toward meeting the goal that includes measuring the effectiveness of capital investments.³⁴

While the SIOIP includes some of the recommended elements, it does not include others. For instance, as of February 2022, the plan did not include metrics for assessing progress toward meeting each of its goals. Navy officials have stated that they intend to develop metrics to meet this element during a second phase that will be complete in fiscal year 2025. To fully implement this recommendation, the Navy should develop metrics to help it assess progress towards meeting its goals that include measuring the effectiveness of capital investments. Until it does, the Navy will be unable to determine whether it is achieving its SIOIP goals.

In 2019, we made three additional recommendations addressing the SIOIP's first cost estimate.³⁵ We recommended that the shipyard optimization program office (PMS 555):

- Include all costs—such as costs for inflation, program office activities, utilities, roads, environmental remediation, historical preservation, and alternative workspace—when developing its second, more detailed, cost estimate.
- Use cost estimating best practices—as outlined in the GAO Cost Estimating and Assessment Guide—in developing its second cost estimate, including a program baseline, work breakdown structure, a

³³GAO-17-548.

³⁴GAO-17-548.

³⁵GAO-20-64.

description of the methodology and key assumptions, inflation, fully addressing risk and uncertainty, and a sensitivity analysis.

- Obtain an independent cost estimate of the Naval Shipyards program prior to the start of its project prioritization effort.

Navy officials concurred with all three recommendations and stated that they planned to implement them when the program office secured its second internal cost estimate, which it expected to occur in fiscal year 2022. However, as of March 2022, Navy officials stated that the schedule for completion of the second cost estimate has slipped to fiscal year 2025. We continue to believe that implementing all four recommendations will help the Navy improve the accuracy of its funding requests and better manage the complex SIOP effort.

In summary, implementing the SIOP will take several years and require significant planning and management attention, as well as funding over historical levels for depot facility construction, restoration, modernization, and equipment. The Navy has reported that implementing the SIOP would contribute to improved shipyard performance and ultimately to improved readiness. However, the Navy faces a number of challenges to implementing the SIOP. With long-term costs still unknown and the ADPs several years from completion, it remains to be seen whether the Navy will be able to follow through on its dry dock improvement, facility layout optimization, and equipment recapitalization plans. We will soon begin work assessing the Navy's project cost estimates for the SIOP and will continue to monitor and assess this multi-year effort.

Chairman Kaine and Chairwoman Hirono, Ranking Members Sullivan and Cramer, and Members of the Subcommittees, this concludes my prepared statement. I would be pleased to respond to any questions you may have at this time.

GAO Contact and Staff Acknowledgements

If you or your staff have questions about this testimony, please contact Diana Maurer, Director, Defense Capabilities and Management at (202) 512-9627 or maurerd@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. GAO staff who made key contributions to this testimony are Suzanne Wren (Assistant Director), James Lackey (Analyst-in-Charge), Ava E. Bagley, Amy Bush, Chris Cronin, Amie Lesser, Felicia Lopez, Michael Silver, Emily Wilson, Elizabeth Wood, and Lillian Moyano Yob.

Related GAO Products

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Senator HIRONO. Thank you. We will proceed to 5 minute rounds of questioning. We will start with me.

So Admiral McClelland, are you the person that is charged with overseeing SIOP?

Rear Admiral McCLELLAND. Yes, Senator, I am. Admiral Troy McClelland and I have been assigned as the Program Executive Officer for Industrial Infrastructure, and SIOP is in my portfolio. I will note that I work very closely with the Naval Facilities Engineering Systems Command, the agent for design and construction, and Naval Sea Systems Command, Senator.

Senator HIRONO. But you are the point person to oversee SIOP?

Rear Admiral McCLELLAND. Yes, Senator, I am.

Senator HIRONO. So one of the major issues relating to the modernization program is the vast difference between the cost estimates—and I think Portsmouth is a prime example—the difference between the estimates of what it would cost to modernize those facilities, that shipyard, and what the contract goes out for. So what is being done or has been done to make sure that as you embark on the Pearl Harbor Naval Shipyard modernization that the estimates are accurate?

Rear Admiral McCLELLAND. Thank you, Senator, for that question. So what I lead with is a mechanism for early contractor engagement has been installed by the construction agent, Naval Facilities Engineering System Command, and specifically it is an acquisition strategy that allows us to have early engagement with multiple contractors so we can discuss with them means and methods, talk to them about the costs that they see, and then implement lessons learned as we are developing the program. That has been done for the Pearl Harbor work, Senator.

Senator HIRONO. Ms. Maurer, do you think that that is a lesson learned from the Portsmouth example?

Ms. MAURER. Thank you, Senator. Yes, I would imagine and hope that the Navy has learned some lessons from what happened in Portsmouth in terms of cost growth with the dry dock.

Senator HIRONO. Is your microphone on? I am having a little difficulty hearing you. Maybe you can get closer.

Ms. MAURER. Sure. Is this better?

Senator HIRONO. Yes.

Ms. MAURER. Okay. So I would hope that, and it is clear from the Navy's reporting that it provided the Congress just a few weeks ago that they have listed a number of lessons learned, and one of the items that is noted in their report is that they are learning some lessons from the cost growth from the Portsmouth project as well as others. That is something we will be looking into in much more depth when we start our new review, digging into cost estimates and schedule estimates for some of the larger SIOP projects.

I would note, as well, that there has been pretty significant cost growth for the Pearl Harbor project as well, which is obviously a critical capability that is required, but there has been significant cost growth in that project as well as increase in the overall scope.

Senator HIRONO. So Secretary Stefany, in view of the challenges that you have had in making sure that our cost estimates are accurate, and you note that there is, in the 2023 budget, \$1.7 billion, and then going forward what I think I heard you say \$8.3 billion

for the SIOP project. Do you think that is going to be enough, in view of the challenges that you faced in accurate cost estimates?

Mr. STEFANY. So, ma'am, one of the other lessons that we wanted to bring up was getting the design much more mature before we actually put out a formal estimate. That was another lesson we learned from Portsmouth and Pearl as well.

So I feel like the big projects that are in the next 5 years, we have the designs mature enough that we have confidence that there is not going to be continued growth on those projects. Do we have enough funding across the FYDP to do all the work that we have planned for those 5 years? Yes, ma'am. I think later on we will talk about things maybe to accelerate or move things from outside the FYDP in. But yes, in the 5 years of the FYDP we have enough funding to do the work we need to do in those years.

Senator HIRONO. I think that we are really going to be very much focused on making sure that there is enough funding to proceed with SIOP because the four public shipyards are counting on us to be able to move forward.

As mentioned, I have been very focused on the waterfront facility. I still do not quite understand why that production facility, which is going to enable the Pearl Harbor Navy Shipyard workers to be able to be more efficient in the work that they do, I still do not understand why the facility part of the modernization is not happening at the same time as the dry dock building. Care to comment, Mr. Secretary, very briefly? I am running out of time.

