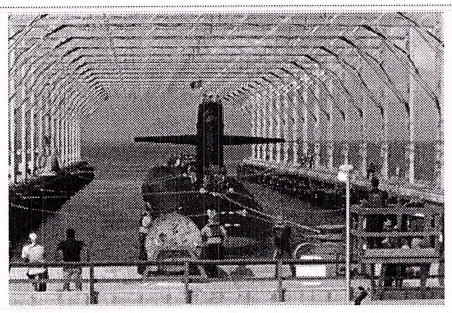


# A New SSBN Operating Cycle for Kings Bay

by CAPT Butch Hansen

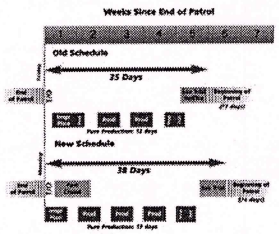
The Submarine Force has recently observed the 38th anniversary of the first submarine Strategic Deterrent Patrol, commenced by the USS George Washington (SSBN-598) in November 1960. In addition to initiating a new era in naval warfare, the ballistic missile submarine introduced an innovative and unique operating cycle that used two alternating crews to keep the ships at sea for over 70 percent of their operational life, while maintaining both material and crew readiness at the highest levels. The success of this "Blue/Gold" crewing concept over nearly 40 years speaks for itself, and until recently, the SSBN operating cycle has required little change despite new classes of ships, maintenance facilities, and homeports.

Currently, the SSBN force operates on a 112-day cycle that consists of a 77-day strategic deterrent patrol, followed by a 35-day refit period. Normally, the refit has begun with a 2-day period when the ship is "turned over" to the crew making the next patrol and ends with five days underway for combined sea trials and refresher training. Occasionally, maintenance facility limitations and real-world contingencies have caused some divergence from this "normal" sequence, but these changes have provided some unanticipated insights by showing that substantial training benefits could be gained by re-sequencing our operating cycle. This realization coincided with growing needs to improve our efficiency in refitting SSBNs between patrols. Now that Submarine Base Kings Bay, Georgia, for example, has its full complement of ten TRIDENT submarines, sheer numbers, aging hulls, required modernization, and manpower reductions at the TRIDENT Refit Facility (TRF) have posed real challenges. These factors have all come together to spark development of an improved SSBN patrol and refit cycle.

The workload associated with each SSBN refit consists of routine shore services to provide utilities, rigging, heavy lifting and industrial support, scheduled and corrective maintenance, and modernization projects. Scheduled maintenance includes incremental overhauls and the periodic "swap-out" of selected equipment onboard with shore-refurbished units to preclude taking the ship out of service for shipyard overhauls. Corrective maintenance is aimed at equipment that "broke" or shows signs of incipient problems. In addition, TRF conducts a substantial modernization program to keep the TRIDENT submarines current with new technology.

The average number of man-hours required for each refit has increased steadily over the life of an average Kings Bay SSBN (see graphic). Not unexpectedly, as the ships mature and modernization projects are approved, the maintenance investment and corresponding workload increases. This growth has had a direct impact on TRF's ability to meet their responsibilities, since the facility has only a finite capability to generate man-hours. Any work projected beyond the maximum production capability requires that work be deferred to future refits, and a significant accumulation of deferred maintenance might jeopardize the TRIDENT lifecycle maintenance plan.

Consequently, a working group with representatives from all of Kings Bay's major commands conducted an extensive review of the operating cycle. It was clear that sending the "off-crew" back to sea as soon as possible, i.e. before commencing the refit, had great potential for enhancing their training and maintaining operational proficiency. Revising the cycle, however, needed to accommodate the growing maintenance load and maintain TRF's efficiency without increasing production costs. Additionally, existing strategic and operational commitments would have to be met without an increase in reactor fuel expenditure that would shorten the TRIDENT submarine's projected lifetime. We believe that we have attained all of these goals in a revised SSBN operating cycle that will be fully implemented in the coming year.




*Pure Production: 17 days*

**Today's SSBN Operating Cycle**
The current 112-day operating cycle consists of a 77-day patrol that ends with a Friday arrival in Kings Bay, followed by a 35-day refit period that starts with a two-day weekend turnover and a 16-day TRF production period. Time for retest and dock trials, as well as a combined sea trial and refresher training period are set aside at the end of the refit timeline.

