Letter to the Suppliers

General Dynamics Electric Boat designs and builds the most complex machine produced on the planet, a United States Navy Nuclear Submarine. These magnificent machines operate undetected in areas of the ocean for extended periods of time with crews exceeding one hundred and thirty people. These brave men and now women serve aboard these ships protecting our freedom with the highest level of confidence in the submarines’ safety and reliability. They are able to do this as a result of the partnership between the Shipbuilders and the Submarine Supplier Industrial Base. Together, shipbuilders and suppliers hold a sacred trust; never ever deliver a part or a product that does not meet the quality standards that are expected.

A Navy Nuclear Submarine is produced from hundreds of thousands of parts produced by hundreds of suppliers. Each one of these parts was uniquely designed or selected to perform a specific task and in combination with all of the other parts is relied upon to keep both the ship and sailors safe. Building a submarine is the ultimate team sport; if one member of the shipbuilder or supplier team fails to perform as expected, the entire team fails.

In 2016, the team was struggling. Purchased material availability, our key metric for how the supply chain is supporting the operations side of our business, was tracking at 90%. What this meant was that one out of every ten work orders (the process by which our trades perform work) was missing the required material. Just imagine how each of us would feel that once every ten days when we got in our car to drive to work, the car would not start. I am sure you would all agree, we would not keep that car very long.

Urgent action was required. Working side by side with our supplier partners we stood shoulder to shoulder and through hard work and raw determination we have steadily improved performance while upholding the sacred trust for conformance to quality standards. The team has now achieved greater than 98% material availability for four straight months. This improvement is a significant accomplishment; material is the gas for our production engine, we could not have gotten here without you and we are appreciative of your support and dedication.

Our work is not done; in fact it is only beginning. Block IV is in full production and our two ships per year delivery cadence is upon us, Block V is right around the corner with an award anticipated in the fourth quarter of 2018 preceded by Advance Procurement Funds in 2017/2018 and Columbia Class is rapidly moving from design and development to metal. We are collectively on the edge of a generational opportunity for Nuclear Shipbuilding and our need to focus on and deliver first time quality has never been greater. With this opportunity comes great responsibility, this will not be a time for the faint hearted. A commitment to excellence must be felt and demonstrated every day in everything we do. Quality is not an option, it is an imperative.

Thank you for what you do, people’s lives depend on us all doing it right! Please take the time to read the enclosed articles and understand the messages. Share them with your co-workers and your suppliers. If you have any questions, please ask. Have a quality day!

Regards, Your Partner in Shipbuilding,
The 1-3-8 Rule

A useful shipbuilder’s rule of thumb called the “1-3-8 rule” compares the cost and labor hours required to accomplish the same work in succeeding states of submarine construction. This rule emphasizes the importance of supplier schedule adherence and first time quality. If key schedule dates are not met, cost and labor hours increase exponentially for the Navy and the nation’s submarine program. The impact of the 1-3-8 rule should resonate with all our suppliers as we work toward a shared goal of high performance.

The earliest part of the construction process takes place on the shop floor. This is generally the most efficient work environment because plans, tools and jigs to facilitate assembly are readily available, and utilities are easy to access. It is also the easiest place for supervisors to provide guidance when needed and to observe and correct deficiencies early enough to avoid rework. Finally, the shop is a controlled environment, so work there can continue in all weather.

As work packages are assembled into larger units called modules, the work moves to outfitting buildings that are specially designed to handle the heavier units and align the various modules for insertion into hull sections. (Note that the “modules” discussed here are not the same as the large hull-section modules discussed earlier; these modules are packages of equipment that will eventually be inserted into the large hull sections.)

As construction progresses, the impact of quality issues on cost and schedule increases according to the 1-3-8 rule.

An outfitting building is a less efficient workspace than the shop floor because adjacent systems increase congestion, and equipment already installed in modules limits access. A task that takes one hour on the shop floor requires roughly three hours in an outfitting building.

The least efficient work environment is inside a hull. Once hull sections are assembled into a complete hull, personnel working within are much more remote from their bench tools and other resources, and access, congestion and safety become much greater concerns. Thus, a job that could be completed in one hour on the shop floor or three hours in a modular outfitting building can take up to eight hours inside a hull.

LESSONS LEARNED FROM THE SHIPYARD

Criticality of On-Time Performance

By Thomas Plante, Director of Strategic Planning

The Virginia Class construction program is in steady state production at two submarines per year. Today it takes about 5.5 years to build one Virginia Class submarine with the goal of reducing that by 8% to 5 years (60 months). Our four-module build plan has been optimized for modular construction efficiency with the shipment of 2000-ton modules that are outfitted to 95% completion when they arrive at one of the two delivery yards for final assembly.