Mr. STEFANY. Quickly, ma'am, yes. In a previous budget cycle we had to make a hard choice to push the design and the planning of the waterfront facility off because of budget constraints in a previous cycle. Now we are looking to see if we can bring it back. So previous decisions have pushed the facility out 2 years beyond the dry dock itself, but we are looking, as part of the next budget cycle, can we bring things forward and try to line them up. Because ideally, we would like to have them lined up, in a perfect world, ma'am.

Senator HIRONO. Which means—just one more thing, then—as Ms. Maurer testified, a lot of the equipment is also beyond the age of when they should be replaced, and if we are not going to have the waterfront facility next to or near where the dry dock is, where they equipment will be necessary, we have got to make sure that the equipment that they are using is up to par.

I would like to recognize Senator Cramer.

Senator CRAMER. Thank you, Chairwoman, and thanks again to all of you. So sticking with the lessons learned theme a little bit while looking forward, let me start with you, Secretary Stefany. Do you have any advice for us, in terms of policy, streamlining processes, authorizations, obviously funding, but what have we learned that we can be helpful with in making this process a little more efficient and effective?

Mr. STEFANY. I will start with a couple, Senator, and see if Admiral McClelland has a couple more in the details.

Senator CRAMER. That would be great.

Mr. STEFANY. Authority which we have for these mega-projects to fund them incrementally over time, which you have provided us in the past, I think continuing that for these large projects and po-

tentially looking at maybe a multi-year type procurement like we do in the shipbuilding world, where we can see if we can get the most efficiency by building a set of projects together in a multi-year contract, a single, large contract I think are two authorities that might be worth looking at to give more flexibility and negotiating space to our team.

I will ask Admiral McClelland if he has any more specific ones.

Rear Admiral MCCLELLAND. Thank you, Mr. Stefany. So I would only mention maybe and emphasize what Mr. Stefany said. Really, the multi-year work relative to repair and maintenance is something we are looking very closely at. These are complex projects, and I sometimes think repair and maintenance could give the impression of less complexity. But really, the multi-year relative to, say, a dry dock that we are repairing and the way that relates to an operational availability, and a current operational availability, is absolutely critical.

So our ability to have a flexible approach, multi-year funding certainly is going to help us execute over time, Senator.

Senator CRAMER. Thank you for those. Along with all of that, of course, there is another challenge that we are hearing from everybody, I mean, seasonal, farm, hospitality workers to surgeons and very sophisticated technology workers, and everything in between, we have a workforce challenge in our country right now, particularly in the private sector.

I presume you are experiencing the same thing or seeing the same thing. Do you have any thoughts, first of all, maybe what you are trying to do to recruit and retain employees at the yards but also, again, if there is anything that you think we could be doing.

Mr. STEFANY. I think Admiral Galinis would be best to address the workforce at the shipyards.

Vice Admiral GALINIS. Yes, Senator, that is a great question. Thanks very much. You know, we are seeing the same thing in the public yards as well. Our attrition rates are higher than what we had planned. Our recruitment rates are lower than what we had planned. What we are doing is we offer some pretty good training as we bring people into the yards through our apprentice programs, so that is one real positive.

The other thing that we are looking at right now is, you know, we are actually looking at wages. For our entry-level positions—and many times we are competing at a wage that is less than what some businesses in the local area, for example, whether it be Amazon or even a Starbucks, for example. Typically the starting wage for some of our mechanics is in that \$14-an hour to \$15-an hour, so right about the minimum wage level. What we are finding is in some areas where our shipyards are located, Portsmouth and Puget Sound, in particular, the going wage is actually higher than that. So we are working through Navy leadership and with the human resources organizations across the Department of Defense to look at that wage grade that we are paying our folks.

Senator CRAMER. I commend you on that, and if we can be helpful we ought to be. Clearly when you are competing for talent with Starbucks in the Seattle area it is a tough competitor, but we ought to have the best that we can get, and we want to certainly help you be competitive.

I will just bring up, real quickly, there are 18 co-sponsors, and a lot of from this Committee, of the Shipyard Act, speaking to the infrastructure and some additional resources. Maybe you could just generally comment on the Shipyard Act, what you know about it, and how helpful it maybe could be. Mr. Secretary?

Mr. STEFANY. Yes, sir. The Navy supports that act, the idea of having a commitment of all the funding up front with a time—not a time limit, you know, 1 year to spend it, but having a period of time to spend the funding most efficiently. The knowledge that all, in this case, the total dollar value was there and could be worked with industry most effectively, is a best practice. So we would absolutely support that, sir.

Senator CRAMER. It is always tough to apply the time value of money in appropriations processes by the government but we need to get better at it. Thank you.

Thank you, Madam Chair.

Senator HIRONO. Senator Kaine.

Senator KAINE. Thank you, Chair Hirono. Ms. Maurer, I have a couple of questions for you. In your prepared testimony you talk about the GAO finding that the average condition of facilities at the four public shipyards improved at three of the four from 2016 to 2020. I would be remiss if I did not notice that the one that did not improve, and actually got worse, was the Norfolk Naval Shipyard. Explain the GAO's finding in that regard.

Ms. MAURER. Sure. Thank you, Senator. So we were reporting and summarizing information that is collected at all the public shipyards by the Navy, and you are absolutely right, Norfolk was one of the four where conditions had actually worsened a bit over the course of a 3-year period. Some of that was no doubt related to just the sheer age of the facility, both in terms of the facilities as well as some of the equipment. Some of it may have been related to a change in some of the methodologies that the Navy is using to assess facility conditions. That may have been part of it as well.

Big picture, all four of the public shipyards are still rated as poor in terms of overall facility conditions, and we remain gravely concerned about that.

Senator KAINE. The GAO issued a report yesterday, and your team's work found that applying leading practices and more transparent reporting could help reduce risks posed by the \$1.8 billion maintenance backlog. Can you talk a little bit about the GAO's recommendations to reduce risk associated with that backlog?

Ms. MAURER. Sure. Thank you. Yes. So we did issue a report yesterday. We were focused on the amount of backlog which is the uncompleted depot level maintenance across the fleet. Nearly all of that \$1.8 billion was in the surface fleet. Most of that was in some of the ships that the Navy has identified either previously or currently for decommissioning.

We made recommendations to encourage the Navy to be more transparent about how it collected and reported the information on backlog, both internally as well as to the Congress. We also felt that the Navy could do a better job of applying best practices, of tracking that growth in backlog and assessing its progress and whittling it down over the years.

Senator KAINE. One more question for you, Ms. Maurer. In the prepared testimony you said that the GAO had offered nine recommendations and the Navy has implemented five of them to date. Can you talk a little bit about why the other four have not yet been implemented?

Ms. MAURER. Sure. So definitely want to give Navy credit for implementing the five, and those are largely around the overall governance around the SIOP effort, so that is a good-news story.

The four that are still open, three are related to cost estimation, and that has been, frankly, one of the major problems with SIOP from day one. The cost estimates have not been on point and they have been, frankly, wildly off point from the initial plan that was developed in 2018.

We are encouraged by what we are hearing today, that the Navy is taking better steps to get their arms around that problem, but we are going to continue to encourage them to fully implement the three recommendations we have on cost estimation. The other remaining open recommendation is around assessing and tracking overall progress with the SIOP.

