DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
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IN REPLY TO

NAVSEAINST 4790.23A
Ser 04X/125
23 JUL 2004

NAVSEA INSTRUCTION 4790.23A

From: Commander, Naval Sea Systems Command

Subj: BASELINE PROJECT MANAGEMENT PLAN (BPMP) FOR SSN688 CLASS DMP,ERO,AND EOH AVAILABILITIES

Ref: (a) Joint COMNAVSEA, COMSUBLANT, COMSUBPAC ltr 4790 Ser 04X2/029 of, 4 Jul 99
(b) NAVSEAINST 4790.23 Ser 04X2/251 of 23 Aug 2002

Encl: (1) Baseline Project Management Plan (BPMP) for Improved Planning and Execution of SSN688 Class Depot Modernization Period (DMP), Engineered Refueling Overhaul (ERO), and Engineered Overhaul (EOH) Availabilities, Revision B

1. Purpose. To promulgate enclosure (1), revised Baseline Project Management Plan (BPMP) requirements for planning major SSN688 Class depot availabilities implemented by reference (a). BPMP revision B contains significant changes that have been approved by the five stakeholders including revision of the Planning Timeline for Major Depot Availabilities.

2. Cancellation. NAVSEAINST 4790.23 of 23 August 2002.

3. Background. Reference (a) was a joint letter signed by the Five Submarine Maintenance Stakeholders that forwarded the BPMP for Improved Planning and Execution of SSN688 Class Depot Modernization Period and Engineered Refueling Overhaul Availabilities. The principles discussed in reference (a) remain in force. The original BPMP has been used in the planning and execution of FY 01 and later SSN 688 Class Depot Modernization Periods (DMPs) and Engineered Refueling Overhauls (EROs). Reference (b) issued BPMP Rev A as NAVSEA Instruction 4790.23 revision A.

4. Discussion

a. Implementation of the processes in references (a) and (b) has been instrumental in the execution of several major availabilities within schedule. Lessons learned from the

planning and execution of recent availabilities have been integrated into enclosure (1).

b. The BPMP provides minimum requirements for planning major submarine depot availabilities. Senior leaders from each key stakeholder are responsible for the implementation, institutionalization, and execution of the enclosure (1) BPMP requirements within their respective organizations in accordance with local technical documentation implementation processes.

c. Continuous communication is key to success in this effort. To this end, forums for regular exchange of information have been implemented. Additionally, annual meetings are being held to review lessons learned, identify best practices and necessary changes to the BPMP.

d. Changes and revisions to the BPMP will be staffed with stakeholders by SUBMEPP in accordance with Appendix K of enclosure (1) under the guidance of NAVSEA 04XO. NAVSEA 04XO is responsible for the administrative requirements of the BPMP.

5. Action. Naval Shipyards shall implement enclosure (1).

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Assistant Deputy Commander for
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Baseline Project Management Plan

for SSN 688 Class Depot Modernization Period, Engineered Refueling Overhaul and Engineering Overhaul Availability Improved Planning and Execution

Revision B

REVISION RECORD

REVISION	DESCRIPTION	DATE
Original	Original revision of the Baseline Project Management Plan (BPMP) issued for implementation in FY 00 and later SSN 688 Class Depot Modernization Periods and Engineered Refueling Overhauls. The BPMP provides minimum requirements for planning these availabilities. Each project team is to develop and implement a project specific Project Management Plan using the BPMP as the baseline requirements.	4 July 1999
A	First revision of the BPMP issued to update as a result of the approval of BPMP change requests 1, 2, 3, 4, 5, 6, 11, 12, 15, 16, 17, 19, and 20. All other change requests through change 23 were disapproved or withdrawn. At stakeholders request at VTC held in December 01, the reference to Work Permit (WP) was changed to Work Authorized Form (WAF). Due to the extent of the revision, changes are not marked.	
B	Second revision of the BPMP issued to update as a result of the approval of BPMP change requests 26, 27, 28, 32, 33, 34, and 36. Changes 24, 30, 31 and 35 were modified and rolled into Change 36. Changes 33 and 36 were actions as a result of the BPMP Reengineering Knowledge Sharing Network (KSN) of 03 April 2003. Change 33 modified the BPMP Planning Timeline and Change 36 modified Section 4.5. Change 1 Strategy were approved at the annual review meeting with Stakeholders 5 November 2003. Due to the extent of the revision, changes are not marked.	Dec 2003

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Foreword

Naval Shipyards are faced with a significant increase in submarine workload from FY 98 through FY 05. This increase comes just as the number of SSNs drops to 50. More than ever, the Type Commanders will rely on these ships being returned to the fleet on schedule, within budget, and in a high standard of material readiness. Without question, our performance in executing these SSN 688 Class Depot Modernization Periods (DMPs), Engineered Refueling Overhauls (EROs) and Engineering Overhauls (EOHs) will have far reaching ramifications in ensuring fleet readiness. In support of this task, the SSN 688 Class Availability Planning Review Team was chartered with membership from NAVSEA, SUBLANT, SUBPAC, Naval Shipyards, SUBMEPP, and SHAPEC.

The foundation for successful project execution is the planning process. Availability planning is the collection of all activities conducted prior to the start of an Availability and up to the start of execution, for the purpose of attaining desired quality during execution, for improving schedule adherence during execution, and for reducing the total life-cycle costs of an Availability. Almost without exception, one of the primary causes of poor Availability execution is that projects are poorly planned and are not ready to efficiently execute their work at availability start. This Baseline Project Management Plan (BPMP), based on the best and most current SSN 688 DMP, ERO and EOH experience, guides a thoughtful, comprehensive, and disciplined process for planning and serves as a vehicle to communicate the overall project objectives and direction to the entire shipyard. A guiding principle in this initiative is that minimizing planning costs does not necessarily minimize total life-cycle costs of an Availability. Maximizing the effectiveness of the resources invested in implementing the key elements of planning is a major factor in minimizing the total life-cycle costs of an Availability. For this reason, the SSN 688 Class Availability Planning Review Team charter focused on improving the effectiveness of planning as an element of total life-cycle costs; this includes both nuclear and non-nuclear and all stakeholders with a vested interest in the FY 00 and later SSN 688 Class DMPs, EROs and EOHs.

1. Project Overview

This Baseline Project Management Plan (BPMP) is the product of a cross-functional team effort completed by members representing all key stakeholders with a vested interest in the FY 00 and later SSN 688 Class DMPs, EROs and EOHs. Although some new ideas and approaches are introduced, the BPMP is primarily a compilation of best practices that have evolved through experience. The BPMP presents a disciplined and methodical approach to implementing these best practices. Significant points that distinguish this BPMP from current practices include:

- The approach starts with the end in mind and works backwards. Through a disciplined and methodical approach early in planning, the project defines where they are, where they want to be at Availability start, and how they will get there. No constraints are levied on the project laying out this "plan for planning." Only after the plan for planning is developed and presented to shipyard management will decisions to accept and accommodate/mitigate constraints on the plan be made. The aim of this approach is to more proactively control the planning phase of an Availability.
- The approach produces a resource-leveled schedule by A-2 months. This allows the project team to focus their attention on transitioning from planning and into execution during the A-2 to A-0 period.
- Key work definition milestones (e.g. initial issuance of the approved work package, conduct of the pre-arrival technical assessment, conduct of the Initial Planning Meeting, early identification of K-Alterations, etc.) will be scheduled and completed in a more timely manner to support approval of all job summaries and CU phases by A-4 months. Additionally, the effort targets identification of all known work (excluding new work) by approximately A-8 months.
- The approach implements a fast start strategy that is aimed at rapidly increasing production progress early in the Availability. The purpose of this strategy is to minimize the barriers that keep job sites from opening during the first 60 days of the Availability. Fundamentally, this fast start strategy is aimed at building momentum early to ensure 85% of production progress is attained by the scheduled undocking date.
- The approach focuses on developing over 25 execution strategies that form the substance of the planning phase. These execution strategies are each formally developed and presented to management. These strategies feed the strategic ties and network in the resource-leveled schedule.
- The approach implements a more deliberate and disciplined approach to conducting risk assessment and implementing lessons learned.

- The approach aims to increase management participation in the planning process to ensure the project's plan is the Shipyard's plan.
- The approach recognizes and supports a team effort to plan availabilities, including Type Commanders, ship's force, SHAPEC, SUBMEPP, executing shipyards, and NAVSEA.

2. Planning Overview

2.1 Applicability

The BPMP applies to all work (nuclear and non-nuclear) except for refueling, which is excluded. The BPMP is intended to implement best practices for key elements of planning and execution for SSN 688 Class DMPs, EROs and EOHs. The BPMP outlines the expectations of the project team during the pre-availability period. The BPMP progresses through an overview of the phases of planning, building the project team, development of project execution strategies, development of a resource leveled schedule and finally the internal control price. The BPMP provides requirements for project teams to implement during planning.

2.1.1 Deviations from BPMP Requirements

Where the BPMP does not specifically give exceptions a deviation is required when the BPMP requirements cannot be met. Deviations should be minimized and require approval above the project team level. Deviations to the requirements of the BPMP will be administratively treated as minor and major deviations consistent with other technical requirements. BPMP requirements that, because of their importance, would require NAVSEA approval shall be processed as major deviations. Major deviations are defined in Figure 2.1-1. Deviation to requirements other than those listed in Figure 2.1-1 shall be considered minor and are locally waiverable by senior Shipyard management (i.e., department head or above) with adequate justification and notification to stakeholders (e.g., NAVSEA 04, 08, PMS 393, SUBLANT, and/or SUBPAC through the NAVSEA bi-weekly project phone call, plan for planning, or readiness-to-start brief). Deviations to local BPMP implementing instructions and processes are to be formally processed per internal Shipyard processes. A list of all local and NAVSEA approved deviations shall be maintained for each project.

2.1.2 Major Deviations from BPMP Requirements

The BPMP requirements that, because of their importance, require NAVSEA approval are Major Deviations and are listed in Figure 2.1-1.

Figure 2.1-1 BPMP Key Events Requiring NAVSEA Approval of Deviations

PLANNING EVENT DESCRIPTION (Action Required)	ACTION REQUIRED BY BPMP SECTION	RESPONSIBLE ACTIVITY/CODE	COMPLETE ACTION BY
Stand Up Initial Project Team See Note 1	3.3.1	Executing Activity	A-15
Plan for Planning	3.2	Project Team	A-12
Resource Leveled Schedule See Note 2	4.4.1-4.4.3	Project Team	A-2
Readiness to Start Brief to Management	4.2	Project Team	A-2

Note 1: Business and Strategic Planning Office representative, Project Superintendent, Project Engineering and Planning Manager.

Note 2: It is noted the Fast Start Criteria of BPMP section 4.5.4.3 are incorporated into the Resource Leveled Schedule.

A formal Deviation requesting concurrence and approval from NAVSEA will be processed when one of the above event(s) item listed will be more than one month late from the required completion date or will be called complete without meeting all of the requirements of the referenced section of the BPMP

The request will identify:

- The cause of the delay.
- The Risk/Impact to other Executive Level Project Planning Timetable items.
- The Mitigation/Recovery action plan.

2.2 Phases of Planning

Availability Planning is defined as the collection of all activities conducted prior to the start of an Availability and up to the start of execution for the purpose of attaining desired quality during execution, for improving schedule adherence during execution, and for reducing the total life cycle costs of an Availability.

The planning effort begins at approximately A-21 months with the receipt of the initial approved Availability Work Package (AWP) and appropriate funding in place at the executing shipyard and Ship Availability Planning and Engineering Center (SHAPEC). Planning and job summary development commences. Historically, approximately 70% of the total work package is identified in the first issue of the AWP. The remainder of the work package is defined at various stages of the pre-availability period. Details of the work authorization process are discussed in Section 4.5.4.2. Upon receipt of the AWP and funding, the Business and Strategic Planning Office establishes the project in AIM and authorizes SWLINs by A-20.

From approximately A-15 to A-12 months, the Project begins to form as outlined in Section 3.3 and develops the "plan for planning". Details for building the plan are discussed in Section 3.0. This phase culminates with a presentation of the "plan for planning" to shipyard management.

From approximately A-12 to A-4 months, integrated execution strategies are developed per Section 4.0. Additional members are added to the project team to review job summaries, establish strategic ties, develop integrated strategies for managing key jobs, contract shop work, resources, special tooling and facilities, and risk assessments and mitigation. The test and inspection period and the pre-availability technical assessment are scheduled during this time period to assess the material condition of the ship in preparation for the Availability.