TRF's 16-day production period starts on a Monday, with the first four days spent mostly in arrival inspections, ship checking, and planning of major corrective maintenance. The 12 days of "pure production" that remain are meticulously managed to ensure that the work is de-conflicted and organized to minimize any need to tap into a very limited overtime budget. The "off-crew" assists the "on-crew" in the execution of the refit for approximately 14 days prior to the new deployment, when they get two weeks of stand-down before beginning the off-crew training cycle.

**The New SSBN Operating Cycle**
The new cycle provides for better training by providing continuity between shore and at-sea refresher training, and also improves the effectiveness of the refit. These objectives are accomplished while maintaining the same number of days the ship is underway during the operating cycle. The accompanying timeline compares the new approach with the customary refit cycle. In the revised cycle, the ship arrives in port on a Monday after a 74-day deterrent patrol. Instead of commencing the refit immediately, crew turnover occurs at the same time as TRF's refit arrival inspections and ship checks. After turnover, the oncoming crew conducts a fast cruise and refresher training. By the time the ship returns on Monday, TRF has planned all the jobs identified by the ship checks and arrival inspections, with material procured and technical teams ready to commence work. From their at-sea period, the relieving crew gains first-hand knowledge of the ship's material condition, while the new off-crew, after several days stand-down, is also ready to get to work supporting the refit.

Comparing the two operating cycles reveals several key differences:

- The fast cruise-refresher training is separate from the sea trials, even though the total number of days underway remains the same at 82. This allows the crew to give undivided attention to training.
- The inspection and planning period overlaps the crew turnover, and the fast cruise allows additional preparation time before commencing actual refit production. This improves overall efficiency and minimizes conflicts.
- The number of "pure production" days is increased from 12 to 17.
- The number of days with two crews available to support the refit production period is increased from 14 to 19 days, by giving the new "off-crew" time off during the fast cruise rather than during pure production time.

In addition to these advantages, inspections, planning, and missile change-outs at the Explosives Handling Wharf have been

The biggest advantage of the revised SSBN operating cycle appears in improved continuity of crew training. By conducting refresher training prior to the start of the refit rather than at the end, the time elapsed since the ashore crew last operated the ship underway is reduced by a full month. Conducting refresher training separate from the sea trials greatly enhances the former by enabling the crew to concentrate on proficiency, qualifications, and teamwork rather than sharing their time and effort with required equipment re-tests following refit. Additionally, the crew is able to apply their off-crew training immediately to shipboard watchstanding and regain a sense of ownership for the ship. The benefit to operational readiness is apparent.

Because refresher training under the new scheme takes place with empty missile tubes, there are also excellent opportunities to conduct underway missile and launcher casualty training, as well as additional time to prepare the tubes for preservation and pre-Extended Refit Period procedures.

The new operating cycle has been validated using four trial refits of varying complexity, including a dry-docking and a Mini-DASO (Demonstration and Shakedown Operations). All four trial cases provided data which strongly supports TRF's expectation of increased effectiveness. There were significant gains in the number of jobs planned, a decrease in jobs deferred, and less unanticipated additional work required during the refits. While TRF was normally ready to start work on only 65-70 percent of jobs identified using the standard timeline, they exceeded 90 percent in all of the trial refits, while deferred work was reduced by at least 10 percent in each case. Unplanned job growth in the modified refits averaged 4-5 percent, about half the earlier average.

The Commanding Officers of ships refitted under the revised operating cycle have had high praise for the new schedule as well. All stated that conducting refresher training prior to refit was extremely beneficial for preparing both the crew and the refit. It also provided an excellent opportunity to bring new crew members onboard and allow them to pursue watch qualifications much earlier in the operational cycle. The bottom line is that all objectives for improving training continuity and the effectiveness of TRF were achieved.

Beginning in January 2000, the "normal" SSBN operating cycle will adopt the revised scheduling approach and in particular, the early refresher training periods. The existing SSBN operating cycle has worked well for many years, and these changes were not undertaken to "fix" a broken or obsolete system. With the changing conditions of strategic deterrence in the new millennium, however, our challenge has been to take a well-established and successful program and make it even better. I think we've succeeded.

*CAPT Hansen is Commander, Submarine Squadron Twenty, at Naval Submarine Base Kings Bay. Honoring the "Forty-One for Freedom" at Deterrent Park by CDR Angus McColl, USN, COMSUBGRU 9 Staff*