Senator KAINE. Thank you. To the Navy witnesses, talk to us a little bit about what you are doing—well, actually, I am going to skip. I think that question has been asked by another colleague.

To the Navy witnesses let me ask one thing about pandemic. Everything everybody has to do has had to change because of COVID, and shipbuilding and the operation of your enterprise along with it, and we are not out of it yet. I think we are seeing improvement but we are not out of it yet. What pandemic-related impacts have you observed as it relates to shipyard operations, workforce issues, and supply chain-related challenges?

Vice Admiral GALINIS. Yes, Senator, thanks for that question. I will take that one. We have seen some impacts across the shipyards. I will tell you due really to the men and women in our shipyards and the leadership in those shipyards we kept every shipyard open every day during the pandemic, and they really did a tremendous job.

That being said, there was impact as the pandemic kind of ebbed and flowed across the country. We were able to mitigate that to some extent by activating our reserve force that we have in each one of the shipyards. That played some tremendous benefits. So we activated the reserve force for a period of about 9 months or so, really through the worst stages of the pandemic, and that really helped us mitigate that.

I would tell you right now I think we are at a stable work environment. We are seeing probably almost near pre-pandemic levels in terms of the workforce on site every day inside the shipyards. Where we are starting to see some of the impacts is in the supply chain, I think, and that has been discussed in several different forms, but that is where our biggest impact is today, sir.

Senator KAINE. Thank you, and as I hand back to the chair, as I have spent time in shipyards and ship repair facilities in Virginia I sort of just ventured a compliment, “how well you are dealing with pandemic, it has got to be hard to rethink everything.” One of the ship repairers reminded me, you have got to remember we are an industry that thinks about safety first. Not every office puts

safety at the beginning, the first briefing of every day, and they said this is an industry that does it, and so it was maybe easier for us than others to come up with the right protocols to continue to do the Nation's work and to do it safely. So I applaud our shipbuilders and ship repairers, the Navy and our industrial partners for that.

Madam Chair, I yield back.

Senator HIRONO. Senator Sullivan.

Senator SULLIVAN. Thank you, Madam Chair. I want to go back to my *Yorktown* historical moment. So that was a ship that was severely damaged in battle and then came to Hawaii, I believe, and was very rapidly repaired and then participated, decisively, in the Battle of Midway.

Admiral Galinis and Ms. Mauer, a June 2021 GAO report on the Navy's ability to repair battle-damaged ships revealed alarming shortcomings. So I want to know how we are addressing this contingency. Let us assume we get into a serious naval battle with the Chinese, led by the Chinese Communist Party. What is our capability to, for example, repair a battle-damaged aircraft carrier or a battle-damaged submarine? My understanding, from reading the GAO report, is that those ships would have to go back to the continental United States for repair. Is that true, and are we trying to address many of the shortcomings revealed in the 2021 report?

Admiral, why don't we hear from you first and then Ms. Mauer on this question.

Vice Admiral GALINIS. Yes, sir. That is a good question. I mean, let me just, for the Committee, right up front, I would tell you I feel like we are challenged in that area, and that is something our team is working on closely. We have conducted a number of different, I will say, exercises, both tabletop exercises as well as real-life exercises on battle damage repair.

I will give you just a couple of examples. The *Bonhomme Richard*, I think everybody here knows the story of that. We were able to, as we were bringing her around and into the ship dismantling yard on the Gulf Coast there we conducted a number of exercises where we actually sent teams of Navy repair experts onto that ship to go through and conduct battle damage assessments and some rudimentary repairs to really start to exercise some of that capability.

For some of our normal repairs, and I will use the USS *Chancellorsville*, which right now is in dock out in Yokosuka, Japan, where we are replacing a shaft out there, looking at that and thinking about that differently. The initial estimate that came in to replace that shaft was in the range of 140 to 150 days. As we kind of thought our way through that, you know, we got that down to 90 days to 100 days or so, just by changing our processing and thinking about things different.

So we are exercising that type of thought process into some of our repair, sir, but I will tell you we have still got some work to do.

Senator SULLIVAN. But is it true right now that at least for a nuclear aircraft carrier or submarine that is battle damaged the only place for it to be repaired would be a shipyard in the continental United States?

Vice Admiral GALINIS. We could do some of that work in Yokosuka, Senator. We have got docking facilities and certainly a full range of ship repair capability in Yokosuka. Our major repair facilities, yes sir, are back here in the United States, particularly up in Puget, on the West Coast.

Senator SULLIVAN. Ms. Maurer, do you think that the rather alarming shortcomings revealed in the 2021 GAO report on this topic have been addressed or are they still pretty glaring? I am talking about the topic of battle-damaged ship repair, quickly, like we did with the *Yorktown*.

Ms. MAURER. Thank you, Senator. I think the Navy continues to be challenged to do its regularly scheduled maintenance. We have done reviews that showed that competing depot-level maintenance continues to be significantly delayed far too often. In our estimation they would be significantly challenged to repair battle-damaged ships as well.

On the encouraging side, though, we have seen increased Navy attention and focus on the recommendations we made in our report which were, broadly speaking, to bring some coherence and central leadership and focus to the issue of battle damage assessment and battle damage repair. That has happened since our report so we are encouraged by that. But we are going to continue to watch this very, very closely.

You used the *Yorktown* example. Obviously, the ships that the Navy is using today are much more technologically sophisticated than the *Yorktown* so it creates an even more substantial and significant battle damage repair challenge for the Navy.

Senator SULLIVAN. Great. Thank you.

Senator HIRONO. Senator Scott.

Senator SCOTT. Thank you, Chair.

First of all, I thank all of you for being here. Mr. Stefany and Admiral McClelland, thank you for all your hard work with regard to shipyards. Do you think we have enough shipyards? Are they the right size, adequately equipped? Do you think we have the right labor force, and are we where we need them?

Mr. STEFANY. Thank you, Senator. I will start with the nuclear base, and I would say yes, the four nuclear shipyards we have, as augmented by our two private shipyards, are able to do nuclear repair work. Newport News and Electric Boat I think are sufficient. The SIOP improvements, efficiencies we are going to get from SIOP as well as some of the productivity improvements to our Naval Sustainment System will provide the capacity among those six, the four public shipyards and the two private, I believe, to meet the demand going forward.

On the surface ship side, the private shipyards, again, that is an industrial base that fluxes more, but I believe again we have the right number of private shipyards for the surface ship side as well, sir.

Senator SCOTT. How about the labor force?

Mr. STEFANY. Labor force I think we are tapping out in each of those regions. We have actually started a couple of pilot projects with the Department of Labor, looking at bringing skilled workers from other parts of the country into the areas where our shipyards are. Because I think each shipyard has a really good training pro-

gram locally but it is not enough to support the shipyards in those areas. And I can certainly give you a do-back on areas where we are working for developing other forces around the country.

[The information referred to follows:]

Mr. STEFANY. In partnership with OSD, the Navy has piloted several defense workforce programs in major maritime centers of gravity like Pennsylvania, Virginia, and New England targeted at the public shipyard workforce. Some of these efforts will involve traditional pipelines back into the academic community, while others will provide an accelerated training path specific to defense manufacturing skillsets like welding, machining, quality assurance, and advanced manufacturing. These workforce programs, when combined with organic training and apprenticeships at each public shipyard, will support the speed, scale, and retention needed to meet the future labor demand signal.