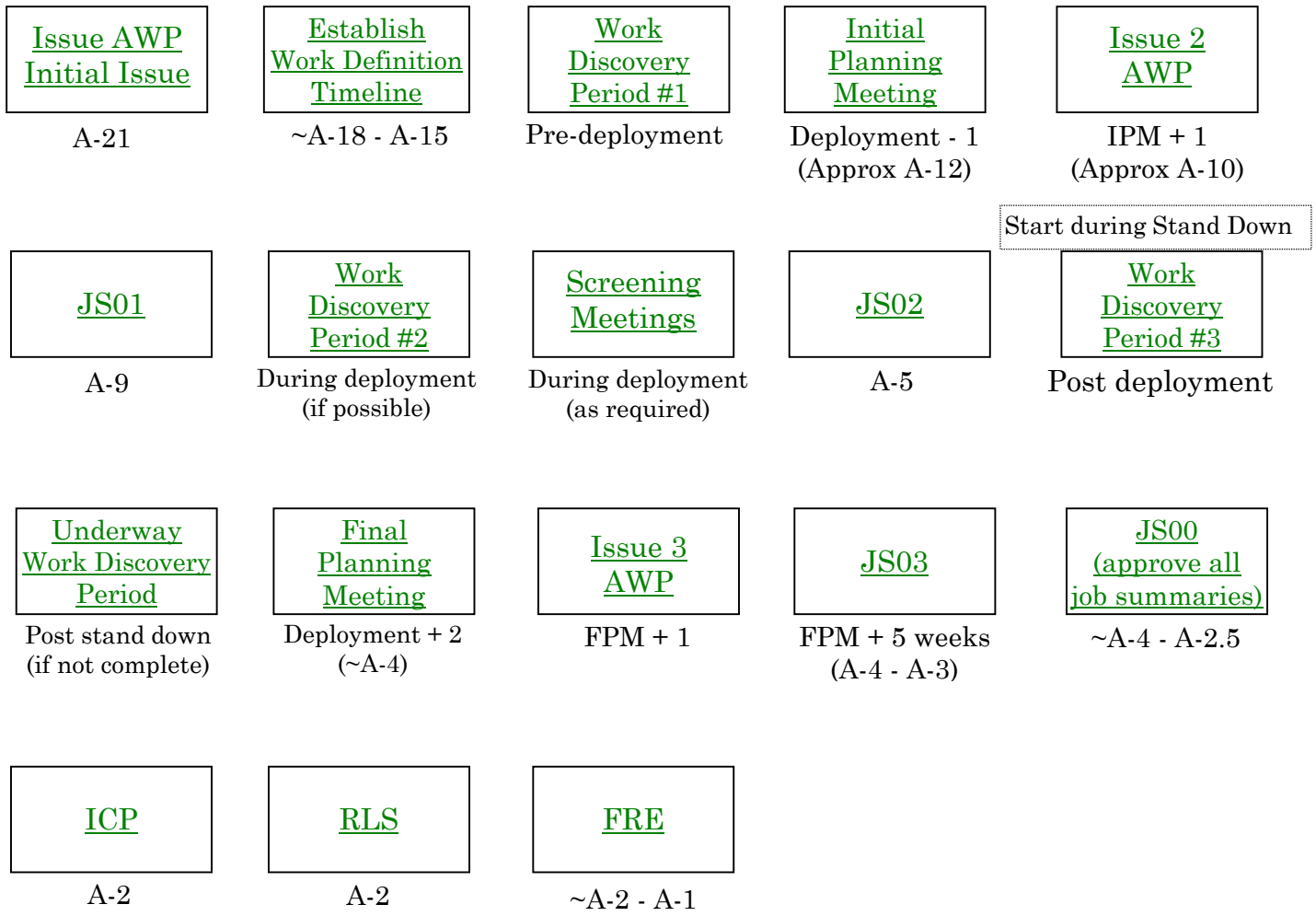
Final development of the resource leveled schedule is the primary focus during the A-4 to A-2 period. The team continues studying work assignments, reviewing TGIs, refining resource and manning projections, scrubbing the schedule to balance work, people, job sites, material management, prefabrication, and system turnovers. They are actively involved in ensuring facilities; special tools and material have been accounted for and fine tuning contingency plans. This phase of planning culminates with a readiness brief to NAVSEA, TYCOM and senior shipyard managers. The brief shall concentrate on a review of the elements of the fast start strategy, resource requirements, commitments and a review of the checklist provided within Section 4.4.2, Resource Leveled Schedule Process.

During the A-2 to A-0 period, the project team transitions from planning to execution, focusing on preparations to successfully execute the fast start strategy. This is the period when the Availability execution plan is communicated to first line supervisors.

2.3 Integrated Timeline for Planning

Figures 2.3-1, 2.3-2, and 2.3-3 provide integrated timelines for the key elements of Availability planning. These timelines show notional planning times. Various execution strategies presented in Section 4.5 convert these notional planning timelines into project specific timelines.

Figure 2.3-1 Work Definition and Integration



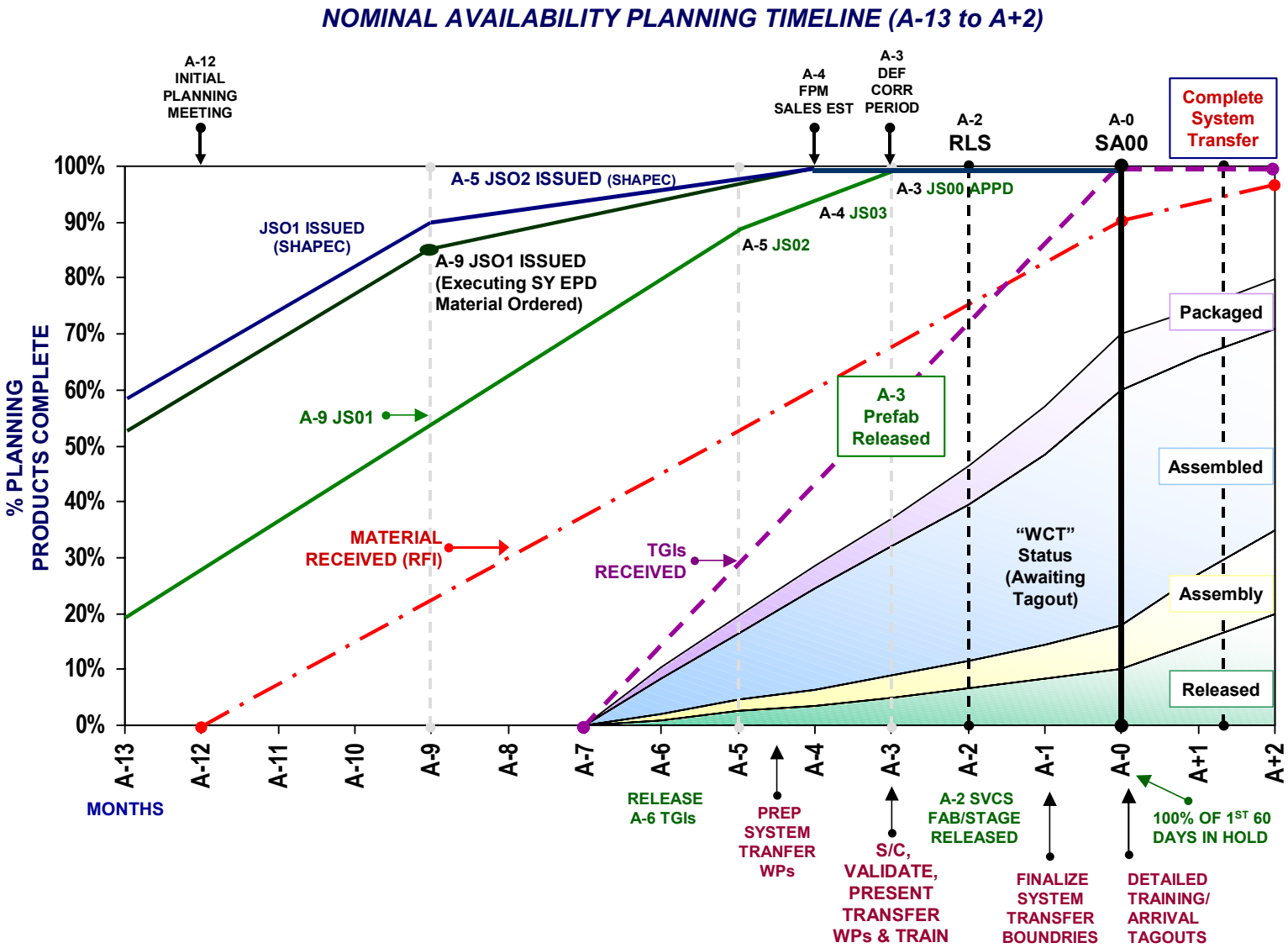


Figure 2.3-2 Nominal Availability Planning Timeline (Part I)

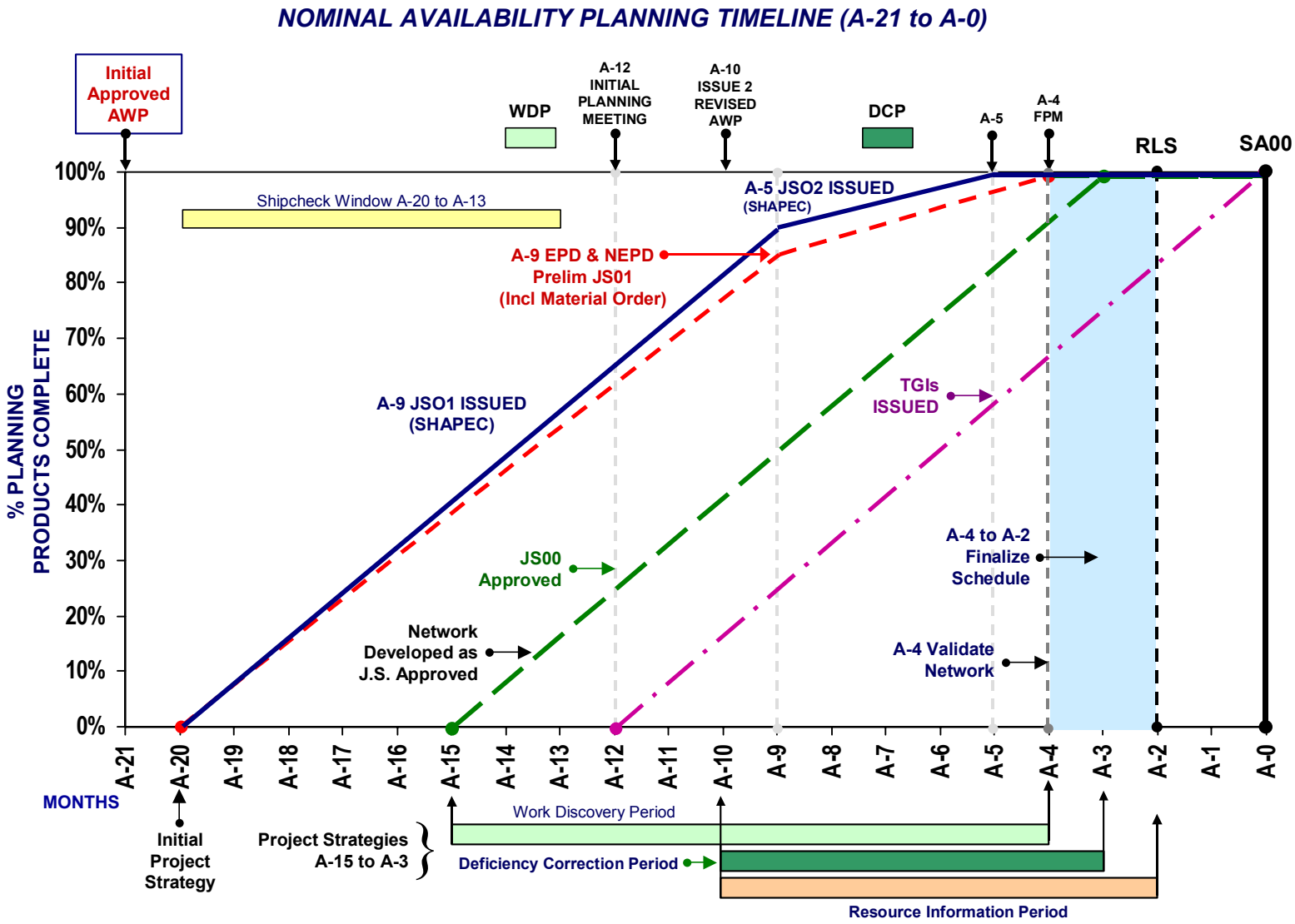


Figure 2.3-3 Nominal Availability Planning Timeline (Part II)

2.4 Glossary of Key Planning Terms

Approved Job Summary - Describes job summaries which have been reviewed by the project, comments incorporated, material ordered and identified to the correct end-use CU Phase, and final approved (bought into) by the project team including technical sequencing. All CU Phases within an approved job summary are in approved status that supports the "packaging" process.

Assembly - The activity that takes a Task Package created under the "packaging" concept defined above and verifies that the TGIs for the Component Unit (CU) Phases in the Task Package are received and all other prerequisites are on track for completion in support of Task Package release.

"Awaiting Material" (MAT) Status - Indicates all conditions (i.e., technical instructions, work control, references, etc.) have been met to release the Task Package with the exception of all material being RFI. (NSSG action is required to add this status to database.)

"Awaiting Work Control/Tagout" (WCT) Status - Indicates all conditions (i.e., technical instructions, material, references, etc.) have been met to release the Task Package with the exception of work control authorization. (NSSG action is required to add this status to database.)

> *Note: The two (2) additional statuses of MAT and WCT listed above have been requested in the WPC module to status TGIs with material and work control deficiencies respectfully. During the interim, "Hold" may be utilized to indicate TGIs awaiting work control conditions to be met.*

"Assembled" (ASY) Status - Indicates all conditions have been met and the package can be released as the Resource Leveled Schedule (RLS) dictates.

Availabiltiy Start Date - CNO scheduled Availability start date.