The highly integrated construction plan involves over one million parts and 100,000 activities and logic constraints in the Integrated Master Schedule. The Shipyards build each of their assigned modules in “assembly line” fashion, boat-over-boat and year-over-year for two ships per year. The work is executed continuously, there are no production breaks. Adhering to established production schedules and meeting material delivery dates are critical to keeping the efficient ship construction plan on schedule and meeting established cost targets. Any perturbation caused by late material delivery can prevent the shipyards from executing the efficient Virginia Class build plan. For example, failure to install one major component can prevent the shipbuilders from stacking decks which will impact all downstream activities for that module. At two shipments per year, impact to one module will also result in impacts to that module on subsequent ships—a sort of ripple effect. It may cases it can take five to six boats to recover to plan from a late material impact.

The impact of reduced material availability is longer construction spans and increased programmatic costs for our customer, the Navy. The Shipbuilders currently have fourteen submarines in the backlog (4 Block III and 10 Block IV) which will be delivered over the next six years. These fourteen submarines will represent 25% of the current SSN fleet and are urgently needed to support Navy fleet commitments. Our Nation’s defense relies heavily on our timely delivery of high quality and effective submarines.
Material Availability Increases from 90% to 98%

By Jim Cassidy, Director of Subcontracts and Material Performance

In late 2015, Electric Boat had purchased material availability of 90% for VIRGINIA Class Block IV submarines. This performance meant that 1 in 10 trade work orders did not have all necessary material prior to scheduled start, resulting in either a delayed start or less efficient work execution. Since then, Electric Boat has been working with the supply base to improve purchased material availability, which is foundational to efficient submarine construction. Thanks to your continued efforts, we have collectively improved purchased material availability from 90% to 98% and have sustained 98% for the past four months.

This improvement effort has not been easy, as collectively we are building one of the most complex machines on the planet. It has required investment in people, tools, processes, and additional efforts from all of us. This performance improvement has enabled the continued success of the VIRGINIA Class submarine program. Delivering high quality VIRGINIA Class submarines on time proves to both the Navy and to Congress that we meet our commitments as a submarine industrial base and continues the strong support for submarine programs. As we move forward, we must continue to meet our commitments as the success of our submarine programs and, ultimately, the strength of our national defense depends on it. Thank you again for your continued support, hard work, and commitment to performance.
Supplier Quality All Hands Briefings

“Passionate” and “meaningful” are two words that are often used to describe the Supplier Quality All Hands Briefings. This new series that began late last year brings speakers from Electric Boat to our suppliers’ facilities to share personal experiences and messages centering around the importance of quality in shipbuilding.

Speakers include Vice President of Quality and Radiological Controls Ken Blomstedt, Vice President of Supply Chain, Material Conveyance and Strategic Sourcing Blair Decker, Director of Supplier Quality Jim Noonan, former crewmember of the USS Hartford Chris Yaris and wife of a retired Navy sailor Despina Metakos. Ken Blomstedt shares his unique experiences as an engineer on sea trials, when the submarine is tested under the harshest conditions. Chris Yaris captivates the audience while he describes a near-death experience on the USS Hartford and the welders whose commitment to quality saved his life. Despina Metakos shares the emotional perspective of what it’s like to be a family member of a sailor and the many sacrifices that accompany that responsibility. Finally, Jim Noonan recounts the tragic story of the USS Thresher to remind the audience all that could be lost in a single moment.

Thus far, this series has been presented to 18 of Electric Boat suppliers. At each briefing, employees come off machines and manufacturing is shut down for this hour-long presentation, displaying commitment from our suppliers to hear these messages. At the end of the presentation, the team presents a banner to the supplier and encourages each employee to sign. This banner hangs in many suppliers facilities to serve as a reminder of their commitment and the importance of first time quality.

Feedback from those that have received this presentation has been phenomenal and the team has a goal of reaching a total of fifty suppliers by the end of this year. The core content of the briefings is available in Electric Boat’s Supplier Quality Awareness video. Please visit the link located on the front page of this bulletin to view this video.
Tips for Schedule Adherence

1. Submit procedures (VIRs, VPARs, or Test Reports) in a timely manner.
2. Review all standard clauses in their entirety.
3. Be prepared to make changes to paperwork as needed.
4. If material requires an EB source inspector, take note of EBSI Request Deadline date to ensure enough time for on time delivery to contracted delivery date.
5. Notify buyer when item is ready for source inspection.
6. Ensure you are ready for source inspection: paperwork complete, material and personnel available at time of visit.
7. Be honest and upfront about any quality concerns.
8. Ask questions as soon as they arise to clear up any confusion.
9. The vendor promise date is the date you, the supplier, commits to have your parts at Electric Boat (including those that require source inspection). It should reflect date of expected material arrival at Electric Boat, and ideally should be no later than the original Contract Delivery Date.
10. Your lead time must take into account your estimated period of performance when considering completion of all pre-production efforts (i.e. long lead time material requirements, tooling, procedures, etc.) and other production schedule demands (i.e. work load, inspection, etc.). You commit to your contract delivery date at the time of quotation or purchase order award.
11. Plan work accordingly to understand your real period of performance, and perform.
12. Report schedule changes as early as possible.
13. Wherever possible, use the SPARs VPAC system for preparing shipping labels and packing list.