Senator SCOTT. Admiral McClellan, do you want to add anything?

Rear Admiral MCCLELLAND. Yes, sir. I would only mention that of course we are considering the future capability that is needed for new classes as we are working on the capacity as well, and it is really all three of the efforts in SIOP that help us relative to the capability and capacity, and that is the new dry dock, of course, as well as repaired and restored dry docks, as well as recapitalization, new and restored buildings, and then the equipment. I think it was mentioned the equipment and upgrading the equipment is vital for the ultimate capacity of the public shipyard. Sir, all of those are being considered in SIOP and thought through accordingly, Senator. Thank you for the question.

Senator SCOTT. Thanks. As I understand it, Communist China is producing about half of all ships built globally. If our number one adversary has that kind of market control, does the United States and our democratic allies facing long-term risks to national security and merchant shipping? If each of you could sort of answer that.

Vice Admiral GALINIS. Yes, sir. From a shipbuilding capacity perspective, you know, predominantly the shipbuilding done here in the United States is military vessels, both on the nuclear side as well as the surface side. We have got some good capacity in that area, down on the Gulf Coast in particular, Newport News and a number of other places, and Virginia, up in the Northeast as well. So we have got good capacity, surely not near what our competitors have, particularly China. But, you know, the capacity we have, I think, is fully utilized right now, utilized well.

Mr. STEFANY. I would like to offer that the other competitor countries that you mentioned, Senator, have a strong commercial shipbuilding that then feeds their military. Anything we can do to help expand U.S. commercial shipbuilding would be something that we would certainly look favorably upon, to help our military shipbuilding.

Senator SCOTT. Anybody else?

Rear Admiral MCCLELLAND. Sir, and in SIOP the four public shipyards is, of course, focused on the availabilities and the depot-level maintenance. I think that works hand-in-hand as we improve our efficacy relative to the operational availability in SIOP in conjunction with the process improvements. I think that will then help overall from a fleet availability, sir.

Senator SCOTT. Ms. Maurer?

Ms. MAURER. Thank you, Senator. From the GAO perspective, some of our work has seen some of the tradeoffs that need to be made between new ship construction and resources going towards maintaining ships. Sometimes those tradeoffs need to be made. We already talked a little bit about the workforce challenges. I think that is a significant constraint as well. We issued a report about 3, 4 years ago that flagged workforce challenges facing the entire depot enterprise, not just the public shipyards. That continues to be a challenge and an even more significant one. It is certainly an issue that would need to be addressed, on both the private sector as well as the public sector side of the house.

Senator SCOTT. Thank you. Thank you, Chair.

Senator HIRONO. Senator Hawley.

Senator HAWLEY. Thank you, Madam Chair. Thanks to all the witnesses for being here.

Mr. Stefany, if I could just start with you. A few weeks ago Admiral Conn testified to the Committee, and you were here for this, that the first and second profiles in the April shipbuilding report did not meet or support the operational requirements for denying a Chinese assault on Taiwan. Can you help me understand why the Navy would include two shipbuilding profiles in the plans that do not support the pacing scenario and the pacing theater?

Mr. STEFANY. Yes, sir, Senator. I believe the goal of the plan was to provide options, different ranges of options, to you and to the rest of the Department. One option clearly is if we had a fiscally constrained approach what would be the best Navy we could have with that fiscally constrained approach. As was mentioned by Admiral Conn, that is a very high-risk approach so we also then wanted to have the un-fiscally constrained approach. So you saw a range there for levels of risk to meet the threat.

Senator HAWLEY. So let me ask you this. How does the SIOP support that third profile in the plan, the one that actually will allow us to meet the pacing challenge and the pacing theater, Profile 3, I think it is.

Mr. STEFANY. Yes, Profile 3, as you look at the ships that we would build in that profile compared to the capacity that we are creating through the SIOP program, that those match up, that as we look further out into the out years, in the '30s and the '40s, the SIOP will enable us to be able to maintain that size fleet.

Senator HAWLEY. Okay, good. So the SIOP does support that third profile.

Mr. STEFANY. Yes, sir, because, frankly, in the submarine and in the aircraft carrier world, the profiles are not that different, and that small delta the SIOP will support. Yes, sir.

Senator HAWLEY. Great. Good. Tell me this. Is it accurate, Mr. Stefany, that 20 percent of the Navy's fast attack submarines are both behind schedule on maintenance and have also lost critical dive certifications? Is that right?

Mr. STEFANY. Sir, I would not know the exact number here in front of me. I would have to take that for the record, unless one of my other witnesses know that number.

Senator HAWLEY. Does anybody else know?

Vice Admiral GALINIS. No. I would have to look at that to get those numbers.

Rear Admiral MCCLELLAND. No, sir. I do not know.
[The information referred to follows:]

Mr. STEFANY. At any time, some percentage of attack submarines are in depot maintenance or no longer certified to conduct submerged operations, typically awaiting induction into depot maintenance.

As of 16 June 2022, there are six fast attack submarines in depot maintenance availabilities that are projected to complete later than original schedule. This represents 12 percent of the fast attack submarine force.

As of 16 June 2022, there are five fast attack submarines awaiting induction into depot maintenance availabilities that are no longer certified to conduct submerged operations. This represents 10 percent of the fast attack submarine force.

Senator HAWLEY. Let me ask you this then, Mr. Stefany. How does the Navy plan to overcome the current maintenance and certification backlogs? Go ahead, Admiral.

Vice Admiral GALINIS. Yes. So there are three areas that we are working on. One is the SIOP piece, with is a recapitalization of the yards that we are talking about today. The second area is how we operate the shipyards, which is through the Naval Sustainment System for the shipyards, that Secretary Stefany talked about. That really gets into the processes, so that is how we plan the availabilities, how we execute the availabilities, how we get material into the yards, and really just kind of improving those processes. I tell you, we have got some challenges in that area.

Then the third part really gets to our workforce piece and how we train the workforce. And I talked to you a couple of times about some of the training programs that we have, bringing people in. I will tell you, you know, one of the things that we are seeing is as we hire folks, more of a challenge in bringing people into the yards that have some level of mechanical experience. By this I mean at the journeyman or even the apprentice level. We are finding that more of the folks are coming in really with little skills and we are having to put them through the entire training program, and that is something we have continued to work through over the last couple of years.

Back on the Naval Sustainment System piece, just a lot of work going in there. Think about the complexity of overhauling a nuclear-powered aircraft carrier or a nuclear submarine. You know, getting the planning right up front, getting the planning done right up front is key to that. And so a lot of focus on that.

Materiel procurement, especially on a *Virginia*-class, has got to improve, and then just basic day-to-day execution inside the yards.

Senator HAWLEY. Admiral, do you have now the manpower and dry docks available to address the current maintenance backlog?

Vice Admiral GALINIS. I do feel like we have the manpower available. We have got about 37,000 folks inside our four shipyards. That is enough manpower. We need to improve our productive capacity inside those yards through the three things I just talked about.