Early Start Date - Point at which the operational schedule permits work to start (installation of services, processing tag-outs/Work Authorization Form (WAF), starting production work, etc.)

Issued Job Summary - Describes a job summary that is provided to the project team for review with all references identified, material identified with a complete description of work to be accomplished.

Known Work – Describes all work identified in the Baseline Availability Work Package. Includes all work and deficiencies identified during the pre-availability test and inspection period and screened to the Shipyard at the Initial Planning Meeting resulting in AWP Issue 2.

Management Information Center (MIC) - The MIC is manned by Ship's Force personnel approximately two (2) weeks prior to ship arrival and serves as the central point of contact between the ship and shipyard for all work related issues. The MIC is intended to be an instrument to expedite information exchange, the status of maintenance and the processing of Work Authorization Forms (WAF) during the Availability.

Packaging - The activities involved with determining how to group CU Phases within a Task Package utilizing the project specific Task Packaging Strategy and the Resource Leveled Schedule. This is primarily accomplished by electronically assigning approved CU Phases within the AIM database to a specific Task Package and can be accomplished prior to actual TGI receipt.

"Packaged" (Pkg) Status - Indicates the previously approved CU Phase has been electronically assigned to a Task Package consisting of one or more CU Phases.

Prefabrication - Prefabrication is defined as all fabrication work associated with a component or component assembly. This work shall be identified in a prefabricate/fabrication (F) phase. This phase is accomplished in preparation for shipboard work and is typically worked prior to ship arrival, but is not limited to the pre-arrival time frame.

Received TGI - Describes a TGI which is complete (including all concurrence) from a preparation standpoint and can be electronically received by WPC or hard copy provided to WPC to support the assembly process described above.

Release - The activity that takes an assembled package, re-verifies the completion of all conditions for the execution of the package arranges actual material kit delivery and releases it to the executing Zone Manager based on the scheduled start date.

"Released" (REL) Status - Indicates a CU Phase is part of a Task Package for which all conditions have been met and is released to execution to commence work.

> *Note: CU Phase will remain in "Released" status until the first labor charge is made at which time the status within the database will automatically be updated to "Working" status.*

Short Form TGI - The work instruction issued to production personnel as part of the Task Package when instructions contained within the CU Phase description are sufficient to describe the work (i.e., invoke ship alteration plans, lagging removal/reinstallation, etc.)

Submarine Shipyard Availability Manual (SSAM) – This submarine Type Commander manual provides direction to Ship's Force in preparing for and participating in depot level availabilities. This document contains relevant policy and procedures, key event checklists, and lessons learned.

System Transfer Process - System Transfer consists of two (2) parts: System Turnover and System Turnback. System Turnover (sometimes referred to as System Take-Down) is defined as the process of depressurizing, draining, de-energizing, tagging out, and transferring operational and tag-out control of a system to the shipyard to facilitate authorized work and testing. System Turnback is the process of verifying work and testing is complete to the extent necessary to return system tag-out and operational control back to Ship's Force sufficiently in advance of Key Events. A System Transfer Work Authorization Form (WAF) is used to identify the boundaries and affect this process. There are approximately 60 standard System Take-Downs executed on a major SSN 688 Class Availability.

Task Group Instruction (TGI) - The work instruction issued to production personnel as part of the task package when more detailed instructions are required for complex repairs, data recording or for other work requiring expanded technical instructions.

Technical Information Center (TIC) - A reference system and area established by the Work Packaging and Control (WPC) manager that provides hard copies and/or electronic access/printing capability of drawings, technical manuals, standards, etc. The TIC will be equipped with the required hardware, software, and computer hook-ups needed to access the different drawing and technical manual databases.

Technical Work Document (TWD) - A document prepared/approved by appropriate technical authority. TWDs include TGIs, Short Forms, associated Discrepancy Logs (DLs) and Deficiency Reports (DRs).

TWD Record Sheet (Non-nuclear) (A-SHEET) - Accompanies the Work Authorization Form (WAF) and is used to list all TWDs covered by that WP and its associated tag-out and the status thereof.

Work Control Group (WCG) - The organization in the shipyard that acts as the liaison concerning system status and tag-out, between the shipyard and ship's force to effect the proposal of system status/tag-outs.

Work Authorization Form (WAF) - A form used to affect system tagout, obtain required concurrences and authorize work to commence as specified in the applicable TWD. (Equivalent to the Ship's Force Work Authorization Form (WAF).

3. Developing the Plan for Planning

3.1 Introduction

This section describes how the effects of a newly formed project or planning team should be directed during the initial stages of planning. During the completion of this section, the project's plan (or blueprint) for planning will be developed. The physical products that comprise this plan are listed in Section 3.2.

At the completion of the tasks outlined in Section 3, the project has firmly established the standards and expectations for the condition of planning at Availability start, has clearly defined a credible plan to achieve the expectations, and has developed and received a commitment for a project staffing plan. At this time, the project is gaining momentum and the assigned project team members direct their focus on developing the integrated execution plan (Section 4).

3.1.1 Requirements to Start Planning

A significant sustained planning effort for a major SSN 688 Class Availability cannot start until the following prerequisites have been satisfied.

- Funding for SHAPEC and the Executing Activity (including the Engineering and Planning Department and the Nuclear Engineering and Planning Department) has been received.
- SHAPEC and the Executing Activity have received the Initial Approved Work Package (Issue 1). In unusual situations, and by joint agreement between the involved parties, the applicable Fiscal Year Baseline Work Package may be used to start initial planning.
- The Project has been established financially by the Executing Activity Business Office and in AIM.

The Planning Key Event START PROJECT PLANNING (PS00) may be declared complete when any one of the three major engineering organizations begins a sustained significant effort.

3.1.2 Readiness to Start Planning Brief

Upon establishment of the prerequisites to start planning, the Executing Activity will coordinate a briefing. The intent of this briefing is to formally establish that the supporting actions to allow successful Project planning have been completed. The briefing will be conducted at the Executing Activity at approximately A-20 months.

Although not specifically presenting information at the briefing, the Parent Squadron and cognizant Fleet and Technical Support Center should be represented at the briefing. Specific Project issues and concerns the Executing Activity wishes to address should be communicated prior to the briefing to all preparation of responses for the briefing. The briefing will include the following elements:

- Type Commander and NAVSEA representatives will present funding arrangements established for the Project. This will include a discussion of funds currently provided, as well as a discussion and commitment to provide future funding per a defined profile (with quantity and dates that funding will be provided).
- SUBMEPP will discuss any known or outstanding issues with the AWP and the Work Package Supplement. This discussion should include planned Alterations for the Availability.
- The Executing Activity Business Office will present an overview of the Project which will include a discussion of the establishment of the Project financially and in AIM.
- The Executing Activity will confirm arrangements made to support the initial Project Planning, including designation of Project staff until the format stand-up of the Project Team at A-15.
- SHAPEC will discuss the readiness of SHAPEC to start planning. This will include a confirmation of available resources and funding. Outstanding planning issues, including a required Memorandum of Agreement between the Executing Activity and SHAPEC will be identified. A notional issue curve for JS01 Job Summaries will be provided.
- The Type Commander will discuss the ability of the Ship to support Planning Events including Shipcheck, the Test and Inspection Period, and the Initial Planning Meeting based on the known Ship's Operating Schedule. Any conflicts between the Schedule and the Nominal Planning Timeline of Figure 2.3-2 shall be identified and resolutions discussed.

Upon completion of the briefing, agreement shall be reached that the necessary actions to support Project planning have been completed, and the Planning Key Event START PROJECT PLANNING (PS00) shall be reported complete.

3.2 Products

The following physical products are developed in Section 3 and are collectively referred to as the plan for planning:

- Integrated project team training plan (Section 3.3)
- Time phased resource plan for planning (Section 3.5)
- Executive level project planning timetable (Section 3.6)
- Initial issuance of the project management plan (Section 3.7)
- Written plan for identifying and developing execution strategies (Section 4.5.4.1)
- Work integration strategy that identifies major work identification events (Section 4.5.4.6)
- Project specific fast start strategy (Section 4.5.4.2)
- Project specific schedule for issuing software products (Section 4.5.6.2)

These products will be presented to shipyard management as part of a plan for planning briefing at approximately A-12. The remainder of this section describes how to approach the development of these products. The details are found in the specific sections listed for each product. Upon approval of the plan for planning by shipyard senior management and applicable supporting activities (e.g. SHAPEC), the plan shall be forwarded to SEA 04, SEA 08, PMS 392, SUBMEPP, SHAPEC, and the applicable type commanders for information (at approximately A-12). Where specific requirements of this BPMP will not be implemented the shipyard shall identify these deviations to NAVSEA and the type commander using the deviation process outlined in section 2.1.

3.3 Integrated Project Team Staffing and Development

3.3.1 Integrated Project Team

3.3.1.1 Initial Project Team

As a minimum, the initial project team shall consist of the members listed below. Some members may only be part time during the early phases of planning, but should be available to support the project as needed. The approximate time period for bringing these personnel onboard the project full-time are listed within the parentheses:

Shipyard Members:

- Business and Strategic Planning Office (BSPO) representative(s) (A-20)
- Project Superintendent (PS) (A-15)
- Project Engineering and Planning Manager(s) (PEPM) (A-15)
- Project Lead Scheduler (A-14)
- Project Engineers (PE) (A-12)
- Nuclear & Non Nuclear Assistant Project Superintendents (APS) (A-12)
- Chief Test Engineers (CTE) (A-12)
- Project Quality Engineer (PQE) (A-12 to A-6)

After the initial project team is identified, the planning process commences by reviewing the initial approved AWP. The initial project team can start evaluating the scope of work to be performed and begin developing various strategies, to include financial, management, and execution. The initial project team should also establish dialog with the customers. The PEPM will coordinate the various planning and engineering organizations to begin ship checks, develop drawings and prepare job summaries.

3.3.1.2 Ship's Force Initial Project Team Member

- Ship's Force DMP/ERO/EOH Coordinator (A-10)

The ship's force member of the integrated project team is the DMP/ERO/EOH Coordinator. The DMP/ERO/EOH Coordinator will be an experienced, nuclear-trained Limited Duty Officer (LDO) assigned to the ship as part of the crew augment for the Availability. Although detailing may affect the timing of his assignment, he will normally be assigned to report to the ship as early as possible during the test and inspection period (approximately A-10). He will undergo training in shipyard processes and procedures, BPMP tools, and lessons learned. At the discretion of the Type Commander Shipyard Representative, this training will be tailored to the knowledge and experience level of the officer assigned. To ensure he develops strong working relationships with project team members and is functionally part of the team, a portion of this training will include attendance at Project Management College and working with the project team while assigned to the Type Commander Shipyard Representative at the shipyard prior to his reporting to the ship. Guidance and requirements for this training is contained in Appendix M.

Overall, the DMP/ERO/EOH Coordinator is responsible for the coordinating the integration and execution of ship's force responsibilities during the Availability planning and execution. Some of his specific responsibilities are:

- Represent the ship's Commanding Officer as the primary liaison between Ship's Force and the Project Team; maintaining a constant liaison between the ship and shipyard.
- Coordinate ship's force preparations for the initial planning meeting, the work negotiation meeting and the arrival conference.
- Assist in the coordination of the pre-availability test and inspection period.

- Ensure the ship's requirements for the Availability are conveyed to the Type Commander for funding, and incorporated into the work package.
- Coordinate the integration of all ship's force work into the project schedule.
- Educate/train ship's force on Availability Work Package (AWP) requirements, shipyard processes to be used during the Availability, and BPMP tools and requirements. (This responsibility does not circumvent the requirements placed on the shipyard to train ship's force, but the DMP/ERO/EOH Coordinator will coordinate and complement the training provided by the shipyard).
- Act as a liaison with involved forces afloat activities (e.g., IMAs) during the planning phase to ensure integration of the entire work package and screening of work to the appropriate activities.
- Act as the ship's force representative (or alternate) to the Hull, Propulsion and Auxiliary (HP&A) Joint Test Group and to the Ship Safety Council.
- Coordinate ship's force support in the execution of key events and milestones.

To support these responsibilities, the DMP/ERO/EOH Coordinator should spend a significant portion of his time working with the Project Team prior to and during the Availability. Prior to the Availability start, this may include remaining ashore while the ship is at-sea. Also, although he must stand watch to complete submarine warfare qualification, in order to prevent conflict with his Availability responsibilities, he should not normally be assigned watchstanding duties. The duties and requirements listed above for the DMP/ERO/EOH Coordinator are not all inclusive, and additional duties and requirements may be found in the SSORM Article 1204, JFMM Volume II Section 3.5.1.2, and JFMM Volume V Section 1.5.7.

3.3.1.3 Additional Members of the Project Team

The scope of the work package will impact the design of the remaining project team organization. Once the job summary approval process begins, the project team needs to be expanded to include:

- Zone Managers (ZM) (A-15 to A-2) (Portsmouth and Pearl Harbor have found it prudent to have at least 3 nuclear and 7 non-nuclear zone managers plus backshift personnel as needed to support workload)
- Schedulers (A-13 to A-3)
- Work Packagers (A-7 to A-2)
- Production Supervisors (A-3)

A Project Quality Engineer (PQE) shall be established for each project during the planning phase. The PQE may be assigned at A-12 to provide a strong focus on pre-availability planning, including the development of project execution strategies. Additional personnel are added to the team, as necessary, to support reviewing job summaries, scheduling work, establishing priorities for prefabrication, and refining strategies.