Source: http://www.gdeb.com/suppliers/4_future_suppliers/buyer_expectations.html
Proposal Adequacy

Adequate supplier proposals are critical to supporting Electric Boat and Navy shipbuilding schedules. Adequate proposals lead to reduced fact-finding questions, site visits, and negotiation timelines in support of earlier contract award. When information is not provided with the proposal, the reviewer will be required to extract more information, request field audit services, and perform additional analysis which delays negotiations and award. Currently, some supplier proposals are taking over one year to negotiate, due to inadequate information. This causes delays to scheduled work for our suppliers, Electric Boat and the Navy. Adequate supplier proposals directly supports continuous shipbuilding work for the U.S. submarine program.

Our Navy customer proposal requirements and review has evolved to focus on all cost elements including sub-tier costs. Proposals that meet the cost and pricing threshold (currently $750,000) per FAR 15-403-4 must adhere to Federal Acquisition Regulation (FAR) / Defense Federal Acquisition Regulation (DFARS) requirements.

On December 2, 2011, the Department of Defense (DoD) published in the Federal Register at 76 FR 75512 the requirement for a proposal adequacy checklist into DFARS 215.408, and an associated solicitation provision at 252.215-7009, to ensure offerors take responsibility for submitting thorough, accurate, and complete proposals. The rule was incorporated on March 28, 2013.

Part of the proposal process includes the audit and evaluation of supplier proposals. The expectations outlined below are intended to assist suppliers in preparation for this process. Additionally, proposal adequacy training is available upon request.

Audit/Evaluation Process Expectations

Shipbuilders are responsible to evaluate supplier proposals for single/sole source awarded purchase orders over $750,000. How is that done?

- Review of supporting data submitted with proposal
- Audit fieldwork at supplier’s facility (DCMA or Shipbuilder and their agent)

How to expedite the process?

- Provide supporting data with the proposal submittal
- Provide as much supporting data as possible in electronic format (Excel with formulas visible)
- Allow the shipbuilders to perform the audit of all cost elements
- Shipbuilders are willing to sign Non-Disclosure Agreement (NDA)
- Audit samples selected prior to audit fieldwork and ready at the beginning of the site visit
- If supporting data is sufficient, site fieldwork may not be necessary

Supplier proposals must provide meaningful responses to the following questions for each cost element:

- What is the estimate?
  - The estimate includes the proposed cost and the value associated with it

- What is the estimate based on?
  - Please include the basis of estimate, the source data and the history of actual cost incurred

- How is the estimate derived?
  - Show and describe the proposal calculations

- Why is it reasonable?
  - What conclusion would a prudent business person make given the data provided and why?

Source: Enclosure 6
Integrated Enterprise Plan (IEP)

Over the next 20 years, the nuclear shipbuilding industry will experience a volume of demand it has not seen for over 40 years, with three concurrent programs building fast attack submarines, ballistic missile submarines and aircraft carriers. During the 20-year period between 1977 and 1996, Electric Boat, Newport News Shipbuilding and the industrial base delivered almost 90 nuclear ships that included the OHIO, Los Angeles, Seawolf, VIRGINIA, CGN and CVN class programs. The industrial base population for the submarine programs during that time was in excess of 17,000 Suppliers between both Electric Boat and Newport News Shipbuilding. For Electric Boat, as concurrent programs were completing and industry began the low rate production of the late 1990s, the industrial base was reduced by ~70%. Since this transition, the dynamics of the industrial base have continued to change.

After the major contraction described above, approximately 5,500 suppliers remain to support submarine programs as first tier suppliers. Given the current size of the submarine industrial base, the pending increase in industry workload and existing budgetary pressure, it is imperative that the appropriate attention be given to the nuclear shipbuilding supply chain to ensure the Columbia (CLB), Virginia (VCS), and CVN programs are executed affordably and on schedule.

Electric Boat and Newport News Shipbuilding have established an Integrated Enterprise Plan to coordinate activities such as industrial base growth and stability, supplier risk assessments, and procurement activities to reduce cost and execution risk with on time delivery of material required for VCS, CLB and CVN shipbuilding programs.