Senator HAWLEY. Okay. Fair enough. I am just wondering if we are having this much trouble right now servicing the current submarine force how are we going to maintain the force that the Navy hopes to acquire in the coming years?

Vice Admiral GALINIS. So again, improving that productive capacity. I think SIOP brings a lot of that. The other thing of part of the processes we use and how we manage the shipyards is look-

ing for opportunities to outsource some of this work to commercial industry, particularly at the component level. I think there are more opportunities to do that, that would then free up some of the mechanics inside the shipyard to get after what we really need them to do, working on the vessels on the waterfront there.

Senator HAWLEY. Great. Thanks to all the witnesses. Thank you, Madam Chair.

Senator HIRONO. Thank you. I am going to take a second round of questions, and actually it is a follow-up to Senator Hawley's questions about the certification backlog. So that means that we are having some challenging in making sure that we are repairing and making ready our current ships. I am not talking about the new dry dock that has to be built, et cetera.

Admiral Galinis, you mentioned that these are processes and we have workforce issues, et cetera. So are there specific things you are doing to address the certification backlog problems, some specific things you are doing?

Vice Admiral GALINIS. Yes. Specifically inside the shipyards. So I talked about the number of areas that we are working on. So on the production workforce, for example, waterfront operations, how we manage work day-to-day. So, you know, over a shift, over a week, over a month are we getting the work completed that we have planned? We are finding that in all areas we are not doing that.

When you start to dig into that, why is that not happening? Well, the mechanics do not have the right engineering paper. They may not have the right materials. In some cases, you know, we talked about the industrial plant equipment. Okay, we may not have that fully operational. That slows down work.

So there are issues in each one of these areas that we have got to get after, and there is lot of that that, frankly, is under my control to go fix, and we are doing that. We are working Admiral McClellan through the SIOP program. We are getting out the industrial plant equipment.

I will tell you another area is the information technology. We have not really talked too much about that. That continues to be a challenge inside the shipyards. We have gotten some tremendous help from Navy leadership over the last couple of months to upgrade some of the computers and the networks going to the shipyards.

So those are the things that we are getting after today to improve the productive capacity inside our shipyards.

Senator HIRONO. So in determining how to enable the workers to be more efficient in their work do you also question the workers? Do you get their input, and do they see that you are making changes? Some of the changes may be very simple such as locating the equipment closer to where the repair work is being done. So are you—I have to assume that you listen to them.

Vice Admiral GALINIS. We absolutely are, ma'am. So a couple of ways that we are doing that. Through the process that we have right now—and you are familiar with poll surveys, right? So we target the workforce for specific things in terms of where do they see the barriers? Where do they see the roadblocks? Leadership within my organization, and me personally getting into the ship-

yards, down to the waterfront, and sitting down in, I will say, small groups of mechanics and supervisors, to just kind of have a discussion, talk about what this Naval Sustainment System shipyard really is, what we are trying to get after, and does it really match with some of the challenges that they are seeing day-to-day in the work that they are doing? In some cases we are seeing that close lash-up. In other cases we are not.

The other piece that you mentioned I think really is the ownership, and we are starting to really see, at the trade level, down at the waterfront the supervisors really starting to embrace some of the improvement initiatives that we are putting in place. That, frankly, is where it really needs to start to sustain what we are doing.

Senator HIRONO. I think that is really important. I visited our Pearl Harbor Naval Shipyard a number of times and I know it means a lot to them to be listened to and to have the changes made that will enable them to meet their deadlines.

Ms. Maurer, I am looking at your 2017 GAO recommendations and there were a number of recommendations that were met. But there were a bunch of these that have not been met, such as include metrics for assessing progress toward meeting each of its SIOP goals. It is indicated that that has not been met. Is that accurate?

Ms. MAURER. Yes, that is correct, Senator.

Senator HIRONO. Do they have a ways to go on that point?

Ms. MAURER. They —

Senator HIRONO. How about include all—I am sorry.

Ms. MAURER. They still have some work there, yes.

Senator HIRONO. Include all costs such as inflation program, office activities, utilities, roads, environmental remediation when developing a cost estimate. Has that been done?

Ms. MAURER. That has not been done completely, no.

Senator HIRONO. What about using cost estimate best practices and developing a second cost estimate?

Ms. MAURER. That has not been completed yet either.

Senator HIRONO. And obtain an independent cost estimate of the naval shipyard's program prior to the start of project prioritization.

Ms. MAURER. That is something that the Navy says they have efforts underway to address, and we will be assessing that as part of our new work that starts later this month.

Senator HIRONO. I think they are doing that with regard to the dry dock that is being built at Pearl Harbor Naval Shipyard.

Thank you. The other questions I have I will just submit for the record.

Senator Kaine, do you have a second round?

Senator KAINE. Madam Chair, I just have a couple, but if you want to go vote I can handle it from here if you want me to.

Senator HIRONO. Please go ahead.

Senator KAINE. Actually, you know what? I am going to submit my second round for the record.

Senator HIRONO. Senator Hawley, did you have a second round?

Senator HAWLEY. I just have one or two questions, briefly, Madam Chair, just on the AUKUS [Australia, United Kingdom, and the United States] deal. I think this is for you, Mr. Stefany,

but anybody. As part of that deal we pledged industrial support to our allies, haven't we?

Mr. STEFANY. Yes, Senator. As part of the AUKUS deal we will support them out and what exactly we do versus the United Kingdom versus Australia is to be determined. But yes, we will be supporting that.

Senator HAWLEY. Okay. So here is where I am going with this. Back to this maintenance issue, given how tight we are on maintenance support for our own ships and subs currently, how are we going to meet our pledges under the AUKUS deal and do what we need to do to clear our own maintenance backlog?

Mr. STEFANY. Yes, sir. The AUKUS effort, frankly, is 15, 20 years out before those requirements come into fruition, and by then that is the period of time that we expect that the SIOP-type efforts will have matured for ourselves and provide some capacity.

Senator HAWLEY. Okay. So in other words, I mean, being able to execute on the AUKUS deal, as to these particular terms, depends on us really knuckling down here and in this next window clearing this backlog and getting up to speed. Is that fair to say?

Mr. STEFANY. Both at the private and public yards, yes, sir.

Senator HAWLEY. Yes. Okay. Thank you, Madam Chair.

Senator HIRONO. I just want to note that when I asked series of questions as to whether the GAO's recommendation had been met I would ask the Navy witnesses but particular Admiral McClellan, who is overseeing SIOP, that you will meet those recommendations, unless you disagree with the recommendations. So I should ask, do you agree with these recommendations that you have not met as yet?

Rear Admiral MCCLELLAN. So, Senator, certainly from a lessons-learned perspective many of the item GAO notes are also in our lessons learned, and active plans are being developed and put in place, and in some instances we will immediately see some implementation relative to, as you mentioned, Senator, the work out at Pearl Harbor, for example, dry dock and other places. So very much are actively leaning forward on the recommendations and creating the processes to implement those recommendations, Senator, and look forward to doing so.

Senator HIRONO. So as we continue to focus on SIOP I, for one, would like to see the Navy meet these other recommendations of GAO.