In addition to the typical project team staffing, strong consideration shall be given to including a Deputy Project Superintendent (DPS), and Assistant Project Superintendent Propulsion (APSP).

The Deputy shall be assigned to support the development of the project execution strategies, but need not be assigned to support the development of the plan for planning. At a minimum, the APSP shall be assigned from several months prior to undocking through completion of the integrated propulsion plant test program (IPPTP). This assignment will allow the APS non-nuclear to focus on undocking and the forward end of the ship while the APSP provides a strong focus on the propulsion plant.

The project team roles and responsibilities as well as critical success factors are discussed in Appendix A of the Project Superintendent's Handbook.

3.3.2 Work Integration Team

Work Integration Team Definition - The work integration team for an Availability includes the shipyard work integration leader, the ship's force DMP/ERO/EOH Coordinator, the ship's force MIC/MOC coordinator, and ship's force zone managers. Responsibilities of the work integration team members are as follows:

Shipyard Work Integration Leader - The principal project team member designated to lead the project's efforts to integrate ship's force work and other significant events into the project's integrated schedule (the DPS or an APS typically performs this function). The shipyard Work Integration Leader works closely with ship's force to ensure the proper items for integration are identified and included in the project schedule and assists ship's force DMP/ERO/EOH Coordinator in coordinating ship's force and shipyard actions.

Ship's Force DMP/ERO/EOH Coordinator - The ship's force DMP/ERO/EOH Coordinator works with the shipyard work integration leader to develop the Availability work integration plan. The DMP/ERO/EOH Coordinator should have a good knowledge level of the ship's maintenance and alteration installations and works with the shipyard planners, CTEs, schedulers, and WPC personnel to integrate all work identified for the Availability. He must be intimately familiar with the entire Availability Work Package of both the ship and shipyard.

MIC/MOC Coordinator - The MIC/MOC Coordinator coordinates Work Authorization Form (WAF), system isolation, and tag-outs in support of the project's integrated schedule. The MIC/MOC coordinator works closely with the shipyard Work Integration Leader ensuring ship's work is integrated in the schedule, supervises procurement and delivery of those materials to support the ship's work, and consistently maintains a close working relationship with the project nuclear and non-nuclear CTEs. The complete set of duties of the MIC/MOC organization is described in the SSAM.

Ship's Force Zone Managers (counterpart to Shipyard Zone Managers) - The ship's force Zone Managers, typically division LPOs, maintain a close working relationship with the shipyard ZMs in all matters regarding planning and execution and should be organized and aligned similarly to the shipyard ZMs. The ship's force ZM is responsible for the on-schedule completion, quality, and safety of all work performed by the ship's force within the area of responsibility, and should be the single point of contact for the shipyard ZM regarding matters within the zone.

3.3.3 Project Team Development

The project is responsible to ensure individual team members possess the level of knowledge determined necessary to perform the primary position assigned. One means of establishing these expectations is through the use of qualification cards. Using these written expectations, the Operations Planning Manager is to guide the selection of project team members and ensure that qualification programs are in place. A project specific training plan shall be developed by approximately A-12 months. The training plan must include a schedule for training that overlay the integrated planning schedule.

Each shipyard shall establish written expectations for the training and qualification of project team personnel (e.g., project superintendent, assistant project superintendent, zone manager, PEPM, ship's force DMP/ERO/EOH Coordinator, work packager, etc.). Elements of the training plan must consider the knowledge and experience of individuals, familiarity of basic shipyard processes, and maturity of the team. Figure 3.3.3 provides an example of a training and qualification matrix for project team personnel. In addition, the shipyard should include the role and function of the PQE, requirements and expectations established throughout the BPMP, and incorporated lessons learned from ongoing and recently completed availabilities. The project must review the processes and tools that will be used during the Availability and assess the knowledge level of the team. Determine training requirements that will ensure all team members are capable of performing at a sufficient level. The plan should define the content of course material, how the training will be implemented and include a periodic assessment of the team's performance.

The project's integrated training plan shall be included as an element of the plan for planning discussed in Section 3.4.

Position	PM College	Qual Card	Zone Manager Training	Performance Measurement and Control	Orientation	AIM Overview	Job Summary	ICP	Scheduling (PSS)	Team Building	Daily Production Scheduling Meetings	SubSafe	Tagout	Testing	Safety	Environmental	Work Packaging Procedures
*																	
PS	•	•		•		•	•	•	•	•	•	•					
DPS	•	•		•	•	•	•	•	•	•	•	•					
APS	•	•		•	•	•	•	•	•	•	•	•					
PEPM	•			•	•	•	•	•		•	•	•					
BSPO	•			•	•	•	•	•		•	•	•					
CTE		•			•	•	•		•	•	•	•					
ZM		•	•	•	•	•	•	•	•	•	•	•					
Scheduler					•	•	•		•	•	•	•					
WPC Supv				•	•	•	•		•	•	•	•					
Supervisors				•	•		•					•					
Workers					•												
TYCOM/SSSU				•	•					•	•						
DMP/ERO/EOH Coordinator	•			•	•	•	•		•	•	•	•	•	•	•	•	•
Engineer	•				•					•	•		•	•	•	•	
Tagout Coordinator					•					•			•	•	•	•	•
SF WPC					•	•	•		•	•	•		•	•	•	•	•
Combat Systems Officer					•					•	•		•	•	•	•	

Figure 3.3.3
Project Training and Qualification Matrix

3.4 Defining the Standards for Planning

In recent years, the execution of many major SSN 688 Class availabilities has been marginal at best. Although the problems are complex and varied, early and effective planning is one element that distinguishes successful projects from marginal projects. Many people have asked the question "are problems in planning fundamentally rooted in a lack of defined standards and expectations for planning or in a lack of discipline to adhere to established standards?" The answer is both. The corporate initiative to improve the planning for upcoming SSN 688 Class availabilities targets both problems. However, before significant emphasis can be placed on improving adherence to standards, the standards and expectations must be clearly defined and conveyed to the people who are expected to implement them. Throughout this BPMP, minimum standards and expectations for key elements of planning are defined. This section addresses how a project team or planning team should integrate these minimum standards into a project specific plan for planning.

The project team shall lay out the best actions required to achieve the minimum standards and expectations identified within the BPMP. This plan will be presented to shipyard management. The project shall clearly identify to shipyard management areas where committed resources (in time, funding, facilities, people, etc.) are not expected to support the project's desired plan. Based on input from shipyard management, the resources either will be committed to the project or the plan will be changed; however, any decision to change the plan and deviate from the requirements of the BPMP will be based on a proactive and conscious act by management that receives visibility within the shipyard's senior management (i.e. department heads).

3.4.1 Right-to-Left Sweep (Planning with the End in Mind)

The right-to-left sweep is used very early in the planning phase to define where the project currently is, where it wants to be at Availability start, and how to best get there. Although simple and straightforward, many projects fail to approach planning in this methodical way. Instead, projects work from left-to-right working with a loosely coupled planning list that tends to put equal weight on most items. With this approach the cause and effect relationship of not accomplishing specific items on the list is lacking and often the goal becomes to complete items in the available time rather than thoroughly and effectively cover the vitally important events properly.

Without a clear focus on achieving a defined set of standards and expectations by Availability start, many projects tend to "drift" and achieve only what the available time allows. Additionally, without a clear set of standards and a defined starting point of best practices, the project's frame of reference for planning becomes that of individuals vice a solid set of expectations based on corporate best practices. Unfortunately, this frame of reference can result in doing what you have always done and getting what you have always got, sometimes-good performance, but often-marginal performance at best.

The right-to-left approach is fundamentally rooted in the philosophy of "start with the end in mind" and work backwards. In the case of planning, the end is defined as the first 60 days of the Availability (i.e. the time frame that the fast start strategy targets). By Availability start, the project team has made the transition from planning to execution. By the end of the first 60 days, the project's adherence (or lack thereof) to their integrated execution schedule is relatively well established with the prospects for an on-time, within budget execution firmly taking shape (i.e. few complex DMPs, EROs and EOHs that fall behind early ever catch up; at best, projects that lose schedule early in the Availability struggle to simply keep from losing additional schedule).

The specific steps that comprise the right-to-left sweep are discussed below. Each step adds a more detailed refinement to the plan for planning. At the completion of the following five steps, the project team should have a solid blueprint for planning including a clearly defined set of expectations of what should happen, when it should happen, and who is responsible for making it happen.

Development of a project specific fast start strategy (Section 4.5.4.2) - The fast start strategy is the first strategy to be developed as it defines specific measurable standards and expectations for the condition of planning at Availability start. Specific examples include completing a resource leveled schedule by A-2, issuing 100% of non-test TGIs by Availability start (unless negotiated lower per Section 4.5.4.4), assembling 60% of work packages by Availability start, and increasing the rate of production progress during the first 60 days of the Availability to a defined rate.

Development of the work definition and integration plan (Section 4.5.4.6) - The work definition and integration plan is the second plan to be developed as it identifies the major planning milestones that define the authorized work for the Availability. These work integration milestones must support the fast start requirements and are used as the framework for defining the expectations for the remaining steps discussed below. In general, the work integration milestones should be scheduled as early as allowed by ship's operational schedules and issue of the initial authorized AWP.

Development of a schedule for issuing software products (Section 4.5.6.2) - After development of the above, the project develops a schedule for issuing job summaries and TGIs, ordering material, and assembling work packages. These schedules will be constrained by the dates and targets defined in the two steps above and by commitments from cognizant support codes, including SHAPEC. Issuance of various software products should be started early and will continue throughout the entire planning phase.

Development of a plan for execution strategies (Section 4.5.4.1) - The BPMP requires the development of over 25 written execution strategies. Most of these strategies are needed to support development of the resource-leveled schedule by A-2. In order to complete these strategies with limited planning resources, the execution strategies should be developed in a logically phased sequence. Although development of some execution strategies can begin as soon as planning personnel are assigned, many are constrained by completion of job summaries or other related planning events.

Development of a time phased resource plan for planning (Section 3.5) - After completion of the above steps, the project team evaluates the cumulative resources (in dollars and people) required for supporting actual completion of the plan for planning defined in the four steps above.

The completion of the above, coupled with the development of the initial project management plan, the integrated project team training plan, and executive level project planning timetable, comprise the "plan for planning." This plan for planning should be developed in the window of A-15 to A-12. Prior to presenting this "plan for planning" to management (as required in Section 3.2), the project team should step back and evaluate how the plan compares against past and ongoing performance during other availabilities. This look at lessons learned and best practices is referred to in this BPMP as the "left-to-right" sweep and is covered in the next section.

3.4.2 Left-to-Right Sweep

Fundamentally, the left-to-right sweep is aimed at ensuring lessons learned and best practices from past and ongoing availabilities are incorporated into the planning process. While the right-to-left sweep lays out a specific plan for achieving the project's defined standards and expectations at Availability start (a plan that is developed without bias of the past frame of reference of the planning personnel), the left-to-right sweep ensures that best practices are applied to the specific details of the plan. Additionally, the left-to-right sweep is used to conduct a risk assessment (see Section 4.5.2 of the newly developed plan for planning).

During the left-to-right sweep, the project team identifies recently completed and ongoing availabilities at all shipyards. The project team reviews specific lessons learned and best practices from these availabilities. This may involve travel to other shipyards or temporary assignment to an active project in planning or execution. The goal is to identify and implement best practices and to avoid relearning key lessons. During the left-to-right sweep, not all planning processes are reviewed. However, at a minimum, the project should identify specific processes that should subsequently be reviewed during the development of the execution strategies listed in Section 4.5.

3.5 Developing a Time Phased Resource Plan for Planning

Early development of a time phased resource manning plan for staffing the project management team is essential. The plan must address personnel required during Availability planning and project team staffing for execution. The manning plan must be discussed with support codes so there is a clear understanding of their staffing requirements and to receive their commitment to meet the project needs. Personnel should be identified by name, as early as possible prior to their reporting to the team. This approach will promote discipline in resource allocation and provide ample time to resolve imbalances. The manning plan is one of the principle elements of the briefing presented to shipyard managers at approximately A-12 months.

The Project Superintendent and PEPM and BSPO determine the project management team manning plan after establishing the key elements of the plan for planning (Section 3.4). Mandatory elements of the manning plan are:

- Identifying all positions of the team
- Establishing the number of members required per position at a given time to support elements of the plan for planning
- Nominal performance capabilities of the project team, support code or organization

Once the plan is formulated, the project must take a second look to ensure that the commitment of advance planning funds is a sound investment. This should be accomplished by comparing the project's direct support service ratio (budget) to past shipyard performance, performance on similar availabilities at other yards, and to the NAVSEA benchmark ratio. This comparison should be presented to shipyard management during the A-12 briefing of the plan for planning. The project must get support codes to commit that they will provide personnel at the established time. The project superintendent must continually assess the qualifications, strengths, and weaknesses of the project team as members are identified.

Additional training, alternate personnel or re-designating areas of responsibility may be needed (Section 3.3). The time-phased project manning plan shall be developed using a form similar to that provided in APPENDIX A. The purpose of the manning matrix is to clearly identify the number of personnel needed by month in each area from A-21 to A-0. Although the format may be modified, the final matrix shall clearly show the month-by-month requirement for planning resources. In addition to the manning requirements, the matrix shall also identify the amount of planning funds required by month to support the plan for planning.