With that I am going to leave the record open for 5 days for additional questions from Members, and with that this hearing is closed. Thank you very much.

[Whereupon, at 3:47 p.m., the Subcommittees adjourned.]

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR DAN SULLIVAN

BATTLE DAMAGE REPAIR

1. Senator SULLIVAN. Vice Admiral Galinis, a June 2021 Government Accountability Office (GAO) report on the Navy's ability to repair battle damaged ships revealed alarming shortcomings. How has Shipyard Infrastructure Optimization Program (SIOP) addressed some of these concerns raised in the GAO report?

Vice Admiral GALINIS. The Shipyard Infrastructure Optimization Program (SIOP) is a holistic plan that integrates all infrastructure and industrial plant equipment

investments at the Navy's four public shipyards and contributes to the Navy's ability to repair battle damaged ships through improved dry dock capacity and removing infrastructure barriers to reliable and efficient execution of scheduled depot maintenance. However, battle damage repair is currently not a SIOP requirement driver.

2. Senator SULLIVAN. Vice Admiral Galinis, can you explain our current capability to repair battle damaged nuclear ships while simultaneously conducting routine maintenance?

Vice Admiral GALINIS. Under the fixed capacity model, induction of a battle damaged ship into any public shipyard's workload would result in the deferral of routine maintenance for another ship.

Public shipyards operate at a fixed capacity, balancing work force and workload demand each year. Maintenance requirements must be prioritized against each yard's fixed productive capacity, as onboarding and training requirements limit the rate at which shipyard manning can increase.

Public shipyards operate at a fixed capacity, balancing work force and workload demand each year. Onboarding and training requirements limit the rate at which shipyard manning can increase, such that maintenance requirements must be prioritized against each yard's fixed productive capacity. If a nuclear ship were to be damaged in battle, assessments would be made to determine the best option to repair the ship as quickly as possible, while balancing fleet maintenance requirements to limit readiness gaps. Options to be considered may include executing the repair work, whole or in part, in the private sector.

Drydock and material availability further limit our ability to simultaneously repair battle damaged ships and conduct routine ship maintenance. Though the SIOP is providing some measure of improvement, drydock space will continue to be a limited resource for the foreseeable future. Material availability also limits the pace at which any ship can be maintained and/or repaired.

SHIPYARD INFRASTRUCTURE OPTIMIZATION PROGRAM

3. Senator SULLIVAN. Vice Admiral Galinis, a 2017 GAO report noted that the facilities maintenance backlog for naval public shipyards had grown to \$4.865 billion and that the Navy did not have a comprehensive plan to address and monitor its infrastructure investments. Following this report, the Secretary of the Navy provided a report to Congress titled, "The Shipyard the Nation Needs," which provided the framework for what is now called the Shipyard Infrastructure Optimization Plan. Since these events, the backlog grown to over \$7 billion. What course corrections need to be made to SIOP to start seeing better results regarding this backlog?

Vice Admiral GALINIS. The Navy's SIOP has charted a path to stronger outcomes by prioritizing infrastructure investments that directly support ship maintenance. The SIOP makes a deliberate effort to create and implement long-range investment plans designed to improve shipyard productive capacity through improved condition and configuration of shipyard infrastructure. Ongoing industrial modeling and simulation efforts will provide the ideal configuration of the shipyards to improve readiness and maintain the current and future fleet. SIOP Area Development Plans (ADPs) will leverage the results of modeling and simulation to present long-range shipyard recapitalization plans that optimize and improve the shipyard infrastructure while minimizing the impact of SIOP implementation on critical shipyard operations. ADP implementation at each shipyard will include a mix of new construction, restoration/modernization and demolition. As ADP implementation progresses, we expect to see a significant reduction in the reported backlog and overall improved condition of the shipyards.

4. Senator SULLIVAN. Vice Admiral Galinis and Rear Admiral McClelland, the GAO report Director Maurer submitted with as a part of her testimony for this hearing states, one: "[t]he backlog of restoration and modernization projects intended to restore, renovate, or replace buildings or components . . . is now over \$7 billion," two, "[t]he costs of SIOP dry dock projects have more than doubled," and three, "[t]he schedule for SIOP related efforts has slipped by 3 years." Significantly over budget; significantly behind schedule. Why has SIOP not made any demonstrable improvements to the status of our shipyards?

Vice Admiral GALINIS and Rear Admiral MCCLELLAND. The Shipyard Infrastructure Optimization Program (SIOP) continues to mature. With the tremendous support received from Congress—to include the \$1.6 billion appropriated in fiscal year 2022—the program is advancing several initiatives across all three lines of effort—dry dock modernization, optimization, and capital equipment. Area Development

Plans (ADPs) are in development for each public shipyard; the first will complete in fiscal year 2022 and the remainder will complete in fiscal year 2023 and fiscal year 2024 utilizing the output of the first increment of industrial modeling to inform ideal infrastructure configuration. In fiscal year 2022, the second increment of industrial modeling will commence, which will inform optimal shop floor layouts of the shipyard production facilities.

Additionally, funds will be utilized to begin project design for a *Gerald R. Ford*-class aircraft carrier-capable dry dock at Puget Sound Naval Shipyard, to award the construction contract for Dry Dock 8 saltwater system upgrades at Norfolk Naval Shipyard, to award several restoration and modernization projects, and to purchase capital equipment to replace aged elements to revitalize maintenance shop capabilities. The President's fiscal year 2023 budget submission confirms the administration's commitment to the SIOP effort, with \$8.3 billion in funding across the fiscal years 2023 to 2027 Fiscal Year Defense Program.

Notable accomplishments during fiscal year 2022 include:

- The Pearl Harbor Naval Shipyard Dry Dock 3 replacement project achieved 90% design milestone.
- The Puget Sound Naval Shipyard new graving dry dock is on schedule for fiscal year 2022 design award to support *Gerald R. Ford*-class carrier mission need date.
- Norfolk Naval Shipyard Drive Dock 8 saltwater upgrades on schedule for fiscal year 2022 construction award to support *Gerald R. Ford*-class carrier mission need date.
- The successful April 22 docking of USS *Cheyenne* at Portsmouth Naval Shipyard's newly constructed Super Flood Basin in Dry Dock (DD) 1. This was the first time in history that a *Los Angeles*-class submarine was safely docked in DD 1 with no additional buoyancy assistance nor reliance on a tidal schedule.

QUESTIONS SUBMITTED BY SENATOR MARSHA BLACKBURN

COVID-19 VACCINE MANDATE

5. Senator BLACKBURN. Rear Admiral McClelland, how did the loss of highly-skilled and specialized Department of Defense workers due to the contractor vaccine mandate immediately impact shipyards?

Rear Admiral MCCLELLAND. The shipyards are experiencing very high attrition right now due to a number of factors, to include to the vaccine mandate as previously executed. The Navy is working with shipyards and regional shipyard associations to develop pipelines for the future workforce and to build workforce development programs that encourage skilled workers from colleges and the trade schools to join the shipyard workforce.

INFRASTRUCTURE

6. Senator BLACKBURN. Rear Admiral McClelland, what is the link between facility conditions and performance?

Rear Admiral MCCLELLAND. There is a direct link between facility conditions and shipyard performance. The need to modernize the four naval shipyards has been well documented and was summarized in Government Accountability Office (GAO) report 17-548, *Naval Shipyards: Actions Needed to Improve Poor Conditions that Affect Operations*. That report stated that partly as a result of poor condition, the shipyards have not been fully meeting the Navy's operational needs. Inadequate facilities and equipment have resulted in risks to maintenance schedules, slower production flow, higher maintenance costs, and reliability issues.

Improvements to facilities conditions and configuration is the center-piece of optimization efforts. The Shipyard Infrastructure Optimization Program's industrial modeling and simulation efforts will provide the ideal configuration of the shipyards to improve readiness and maintain the fleet of the future.

7. Senator BLACKBURN. Rear Admiral McClelland, to what extent is the Navy considering depot maintenance capacity concerning future force structure and long-term shipbuilding plans?

Rear Admiral MCCLELLAND. The Department of the Navy (DON) recognizes that sustaining the Navy's force structure through the maintenance and modernization of its naval vessels is key to meeting operational demands and fielding the strongest balance of capabilities. The DON has developed a framework to sustain our investments in the fleet effectively and efficiently through initiatives and investments in the public and private sectors to improve maintenance outcomes. As the Navy

grows, the pace and volume of maintenance and modernization availabilities will increase commensurately. A long-term stable and predictable plan is the cornerstone to ensuring a healthy ship repair industrial base and the force structure necessary to meet worldwide demand for naval forces.

SHIPYARD INFRASTRUCTURE OPTIMIZATION PROGRAM MANAGEMENT

8. Senator BLACKBURN. Ms. Maurer, what recommendations do you have for the Navy to improve SIOP management?

Ms. MAURER. GAO currently has four recommendations that the Navy needs to implement related to shipyard improvement efforts. In September 2017, GAO recommended that the Navy develop a comprehensive plan for shipyard capital investment that established (1) the desired goal for the shipyards' condition and capabilities; (2) an estimate of the full costs to implement the plan, addressing all relevant requirements, external risk factors, and associated planning costs; and (3) metrics for assessing progress toward meeting the goal that includes measuring the effectiveness of capital investments.¹ The Navy concurred with this recommendation, but as of February 2022, the Navy's plan did not include metrics for assessing progress toward meeting each of its goals. Navy officials have stated that they intend to develop metrics to meet this element during a second phase that will be complete in fiscal year 2025.

In November 2019, GAO made three additional recommendations addressing the Navy's first cost estimate for its Shipyard Improvement and Optimization Plan (SIOP).² GAO recommended that the shipyard infrastructure optimization program office (PMS 555):

- Include all costs—such as costs for inflation, program office activities, utilities, roads, environmental remediation, historical preservation, and alternative workspace—when developing its second, more detailed, cost estimate.
- Use cost estimating best practices—as outlined in the GAO Cost Estimating and Assessment Guide—in developing its second cost estimate, including a program baseline, work breakdown structure, a description of the methodology and key assumptions, inflation, fully addressing risk and uncertainty, and a sensitivity analysis.
- Obtain an independent cost estimate of the Naval Shipyards program prior to the start of its project prioritization effort.

Navy officials concurred with all three recommendations and stated that they planned to implement them when the program office secured its second internal cost estimate, which it expected to occur in fiscal year 2022. However, as of March 2022, Navy officials stated that the schedule for completion of the second cost estimate has slipped to fiscal year 2025. GAO continues to believe that implementing all four recommendations will help the Navy improve the accuracy of its funding requests and better manage the complex SIOP effort.

In addition to tracking the status of these recommendations, GAO has begun a review of the SIOP cost and schedule estimates, in accordance with section 355 of the National Defense Authorization Act for Fiscal Year 2022.³ Depending on the results of this review, GAO may have additional recommendations to improve the Navy's management of the SIOP.

9. Ms. Maurer, what does a successful end to the SIOP look like?

Ms. MAURER. In its original 2018 report, the Navy cited three major areas for shipyard improvement—dry dock recapitalization, facility optimization, and modernized capital equipment. The goal for the dry docks was to recover the maintenance availabilities that the Navy would be unable to support (due to capacity issues) through 2040. The Navy expressed a broad goal for its facility optimization that it should “optimally size, configure, and locate facilities at the four public shipyards to best execute current and future mission requirements.”⁴ The Navy did not provide any goal for its equipment modernization effort. In its most recent update to Congress in April 2022, the Navy did not provide new goals for its lines of efforts, but did state that it expected future Acquisition Program Baseline (APB) documents

¹GAO, *Naval Shipyards: Actions Needed to Improve Poor Conditions that Affect Operations*, GAO-17-548 (Washington, DC: September 12, 2017).

²GAO, *Naval Shipyards: Key Actions Remain to Improve Infrastructure to Better Support Navy Operations*, GAO-20-64 (Washington, DC: November 25, 2019).

³Pub. L. No. 117-81 (2021).

⁴Department of the Navy, *Report to Congress: Shipyard Infrastructure Optimization Plan* (Feb. 2018).

for each shipyard to establish cost, schedule, and performance measures at each yard.

GAO has not weighed in on what the Navy's specific dry dock, facility, or capital equipment improvement goals should be. Ultimately, it will be up to the Navy to develop the business case, including identifying acceptable levels of risk, for each respective area. However, GAO believes that public shipyards with sufficient capacity, facilities, equipment, and layout to ensure the Navy can maintain its current and future ships in an efficient and timely manner in peacetime and wartime is critically important. In addition, GAO believes that the end state should provide the Navy with sufficient flexibility to nimbly adapt to future requirements, as the requirements of the Navy fleet are constantly changing. The ideal shipyard for today's fleet might not be aligned to the ideal shipyard for tomorrow's fleet.

QUESTIONS SUBMITTED BY SENATOR JOSH HAWLEY

10. Senator HAWLEY. Mr. Stefany, is it true that nearly 20 percent of the Navy's fast attack submarines are not only behind schedule on maintenance, but have also lost critical dive certifications? If not, what are the correct figures?

Mr. STEFANY. At any time, some percentage of attack submarines are in depot maintenance or no longer certified to conduct submerged operations, typically awaiting induction into depot maintenance.

As of 16 June 2022, there are six fast attack submarines in depot maintenance availabilities that are projected to complete later than original schedule. This represents 12 percent of the fast attack submarine force.

As of 16 June 2022, there are five fast attack submarines awaiting induction into depot maintenance availabilities that are no longer certified to conduct submerged operations. This represents 10 percent of the fast attack submarine force.

11. Senator HAWLEY. Mr. Stefany, would you agree that expanding our shipbuilding infrastructure is critical not just to meet peacetime production demands, but also the wartime demands placed on the industrial base?

Mr. STEFANY. Yes, expanding our shipbuilding infrastructure is critical to meeting peacetime production and wartime demand.

12. Senator HAWLEY. Mr. Stefany, how will the SIOP help to ensure the Marine Corps has access to the platforms it needs—particularly the Light Amphibious Warship—to execute concepts like Expeditionary Advanced Base Operations?