3.6 Developing the Initial Executive Level Project Planning Timetable

The Executive Level Project Planning Timetable is the primary metric to monitor the project team's performance in implementing the plan for planning. It provides an executive level snapshot of planning key events. The executive level PPTT should be incorporated as a standard element of all planning progress reviews. Mandatory tasks of the executive level PPTT include the key elements of the plan for planning identified in Section 3.4. The baseline executive level PPTT is provided in APPENDIX B.

Availability planning dates are first discussed with executing shipyards at the Fiscal Year Standard Work Package Review meetings. These meetings, conducted annually, address Availability dates two fiscal years prior to the Availability execution. Shipyard representatives at the meeting should collect the necessary data for the executive level PPTT. Each project team must confirm theses dates and define start and completion dates for the remainder of activities listed. Additional planning events may be added to the executive level PPTT for local use at each Shipyard. However, the minimum items listed in APPENDIX B shall be retained.

The executive level PPTT is an excellent management tool for monitoring adherence to a project's plan for planning. Project teams shall develop a graphics network that shows the sequential relationships of the key items in the executive level PPTT.

The executive level PPTT and a project specific nominal Availability planning timeline (Figure 2.3-3) shall be submitted to SEA 04X2 on a monthly basis after the A/VP has been issued (A-20). Initially Codes 300.1 and 1200 will be responsible to coordinate with the Type Commander and SHAPEC to begin the development of these products. The executive level PPTT and the nominal Availability planning timeline will be primary tools for communicating project planning goals with customers and NAVSEA.

3.7 Developing the Initial Project Management Plan

The Project Management Plan (PMP) is a dynamic, evolving planning process that communicates the Project's plan and objectives. The PMP is issued to the schedule defined in the PPTT and should follow the guidelines provided in the AIM desk guide. Additionally, the PMP shall address all the elements of the BPMP.

Version 1 is issued at approximately A-20 months and provides the initial overview of the Availability. The initial version of the executive level project planning timetable, developed per Section 3.6, is included with version 1 of the PMP. Version 2 expands to include the collection of products comprising the plan for planning. It is issued in time to support the project's initial formal briefing of shipyard managers. The PMP is continuously updated from then on to reflect changes and clarification as the project plan develops. Formal issue of follow on versions to the PMP is not normally required. A final briefing of the PMP is incorporated as part of the Ready to Start Brief.

4. Developing the Integrated Execution Plan

4.1 Introduction

Section 3 focused on developing the plan for planning. During this timeframe of the planning process, the project planning timetable is now in place to guide detailed planning and the majority of the work is authorized. This further planning produces the integrated execution plan, the central element of which is the resource leveled schedule. This document defines how, when, and who will accomplish each piece of work. The planning phase detailed in Section 4 completes with the submission and approval of the internal control price (ICP). At the completion of Section 4, the project team is now ready to direct their attention from planning to execution and the implementation of the integrated execution plan.

4.2 Products

The integrated execution plan developed in this section results in the following physical products:

- Fully developed execution strategies
- Resource leveled schedule
- Internal control price
- Job summaries
- TGIs

These products will be presented to shipyard management as part of a readiness to start briefing at approximately A-2. The purpose of this briefing is to ensure the project has the full support and commitment of all shipyard departments. Any decision to change the plan and deviate from the requirements of the BPMP will be based on a proactive and conscious act by management that receives visibility with the shipyard's senior management. This readiness to start brief will be attended by NAVSEA and the TYCOM. This brief shall address: a review of the elements of the fast start strategy and how the project stands relative to these elements, status of the resource leveled schedule based on the criteria provided in Section 4.4.2, resource requirements and commitments, and summary of the status of the execution strategies required by Section 4.5. Where specific requirements of this BPMP will not be implemented the shipyard shall identify these deviations to NAVSEA and the type commander in the forwarding letter for the plan for planning using the deviation process outlined in Section 2.1.

4.3 Development and Approval of Job Summaries

4.3.1 Overview

The planning process begins with receipt of an initial approved AWP issued nominally at A-21 months. The cognizant engineering/planning codes, including SHAPEC, could start job summary development as early as A-20 months and will have the goal of having all Baseline AWP job summaries issued for review by the executing shipyard prior to the Initial Planning Meeting (IPM) held at nominally A-12 months. Approval of job summaries (JS01 and JS02) and CU phases for all known work should occur by A-5 months to allow for schedule refinement resulting in the integrated resource leveled schedule at A-2 months. It is expected that maximum utilization of job summary rollover will be used to lower the planning cost and will allow the job summary review and schedule development process to begin earlier leading to better execution.

4.3.2 Job Summary Development

Job summaries are the fundamental planning elements which lead to the production of TGIs and test procedures, the project schedule, budget and resource requirements. Job summaries are developed by the cognizant engineering organization and reviewed by the executing project team prior to approval to ensure that project strategies have been properly integrated, and that the work can be executed as planned.

The job summary development process is defined in detail by various instructions and guidelines. Examples of these sources include the SSN 688 Class Ship Availability Planning & Engineering Center (SHAPEC) Process Manual, SSN 688 Class Ship Availability Planning & Engineering Center (SHAPEC) Job Summary and Task Group Instruction (TGI) Preparation Guidelines, Baseline AIM Process Manual, and specific local instructions for the planning process at the cognizant executing activity. Persons participating in planning the project should be familiar with the applicable governing planning instructions and guidelines. The basic planning process is common between Nuclear Engineering and Planning, SHAPEC, and local executing shipyard Engineering and Planning groups. For convenience, a flow chart of the basic planning process has been included as Figure 4.3.2.

Figure 4.3.2
Planning Process

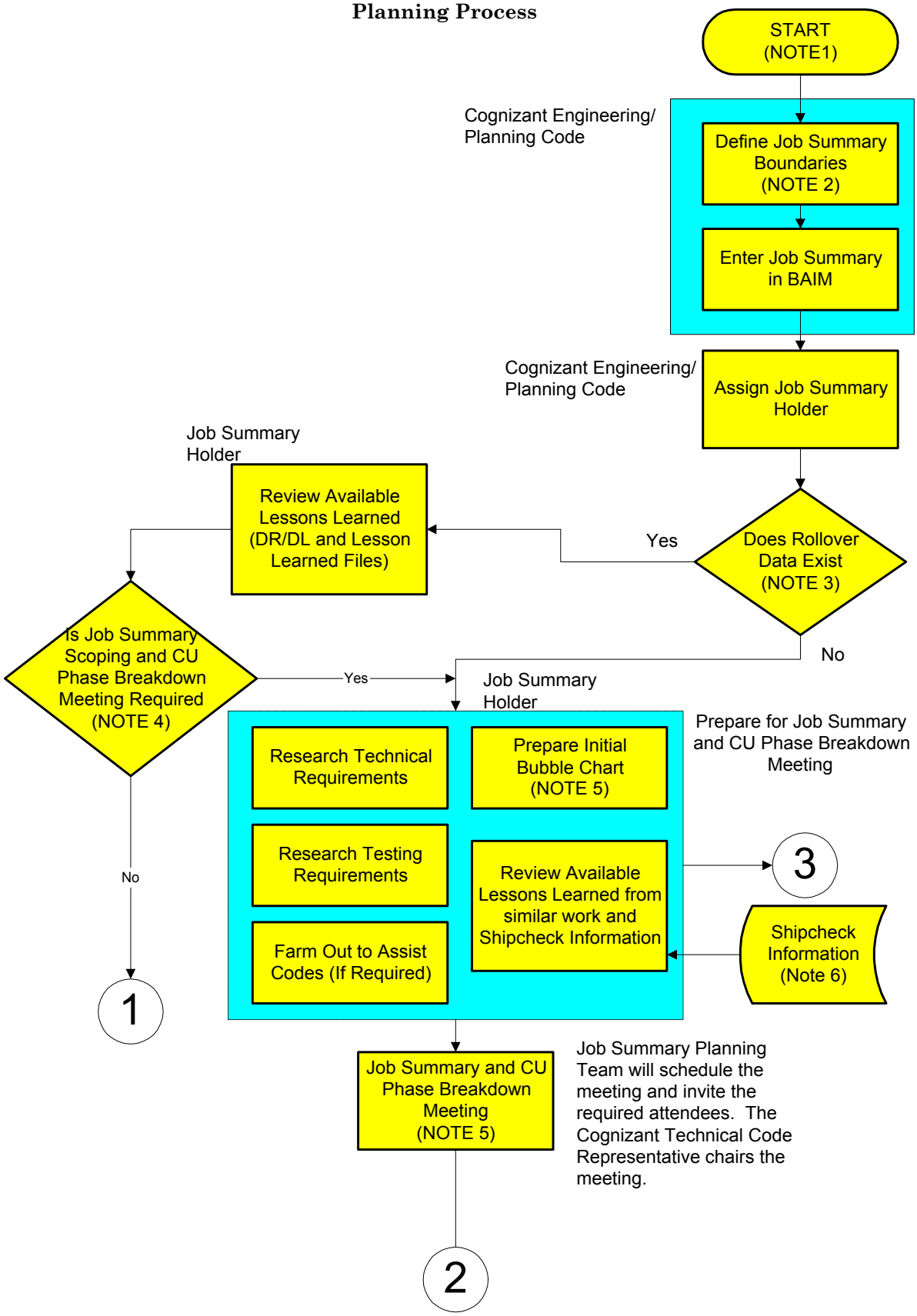


Figure 4.3.2
Planning Process
(Continued)

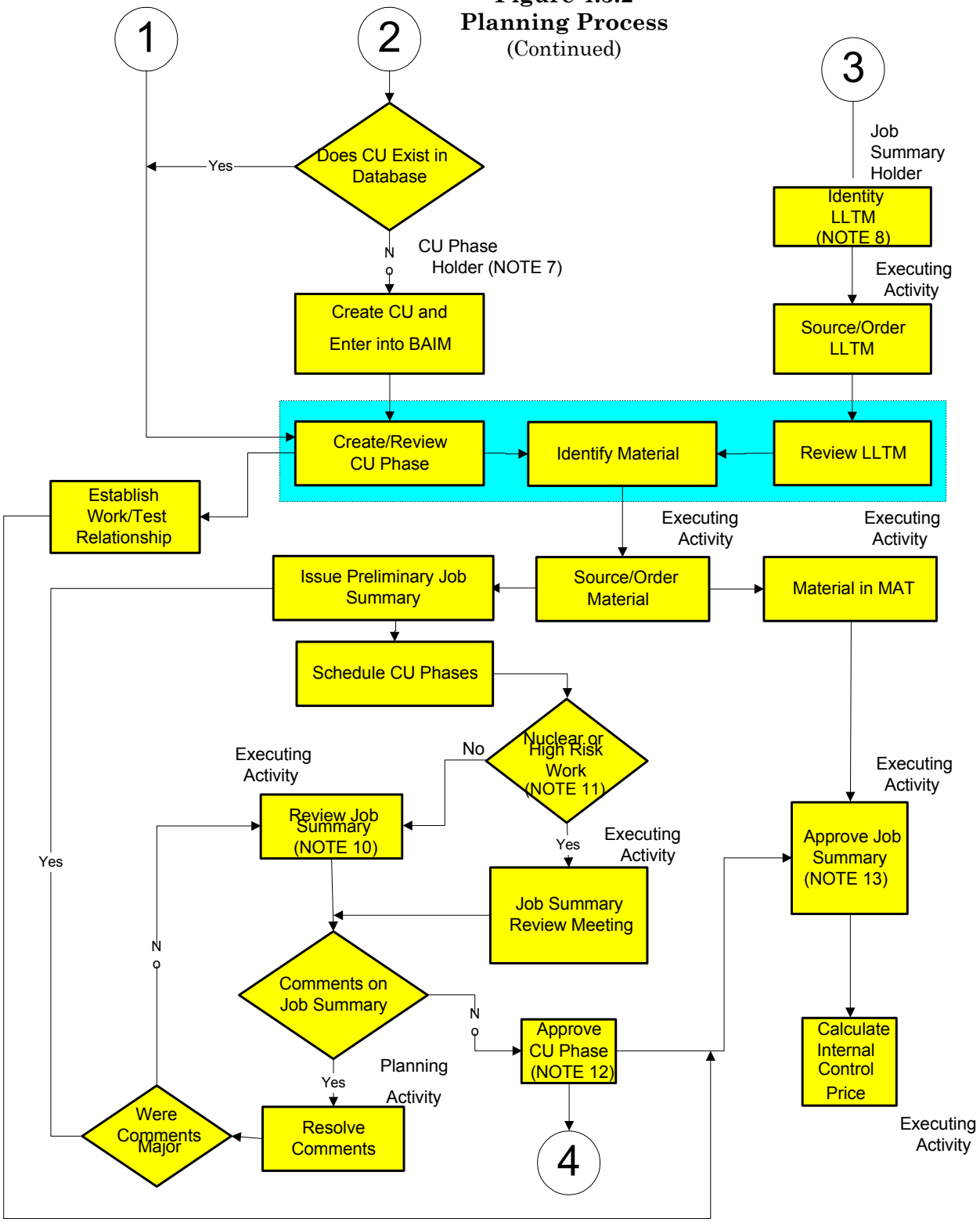
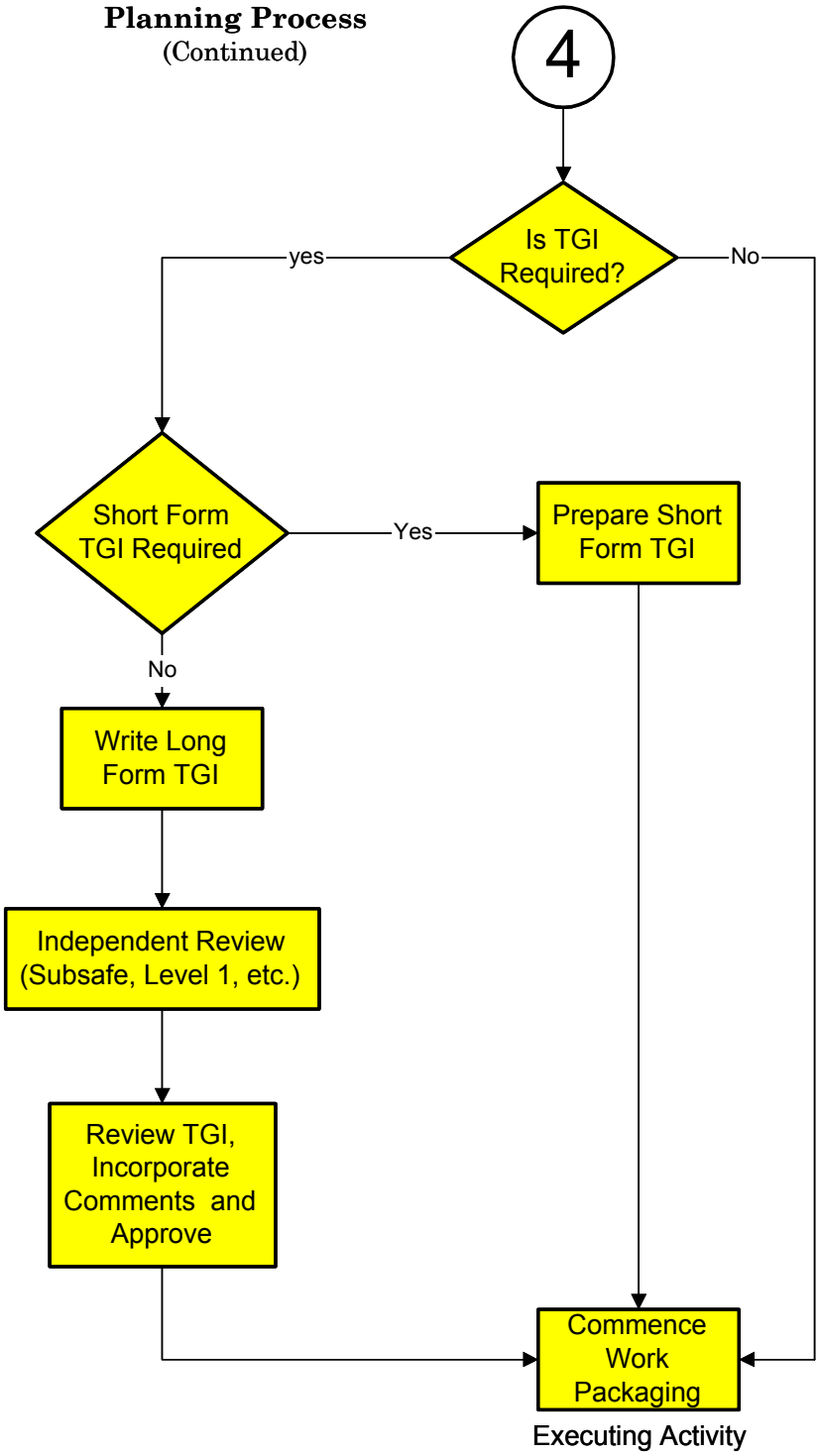


Figure 4.3.2
Planning Process
(Continued)



Notes for Figure 4.3.2

1. *Prerequisite activities include receipt of initial approved AWP, funding for planning effort, establishment of project in AIM, establishment and mapping of COARs, and initial project strategies (project management plan, version 1).*
2. *May be pre-defined by baseline job summaries.*
3. *Rollover data may be available at the SWLIN, job summary or CU Phase level. If this is a baseline job summary, SHAPEC will rollover the data. No CU Phase Breakdown meeting is required. SHAPEC will review Lessons Learned. AIM requires DL incorporation at the end of a Project.*
4. *If the job has been done before and there are no major questions or changes, a scoping meeting is not required.*
5. *Typically not done for SHAPEC planning.*
6. *Shipcheck may not be required for specific work.*
7. *For SHAPEC planning, new CUs are created by CU database administrator.*
8. *For non-nuclear NAVSEA funded Ship Alts, SUBMEPP identifies long lead time material.*
9. *For SHAPEC planning, first signature is by SHAPEC and third signature is by executing activity test organization.*
10. *Normally performed by assigned project team.*
11. *Defined as first time complex work or work with a history of significant cost over-runs.*
12. *Typically performed by executing activity PEPM except for SHAPEC planning where SHAPEC approves the CU Phase.*
13. *Includes review and acceptance of risk factor.*

Development of job summaries is performed by a cognizant engineering organization as follows:

- SHAPEC for non-nuclear work SWLINS. Typically Portsmouth Naval Shipyard is assigned this responsibility, but in specific instances, this may be assigned to another activity acting on their behalf.
- Executing activity engineering and planning organization for specific “0” series and "900" series SWLINS.
- Executing activity nuclear engineering and planning organization for nuclear work SWLINS.

Preparation of job summaries is expected to begin around A-20 months based on receipt of an initial approved AWP and funding for the planning effort. This effort produces job summaries that are issued to the project team for review. The initial planning effort to issue all preliminary job summaries from the initial approved AWP shall be completed nominally by A-9 months ensuring completion before the FPM.

Job summary development allows creation of a good integrated project schedule. A fundamental building block for both the schedule and the job summary is the breakdown of work. Proper work breakdown is required for proper scheduling, planning of resources, and control of work during the execution of the project.

> *NOTE: A joint effort between all the shipyards and SHAPEC has been completed that establishes a standard work breakdown structure for all baseline work package SWLINs. This standard work breakdown structure was developed primarily to support efficient execution of work. It shall be the standard work breakdown structure to be used for all baseline DMP job summaries. A similar effort was also conducted for baseline ERO and EOH job summaries.*

Shipchecks and their results are valuable inputs to the job summary preparation process. Shipchecks shall be conducted in a timeframe to support efficient planning of the initial approved AWP (preferably the A-18 to A-20 timeframe). This will allow job summaries to address significant interferences to the performance of hull access cuts, specific component removals and major alterations, while avoiding unnecessary rework, typically caused in the past by late identification/provision of shipcheck input.

Shipchecks may be performed by various qualified activities; however, it is preferred to have the planning activity (e.g., SHAPEC, executing activity cognizant engineering and planning department) accomplish the work to maintain continuity.

Estimating in support of developing job summaries will be based on engineered methods and standards and best available practices to accomplish the authorized work. Engineered Methods and Standards are no longer to be used for SSN 688 Class planning. Additionally, "normal and usual" work will be planned and included in the estimate. For SHAPEC planned work this will be reflected as issued Inspection ("I") and Repair ("A") CU Phases in the job summary. Normal and usual is defined as 50 percent or greater chance that known corrective actions will be required to be performed. Examples of such include replacement of epoxy installed shims, electroplating worn sealing surfaces, miscellaneous machining to remove defects and ordering of contingent balls and seats for hull and backup valve restoration.

The initial approved AWP defines approximately 70% of all known work; however the remainder is significantly defined by ship specific deficiencies resulting from pre-Availability tests/pre-overhaul tests (PATs/POTs) and the IPM conducted nominally at A-12 months. Resulting changes to the AWP will be issued to the executing activity project team by IPM+1 months.

As an iterative process, preliminary job summaries will be reviewed by project team personnel (PEPM, zone managers, APS, etc.) for accurate shop trade skill designators (TSDs), executable processes, work breakdown structure and durations, and sufficient ability to manage the associated work. As job summary reviews progress, the executing activity must order the material associated with the summaries and establish cross-ties to aid in developing the project network. This effort continues upon receipt of preliminary job summaries defining work authorized as a result of IPM. Approval of all job summaries and CU phases are required to complete by A-2.5 months to support project team validation of the network, allowing sufficient amount of time to achieve a resource leveled schedule by A-2 months.

4.3.3 Technical Work Document (TWD) Development

Once CU Phases are approved, TWD preparation can commence. TGIs are written in accordance with various guidance provided by the AIM Process Manual, SSN 688 Class SHAPEC TGI preparation Guidelines and specific local instructions. The cognizant engineering and planning personnel are required to issue and approve TWDs by Availability start with emphasis on supporting the fast start element of having 60% of total number of non-test TGIs assembled at Availability start. Typically, TGI preparation will begin around A-12 months, but may start earlier. For SHAPEC issued corporate TGIs the executing activity may perform local minor tailoring (including obtaining RADCON, OSH and NEPD concurrence) as required. Test Procedures are typically prepared by the cognizant test engineering group after test boundaries are defined based on final scope of work.

4.4 Development of the Resource Leveled Schedule

4.4.1 Overview of Resource Leveled Scheduling

An integrated, resource leveled schedule is a technically accurate sequence of work which considers resources and duration available to optimally accomplish work. The overall process of developing an integrated resource leveled schedule is depicted in Figure 4.4.1. Details of the process to develop an integrated resource leveled schedule can be found in APPENDIX C. The process contained in APPENDIX C uses the prioritization method to resource level. An integrated schedule contains all shipyard and significant Ship's Force and other non-shipyard work items and/or activities which must be accomplished to complete the Availability. A schedule is resource leveled when the workload distribution matches the committed work force. It is a tool for planning work, evaluating the rate of progress for completing work, managing resources and predicting the ability of the project to achieve planned objectives. It is not a work list, but instead clearly reflects discrete timeframes when work items will be accomplished. The resource leveled schedule shall be issued by A-2 and have the following characteristics:

Incorporates project team execution strategies to facilitate efficiently starting work
Increases required manning in concert with increasingly available open work sites so that BQWP will be at or above the "straight line" level (see Paragraph 4.5.4.3.2) by A+6 weeks
Accomplishes 85% of all production work by undocking
Matches workload distribution (BQWS) to committed resources

> *Note: Committed in this context means that personnel resources are available through on-board resources, borrows from other yards, overtime, or contracting of work. To be committed, each production shop shall verify that resources are or will be available to support he project's workload plan. Where known shortfalls exist, individual shops shall have a credible plan for obtaining the resources and shall specifically identify to the project the consequences and potential risks of the plan (e.g., shop will exceed overtime budget, borrows will exceed the number readily available in the past, resources will be taken from lower priority projects, etc.).*

Development of a Project Network: The process of developing an integrated resource leveled schedule is complex and iterative. Building of a schedule begins with the creation of a key event, milestone and test network. As job summaries are developed CU Phases are created to accomplish the required work items. The establishment of these phases produces the end-use WBS. An effective WBS is the foundation for a successful schedule. Phases within a summary are technically sequenced in the manner that they must be accomplished in order to get the work done. The CU Phases are, in turn, sequenced in the best manner possible to support the key event, milestone and test framework. This process of establishing and reviewing correct technical relationships between the CU Phases produces a network to be used for further development of the schedule. Following individual job summary reviews, cross-ties are developed between job summaries to reflect appropriate sequences.

A key element in developing a credible, executable schedule is the use of realistic durations for accomplishing each individual CU Phase. Determination of the time-span allocated for each duration should be based on the actual time that it is expected to take to accomplish the necessary work. This does not mean a lengthy duration is assigned to simply allow more time to accomplish the work. Increasing durations will reduce available float. Durations must be determined in a judicious, carefully considered manner. Consideration should reflect the manner in which the work will be performed and the historical performance of similar work. Application of realistic durations provides a more accurate determination of actual available float, produces a more credible schedule, provides a more realistic distribution of required labor resources and will reduce the amount of schedule maintenance required during execution.

Development of a Resource Pool - In parallel with the planning process, an accurate representation of the available work force pool must be developed. To be truly effective in resource leveling a project, resources for all shipyard productive work should be resource leveled as well. Development of the available resource pool must account for how manpower will be applied to the project. Determination of the amount of the available resources must include considerations on how the work force will be employed such as overtime, contracted work, borrowed labor and expected performance factors. Accurately assessing the available resource pool is vital to successfully scheduling the project work.