Mr. STEFANY. SIOP efforts are focused on the modernization of the Navy's four public shipyards, which primarily maintain the Navy's in-service, nuclear platforms. SIOP will create capability to maintain our future nuclear platforms, increase capacity for existing nuclear platforms, and modernize towards optimization. SIOP is one of Navy's highest strategic recapitalization priorities—a once-in-a-generation must-do/must-fund effort. As we learn from the SIOP efforts, those lessons will be applied, as applicable, to the maintenance of surface ships at our private shipyards.

Initial sustainment plans for Light Amphibious Warship (LAW) are similar to today's in-service, non-nuclear ships which conduct depot maintenance primarily in private shipyards. LAW is being developed to provide distributed shore-to-shore maneuver, mobility, and sustainment for littoral expeditionary forces MORE such as Marine Littoral Regiments in a contested environment. The Navy appreciates Congress's continued support of the private shipbuilding industrial base that will build LAW as well as the ship repair industrial base that sustains Navy's non-nuclear platforms.

13. Senator HAWLEY. Ms. Maurer, according to GAO's work, what was the effect of rounds of Base Reduction and Closure in the 1990s and 2000s on current shipyard capacity?

Ms. MAURER. The Navy currently has four public shipyards responsible for the repair of the Navy's nuclear-powered fleet. In the early 1990's, the Base Realignment and Closure (BRAC) commission resulted in the closure of five public shipyards.

Philadelphia Naval Shipyard, Philadelphia, PA (1991 BRAC)

The Philadelphia Naval Shipyard opened in 1801, and by the 1990's had 5 dry docks, 2 of which were large enough to accommodate the Navy's aircraft carriers. The yard primarily engaged in ship construction until 1970, at which point it began working on ship repair. In 1991, the Navy cited falling workload and the end of service-life extensions for the non-nuclear powered aircraft carrier program as reasons to close the Philadelphia Naval Shipyard. In addition, at the time, it was one

of the Navy shipyards that could not support repairs to nuclear powered ships. The commission noted that keeping Philadelphia open could jeopardize the Navy's goal at the time of putting 30 percent of its repair work into private yards. However, the commission did recommend keeping the shipyard in inactive status to address potential emergent requirements. The 1995 BRAC dropped this requirement and allowed final closure of the yard. GAO was asked to review the Navy's decision, but cited an inability to assess the Navy's closure recommendations due to limited documentation.⁵ The Navy closed the shipyard in 1996.

Naval Shipyard Hunters Point, San Francisco, CA (1991 BRAC)

In the 1991 BRAC round, the Navy cited significant encroachment, deficient infrastructure, and low closure costs as its rationale to close this yard. The closure of the Hunters Point Shipyard was not contested by the local community. The Navy had not recently operated the shipyard, having leased it to a commercial ship repair company from 1976 to 1986. Parts of the yard were later designated an EPA Superfund site due to contamination. As previously noted, GAO could not review the Navy's analysis of shipyard capacity for the 1991 BRAC round, because the Navy did not document the information for the decision.

Naval Shipyard Charleston, Charleston, SC (1993 BRAC)

In the 1993 BRAC round, the Navy cited excess shipyard capacity, along with the ease of shifting its workload to other shipyards, as justifications for closing this shipyard. The local community raised concerns about the way in which Charleston's excess capacity and military value were calculated. Though it closed the shipyard, the commission rejected the Navy's plan to close the entire naval base outright, instead deciding to retain the use of some Charleston facilities to support other commands near or later moved to Charleston. In 1993, GAO reported that the Navy recommended closing the Charleston Shipyard although it rated higher on military value than shipyards that remain open (i.e., Pearl Harbor Shipyard, Hawaii and Portsmouth Shipyard, New Hampshire).⁶ For the 1993 BRAC round, the Navy had an overarching goal of reducing excess capacity by category of military base, such as shipyards. The Navy also wanted to maintain an average military value score that was at least as high as all the bases in the category. GAO's analysis of the Navy's data showed that the Navy's recommended closure of the Charleston Shipyard was based on assumptions about its needed capacity to handle an estimated nuclear workload.⁷ GAO found the Navy's recommendations and assumptions were generally sound and well documented.

Mare Island Naval Shipyard, Vallejo, CA (1993 BRAC)

In the 1993 BRAC round, the Navy cited Mare Island's excess shipyard capacity, and the lowest West Coast shipyard military value, as justification for closing this shipyard. The local community raised concerns about the way in which Mare Island's excess capacity and military value were calculated. The commission accepted the Navy's recommendation. In 1993, GAO reported that the Navy considered the closures of the Mare Island Shipyard to meet goals of reducing excess shipyard capacity.⁸

Naval Shipyard Long Beach, Long Beach, CA (1995 BRAC)

The Navy considered closing the Long Beach Shipyard in multiple BRAC rounds. In 1991, Long Beach was one of the shipyards unable to conduct nuclear repair work. However, the Navy later approved capital improvements to one of its dry docks to make it nuclear capable. In 1993, the Navy did not recommend to close the Long Beach Shipyard, despite demonstrated excess capacity, because of the concern of losing the capability to dry dock aircraft carriers on the West Coast. However, the Navy recommended its closure in the 1995 BRAC round. The community argued that the Navy based its assessment on peacetime workload, and the shipyard's large-deck drydocking capacity was needed for contingency, mobilization, and future force requirements. The commission accepted the Navy's recommendation and noted that while the number of large-deck ships had not decreased, the general decrease in force structure would allow for flexibility to accommodate unscheduled maintenance. In 1995, GAO reported that in reviewing the 1993 and 1995 military value ratings, Long Beach Shipyard received credit in 1993 for overhaul of sub-

⁵ GAO, *Military Bases: Observations on the Analyses Supporting Proposed Closures and Realignments*, GAO/NSIAD-91-224 (Washington, D.C.: May 15, 1991).

⁶ GAO, *Military Bases: Analysis of DOD's Recommendations and Selection Process for Closures and Realignments*, GAO/NSIAD-93-173 (Washington, D.C.: April 15, 1993).

⁷ GAO/NSIAD-93-173.

⁸ GAO/NSIAD-93-173.

marine ships and salvage ships that it did not receive credit for in 1995.⁹ However, we found that this did not change the shipyard's relative military value ranking in 1995. We also reported that the Navy did not share the concerns of losing depot capability on the West Coast with the shipyard's closure, because the workload would be done at private shipyards.

GAO has not assessed the extent to which those shipyards—as they existed in the early 1990's—would be able to support the current mission of the Navy's public shipyards, which is primarily focused on conducting repairs to the Navy's nuclear-powered submarines and carriers.

14. Senator HAWLEY. Mr. Stefany, the USS *Boise* has not been on patrol in seven years and I am hearing it may be decommissioned ahead of schedule. Why would we decommission the ship, with so much of its remaining reactor life?

Mr. STEFANY. The Navy does not intend to decommission the USS *Boise* which is executing an Early Production Period to be followed by an Engineering Overhaul.



⁹GAO, *Military Bases: Analysis of DOD's 1995 Process and Recommendations for Closure and Realignment*, GAO/NSIAD-95-133 (Washington, D.C.: April 14, 1995).