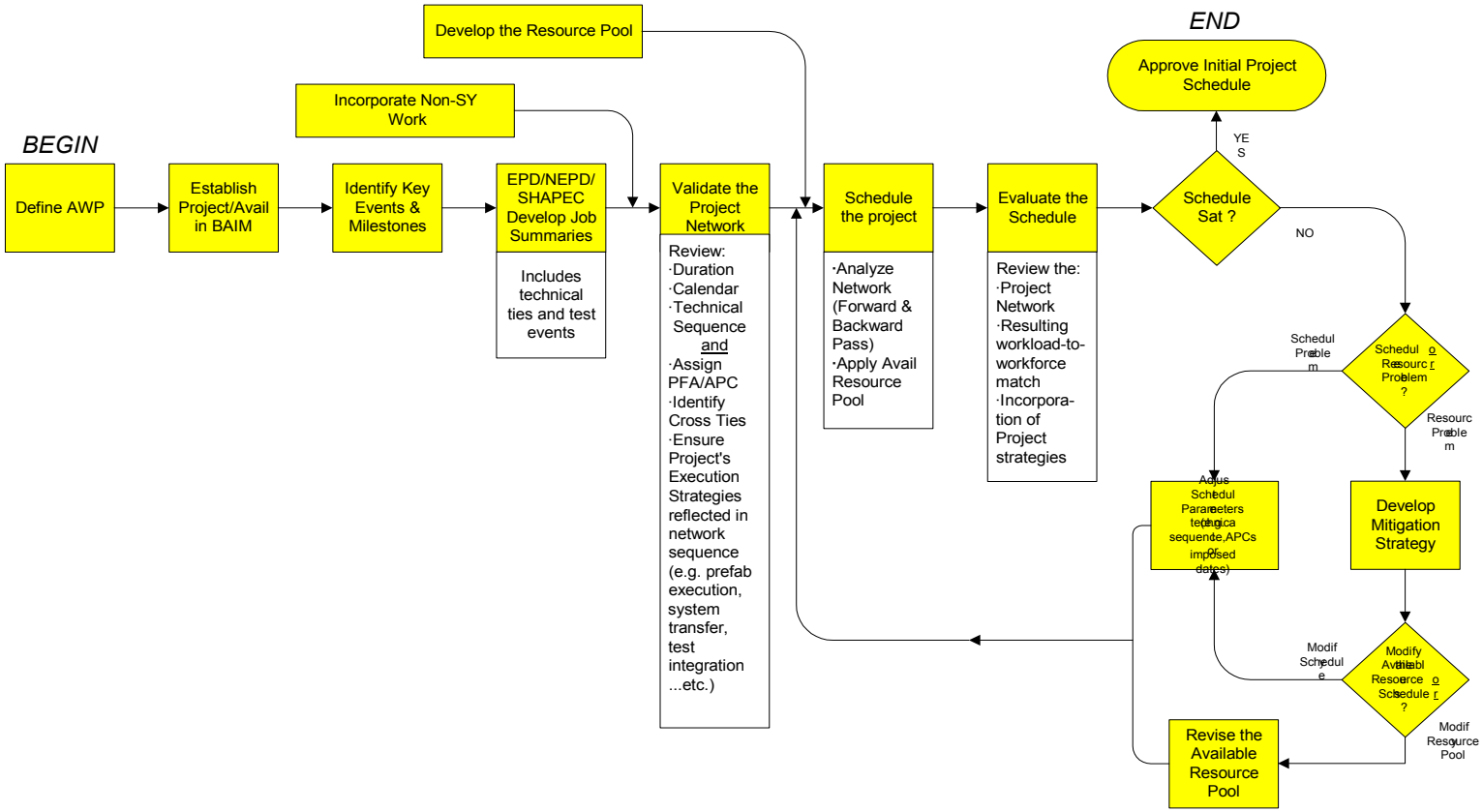
To be meaningful, a reasonable expectation that the resources identified in the available resource pool will actually be provided to the project at the scheduled time for the scheduled time duration must exist. This defines the level of commitment for the involved resources. Although certain specialized skills may require identification of specific individuals in key areas, it is not intended to require broad naming of specific people to obtain this commitment. Rather, it is a diligent review of resources available (including attention to special skill areas), compared to potential and identified work assignments for these resources (to ensure that a resource is not "committed" twice, or scheduled beyond the capability of the resource to fulfill the work assignment). Disparities between resources available and work identified may be mitigated by use of overtime, borrowing additional resources, contracting out or hiring additional resources, training additional resources, or other similar strategies. Initiation (and continued implementation) of a mitigation strategy is an acceptable "commitment" of the resource provided there is a reasonable expectation that the mitigation strategy will be successful if completed, and that the affected parties will carry the strategy through to completion. Significant or unusual mitigation strategies should be presented to and concurred in by shipyard and project management.

Implementation of Project Strategies: The Resource Leveled Schedule will reflect Project Strategies when complete. The initial action to integrate the Project Strategies into the Resource Leveled Schedule occurs when specific cross-ties and sequences are identified by the specific strategy. These are incorporated into the Network before Workload Distribution takes place. An example of this action is reflecting the CU Phase for System Takedown as a predecessor to CU Phases which begin work in the system. The sequencing of the System Takedown CU Phase in the schedule should reflect the System Takedown Strategy developed which provides the specific sequence and plan for taking down all systems. Once in the Network, with a proper duration identified, the Distribution of the Workload will refine the Strategy and provide indication that the developed strategy will provide the desired result.

Distributing the Workload: Once a network has been developed and validated, the workload must be distributed over time by applying available resources. The workload distribution process, which is referred to as resource leveling, is greatly aided by the use of computer algorithms. It is an iterative process that involves judicious application of parameters that determine the priority associated with accomplishing the individual CU Phases. These parameters, coupled with the available resource pool, determine how the workload is distributed. It is during this time that application of the detailed execution strategies developed by the project team is critical. The strategies provide an objective basis for determining the best application of Preclude Float Allocation (PFA), also known as Preclude Float Activities, and of Activity Priority Code (APC) values. Changes to the priority parameters, refinements to the resource pool and mitigation strategies must be iteratively applied and adjusted until a realistic, achievable schedule is produced.

Figure 4.4.1

Schedule Development Process FlowChart



4.4.2 Characteristics of a Resource Leveled Schedule

A resource leveled schedule that supports the fast start strategy can be characterized as an execution plan which:

Incorporates project team execution strategies to facilitate efficiently starting and accomplishing work

Project strategies, developed by the project team during planning and described in Section 4.5 of this BPMP, are incorporated into the development of the plan for accomplishing the work within the schedule. These strategies incorporate the plans for such items as system transfers, inspections, and components repaired in inside shops, testing as well as others. The incorporation of these plans in the development of the schedule influences the logic for creating technical ties between work, allocation of float group values and activity priority codes, and the sequencing of certain jobs. A schedule that is not based on all of these project strategies will be deficient and will not be an effective tool for managing the execution of the Availability. This strategy must recognize limitations caused by space constraints. For example, the Installation and Control (I&C) Ship Alt being accomplished during DMPs creates mutually exclusive work due to worksite availability.

Does not schedule an unrealistic number of jobs to begin in the first few weeks of the Availability

Progress must begin to be immediately earned at the start of the Availability, however, the objective of a fast start resource leveled schedule is not to front-load work at the beginning of the Availability. A correct schedule will, instead, account for accomplishing the activities, such as installation of temporary services and completion of system transfers, necessary to allow work sites to be opened and ready to be worked. Scheduling a large number of jobs to be worked before the required predecessors have been completed will result in the early creation of a bow-wave of jobs that are scheduled to start but physically cannot. The schedule then immediately becomes inaccurate and will require a significant amount of maintenance to become a truly useful tool again. Front-loading the schedule will also create an unrealistically high demand for workers. Even if sufficient numbers of mechanics are available, cost performance will immediately begin to deteriorate since work sites are not ready and workers will not be efficiently used. The resultant bow wave of work will continue to create unrealistic resource requirements and reduce the project's ability to actually accomplish the work items that need to be done at the proper time.

Increases required manning in concert with available open work sites so that BQWP will be at or above the "straight line" level by A+6 weeks

As systems are transferred to the custody of the shipyard and temporary systems are installed, work sites will become available for the efficient accomplishment of work. This will result in a gradual ramping up of manning to accomplish rip-outs, conduct inspections and begin in-place repairs. The goal is to achieve an "earned value" of work (BQWP) which is equal to or greater than the "charged value" (AQWP) from the beginning. It will take several weeks for conditions to permit full application of the total number of resources which must be sustained for the remainder of the time in drydock to accomplish 85% of the required work.

Matches workload distribution (BQWS) to committed resources

The process of resource leveling a schedule is actually a process of distributing workload over the time available to accomplish the project. The work force, as identified in the resource pool that was used to distribute the workload during the resource leveling process, must match the scheduled work. The amount of resources committed will include consideration of factors such as overtime, shop performance factors and borrowed labor. Once the Availability begins work must be accomplished as scheduled. If jobs do not complete as scheduled the amount of work to be accomplished at "time now" will continually build. This will result in a large number of jobs that must be accomplished immediately and resource requirements will increase accordingly. Manual schedule maintenance operations must be performed in order to keep the schedule useful and accurate. Scheduling a greater amount of work than can be accomplished by the committed resources will quickly result in schedule problems. Scheduled work should, therefore, match the amount that can be accomplished with the amount of labor resources that have been committed. This does not preclude work from being started early, if it possibly can be. Beginning work early can still result in the need for schedule maintenance operations, but it will greatly reduce the problems associated with the development of a large bow-wave of work which must be accomplished at "time now".

Accomplishes 85% of all work by undocking

The amount of work which must be accomplished in drydock necessitates a considerable period of the Availability be conducted in dock. In order to complete the training and testing activities required for certifying the work and preparing the crew to return to sea, historical evidence demonstrates that 85% of all production work (Shops 06 – 99) must be completed when the submarine undocks. To determine the latest possible undocking date the project should plan "right to left" to determine the amount of time necessary to complete sea trails, fast cruise, crew certifications, required inspections, dock trials, combat systems testing, IPPTP, PORSE and crew training. To support all of these activities in a timely manner the schedule must allow for the accomplishment of 85% of the production work by undocking.

Uses durations that realistically reflect the time required to accomplish the work necessary for each CU Phase

A key element in developing a credible, executable schedule is the use of realistic durations for accomplishing each individual CU Phase. Determination of the timespan allocated to each duration should be based on the actual time that it is expected to take to accomplish the necessary work. This does not mean a lengthy duration is assigned to simply allow more time to accomplish the work. Increasing durations will reduce available float. Application of realistic durations provides a more accurate determination of actual available float, produces a more credible schedule, provides a more realistic distribution of required labor resources and will reduce the amount of schedule maintenance required during execution.

Realistic durations should reflect the manner in which the work will be performed. For example, for an in-shop repair generally requires several steps: open and inspection, an analysis of the findings of the inspection, ordering of additional material, writing of additional work instructions and then finally the actual repairs are made. The duration for this type of work should account for the time it will actually take complete each task as well as the delay time between steps. The same logic applies to repairs accomplished shipboard as well. Durations can also be used to account for shop performance factors. If it is known that historically a shop performs at a performance factor above 1.0, application of an extended duration will more accurately produce a schedule that more realistically reflects the time it will take to actually complete the work.

An assessment should be conducted which compares the durations assigned by SHAPEC/EPD/NEPD, the durations that were assigned by the project during the process of building the network and the actual durations incurred during execution of the same work on previous projects. Significant differences between any of these durations should be clearly analyzed and understood by the project.

When the process of resource leveling has been completed, but before the resource leveled schedule is considered complete, a cross-check on use of overtime must be performed. Intended use of overtime must be consistent with the executing overtime goals and reflected in the Project Overtime Management Plan A checklist for determining if a project has an integrated, resource leveled schedule that supports the fast start strategy includes the following items:

- System transfers, both to and from the shipyard, are scheduled. (Section 4.5.4.4.2)
- Installation and removal of temporary systems/support is scheduled (Section 4.5.4.4.5).
- Inspections that can result in identification of new work are scheduled for early accomplishment (Section 4.5.4.2.5).
- Removal of all components to be repaired in inside shops is completed by A+8 weeks (Section 4.5.4.2.3).
- Duration for the repair of components in inside shops support required reinstallation and testing timelines (Section 4.5.4.5.2).

- The number of tests scheduled to be accomplished in any given week is supportable by the required resources and by past-demonstrated performances on other projects (e.g., 25 HP&A tests per week) (Section 4.5.6.12).
- The quantity of work scheduled (BQWS) matches the committed resources.
- Labor resource requirements gradually ramp up to the "straight line" (Section 4.5.4.2) level by A+6 weeks.
- Adequate time for Ship's Force tasks is scheduled (Section 4.5.4.6).
- 85% of all production work will be accomplished by undocking.
- Approximately four weeks duration between undocking and start steaming exists to support space grooming, inspections and close-outs (Section 4.5.4.3).
- Approximately four weeks are scheduled between readiness to start steaming and PORSE (Section 4.5.4.3.2).
- Use key events and milestones (at a minimum, the applicable key events and milestones from APPENDIX J).
- The number of scheduled work sites is consistent with that which can be reasonably worked.

4.4.3 Traps to Avoid and Potential Barriers Involved with Developing a Resource Leveled Schedule

Do not apply the resource profile before the network is validated. In a critical path method (CPM) network, there should be only one start and one finish, with no isolated (non-constrained) activities or events. Resource leveling a poorly sequenced network will result in a resource leveled but poorly sequenced schedule.

Do not distribute workload before an accurate resource profile is developed. The resource profile used must be reviewed and agreed to by the Business Office, Production Resources Department, and the project team to ensure it is consistent with performance expectations from recent projects, and reflects resources that will actually be available for the project. Minimize the use of management type milestones in the network (e.g., "Complete all Shop 31 Work"). Instead, use system milestones as a way of establishing benchmarks in the schedule.

Avoid building overly aggressive schedules that require an unrealistic number of jobs to begin in the first few weeks of the Availability. Work toward building a realistic and executable schedule that reflects the fast start strategy developed by the project team that is based on feasible durations.

What may seem like an "executable" BQWS (schedule load) curve at the project level may not be "executable" at the shop or trade skill designator (TSD) level. Check the details. Activity priority codes should be applied consistently through a path of activities. That is, priorities are established for a path of work (e.g., remove/replace main engine shaft), and should be consistently applied for work associated with that path. If a particular path is determined to be priority 1 work, then the entire path (e.g., all work associated) should be so identified.

Do not apply activity priority codes in bulk by job summary or SWLIN. Evaluate and select the true critical path work and assign activity priority codes for that work. For example, a SWLIN to repair main seawater valves may contain several valves to be worked. One valve however, may be a critical path item by virtue of interference to other work in the vicinity. Work associated with the repair of this valve (only) should be given a higher priority, while the remaining valves in the SWLIN can receive a lower priority.

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4.5 Development of Execution Strategies

4.5.1 Introduction

In this section, project execution strategies are developed. These strategies are the heart of the planning process and represent the critical thinking, integration, and alignment of the project's objectives. Individually, these strategies target key strategic elements of planning. Cumulatively, these strategies form the substance of a project team's efforts to convert their objectives into an aggressive, yet realistic integrated execution plan. These strategies directly feed the Resource Leveled Schedule (Section 4.5.4) and are formally documented and presented to management (Sections 3.2 and 3.4). Mandatory execution strategies are identified in Figure 4.5.4.1. Optional execution strategies are discussed in Section 4.5.5. Section 4.5.6 discusses execution strategies whose requirements have been integrated into shipyard standard processes.

NOTE: Since initial implementation of the BPMP, shipyard business processes have evolved as the naval shipyards became more aligned and continued to search for methods to achieve greater efficiency and reduce cost. Toward that end the BPMP Strategy Knowledge Sharing Network reviewed the Execution Strategy section of the BPMP to consolidate the number of strategies by combining related strategies, and to replace selected strategies with shipyard standard procedures, instructions, or General Practices. Section 4.5.6 discusses execution strategies whose requirements have been integrated into standard procedures, instructions or General Practices at each yard, and identifies the recommended timeframe for Project review of these documents to support the project.

This section identifies execution strategies and the minimum requirements of their content. Each strategy is described in detail to allow new project teams to understand the philosophy of the strategy and to provide a blueprint for developing the strategy. Projects are encouraged to add additional strategies and to thoughtfully build upon the minimum requirements provided herein. In addition to the specific requirements listed in the following sections, each execution strategy should include**,** when appropriate, the following common attributes:

- The purpose and goals of the strategy.
- Identification of lessons learned being incorporated into the strategy. Provide a brief summary of benefits and problems other projects within the submarine community have encountered with respect to this strategy.
- Provide a detailed project plan for achieving the purpose/goals of the strategy. Describe how the project will implement lessons learned. This action statement should cover the specific action to be accomplished, who is responsible, when the action will be complete, and what, if any, product will be delivered (e.g., a list of components, a test sequence, an agreement for establishing policies, etc.).

- Identify the process owner and Project individual with overall responsibility to ensure implementation of the strategy. Identify how the Project and the strategy process owner will monitor the implementation and effectiveness of the strategy. Develop metrics as applicable. It is recognized that performance on some strategies is measured by qualitative vice quantitative methods/metrics. Quantitative metrics should include predetermined "trip points" for management action. Lessons learned, both for items accomplished well and those requiring improvement, should be provided to other projects in their planning phase.
- Identify potential barriers or problem areas that may inhibit the implementation of the execution strategy. Develop mitigating actions to minimize risk. Although the project will develop a comprehensive risk mitigation plan (Section 4.5.2), the risk management model must be applied rigorously to the development of individual execution strategies.
- The cognizant process owner and affected stakeholders, including Ship's Force when applicable, will concur on the strategy.

The development of execution strategies is vitally important to the planning process. As such, a disciplined commitment by the project and by shipyard management is needed to ensure the proper resources are applied to their development and that proper scrutiny and oversight is applied to the product. Examples of execution strategies can be found on the corporate BPMP web site: http://nssg.nnsy.navy.mil/subhome/ and select "BPMP Site".

4.5.2 Risk Mitigation

Risk mitigation is about identifying the probability that things will go wrong, the possible consequences if they do, and then acting to reduce the probability of occurrence or possible effects. Risk equals probability of occurrence times severity of consequence. Risk assessment and mitigation is conducted at three discrete levels: 1) overall/total project plan, 2) project strategies, and 3) individual jobs. The project must identify the risks that may invalidate any of the items in these three categories and where the risk is high, develop specific mitigation actions. The results of the project evaluation will be included as part of the execution strategies. The following project activities should be evaluated for risk:

- The work or testing is in the controlling path for the project.
- The work or testing has the potential to have major impact on other organizations or projects. For example, specially qualified workers or special equipment may fall into this category.
- First time major alterations.
- High cost work.
- Hazardous work that could injure personnel or damage equipment or the environment.
- Congested work areas. Even though each work item in a space or area may not be large, the number of work items can be.
- Shipyard work that requires significant Ship's Force or contractor interface.
- Work with a high potential for growth.

The project shall assess risks as follows:

Identify constraints/hurdles/factors that are associated with the scope, cost, schedule and quality objectives of the project and that affect its success
Identify probability of occurrence and the level of severity for each
Analyze and assign actions to mitigate the risks.

1. Project magnitude and complexity determines the appropriate approach to risk assessment. Project superintendents may elect to use simple brainstorming techniques among stakeholders for simple jobs or employ more complex methods such as detailed schedule analysis. Each project must address risk logically, document mitigation responsibilities in the strategy, and review and revise the strategy as the situation changes over the project's lifetime.

2. Risk and risk response (action) may be handled in several ways:

   - Unrecognized, unmanaged, or ignored (by default)
   - Recognized but no action taken (absorbed as a matter of policy e.g., task is mandatory but alternative strategies are not available or too costly)
   - Avoided (by taking appropriate steps)
   - Reduced (by an alternative approach)
   - Shared with others (e.g., by joint ventures)
   - Transferred (to others through contract)
   - Retained and absorbed (by prudent schedule and cost allowances)
   - Handled by combination of the above

There are a number of references to guide a thoughtful and effective risk assessment. The Project Management Body of Knowledge, published by the Project Management Institute is one of the best.

4.5.3 Quality Management Plan

The Quality Management Plan is a key planning document that is prepared between A-9 and A-4 and prescribes the project's plan for ensuring quality work is maintained throughout the Availability. The plan provides an overview of how quality will be built into the work, maintained and monitored through metrics. The project will review work in the AWP and develop a list of jobs which require a more detailed plan to mitigate past quality problems or anticipated quality problems for new work which have been identified through:

- Lessons learned
- Review of DLs/DRs
- Discussions with other shipyards
- Shipchecks
- Review for special tooling
- Review for complexity
- Review for special skills

An important element of this plan is bringing on the Project Quality Engineer (PQE) early enough to allow development and monitoring of this plan and to be involved in the implementation of the plan for planning. (Some shipyards have found it prudent to assign separate nuclear and non-nuclear PQEs.) The plan must define the role of the PQE and the relationship between the PQE and the project superintendent. The PQE must be the project superintendent's pro-active advocate for quality. The PQE must be more than a "bean-counter" of quality deficiencies. The PQEs role during execution must be to look ahead at work that will be starting and assist the zone managers and shop supervisors in providing historical data (DLs/DRs, lessons learned, etc.) for those jobs that have had problems to ensure these past problems are not repeated. The PQE must also be proactive in asking the right questions when quality problems do occur to ensure corrective actions address all the problems and make sure the corrective actions are provided to all the right personnel on the project so problems are not repeated.

The Quality Management Plan shall address the following:

- First-time Ship Alts and repairs
- Major work with critical interfaces with other maintenance providers
- Major critical/controlling path work
- Work targeted for process improvement
- Major tests or Key events
- Special tests
- Major Ship's Force evolutions (e.g., major certifications, PORSE, crew move aboard, etc.).
- Significant work with interfaces with Ship's Force or contractors
- High cost and potentially hazardous work

4.5.4 Development of Execution Strategies Supporting the Resource Leveled Schedule

4.5.4.1 Plan for Developing Execution Strategies

This strategy is one of the first strategies to be developed before A-12. Figure 4.5.4.1 provides a list of the mandatory execution strategies and a recommended timeframe for their completion. The strategy shall include the following minimum elements:

A list of all execution strategies to be utilized on the project. At a minimum, the mandatory execution strategies identified in Figure 4.5.4.1 should be included. Projects are strongly encouraged to add additional execution strategies as needed. Refer to Section 4.5.5 for listing of optional strategies and the Corporate BPMP website: http://nssg.nnsy.navy.mil/subhome/ and select "BPMP Site" for strategies developed by previous projects.

A timeline similar to that provided in Figure 4.5.4.1 should be developed. The timeline should include the list of project specific strategies, the sequence for completing the strategies (including start and completion dates), and the approximate dates for briefing the individual strategies to shipyard management.

The person or department with the lead responsibility, usually referred to as the process owner, for developing the individual strategies should be identified. Where significant support is needed from other organizations, these support codes should also be identified (intent is to clearly identify early in planning the expectations of support personnel).

Prior to initiating the strategic integration of execution strategies into the Resource Leveled Schedule, many of the execution strategies need to be reviewed to ensure they are up to date and reflect the project's current plans. For example, growth in work may change the ship-to-shop plan for repairable components. The execution strategy defined in this section should specifically address which execution strategies should be reviewed and updated prior to the resource leveled scheduling effort.

Figure 4.5.4.1 "Execution Strategies"

Execution Strategy	BPMP Section	Schedule for Completion
Integrated Project Team Training Plan	3.3	A-12 to A-10
Time Phased Resource Plan for Planning	3.5	A-12 to A-10
Quality Management Plan	4.5.3	A-9 to A-4
Plan for Execution Strategies	4.5.4.1	Prior to A-12
Fast Start Strategy	4.5.4.2	A-12 to A-10
Strategy for Plant/Space Preparation for SS00 and HB00	4.5.4.3	A-6 to A-0
Strategy for Plant Conditions and System Status, Non-Nuclear System Transfer, and Temporary Systems/Services	4.5.4.4	A-10 to A-4
Plan for Special Attention Jobs and Contract Shop Work Requirements	4.5.4.5	A-9 to A-4
Ship's Force and Contractor Work Integration Plan	4.5.4.6	A-6 to A-4
Communications Strategy	4.5.4.7	A-4 to A-2
Combat System Availability Planning and Execution Strategy	4.5.4.8	A-13 to A-12

4.5.4.2 Fast Start Strategy

Note: The Fast Start Strategy has been modified to include project prefabrication work (Section 4.5.4.2.4) and open and inspection work (Section 4.5.4.2.5).

4.5.4.2.1 Definition of Fast Start

A review of historical data for completed SSN 688 Class major availabilities shows:

A strong correlation between the rate of production progress (measured by BQWP) in the first two months of an Availability and completing availabilities within the initially scheduled duration. Recovering lost schedule during these relatively short duration, complex, and high tempo availabilities is extremely difficult, and, with the upcoming heavy workload of these availabilities, corporate surge capacity to recover lost schedule is fragile.

Actual production progress (measured by BQWP) during an Availability follows an "S-curve." Initially, progress is slow as systems are taken down and the rip-out phase is completed. The Fast Start Strategy targets this phase to aggressively get production progress greater than the straight-line undocking requirement (get actual progress to Point C in Figure 4.5.4.2.2 below as quickly as possible). After most production work is completed, the rate of progress again slows as a project completes system testing and transitions to major test programs.

Actual production progress can approach Point D in Figure 4.5.4.2.2 below from the left or from the right of the straight-line undocking line. In practice, availabilities that are behind schedule, and working inefficiently (e.g., excessive overtime, partial system certifications, temporary system utilization, etc.), will approach Point D from the right. In contrast, projects that make schedule approach Point D from the left. The challenge is to achieve and sustain production progress to the left of the straight-line undocking requirement as early in the Availability as possible.

Recent experience has demonstrated that showing only the 100-700 SWLIN series production work provides a truer and more accurate picture of BWQP in regard to the Straight-line Undocking graph.

A "fast start" is defined as aggressively increasing production progress (measured by BQWP) early in the Availability to achieve:

A rate of production progress greater than the straight-line undocking rate of production progress (defined in Figure 4.5.4.2.2 below in men per day) within four weeks of Availability start (Point B in Figure 4.5.4.2.2 below).

A cumulative volume of production progress greater than the straight-line undocking cumulative volume of production progress (in mandays) within six weeks of Availability start (Point C in Figure 4.5.4.2.2 below).

4.5.4.2.2 Definition of Straight-line Undocking Requirement

Straight line Undocking	=	Slope of line from Point A to Point D in Figure 4.5.4.2.2 below
Requirement [MPD]	=	$\frac{\text{Point D [Mandays] – Point A [Mandays]}}{\text{Number Weeks to Undock [weeks] X 5 [Days/week]}}$

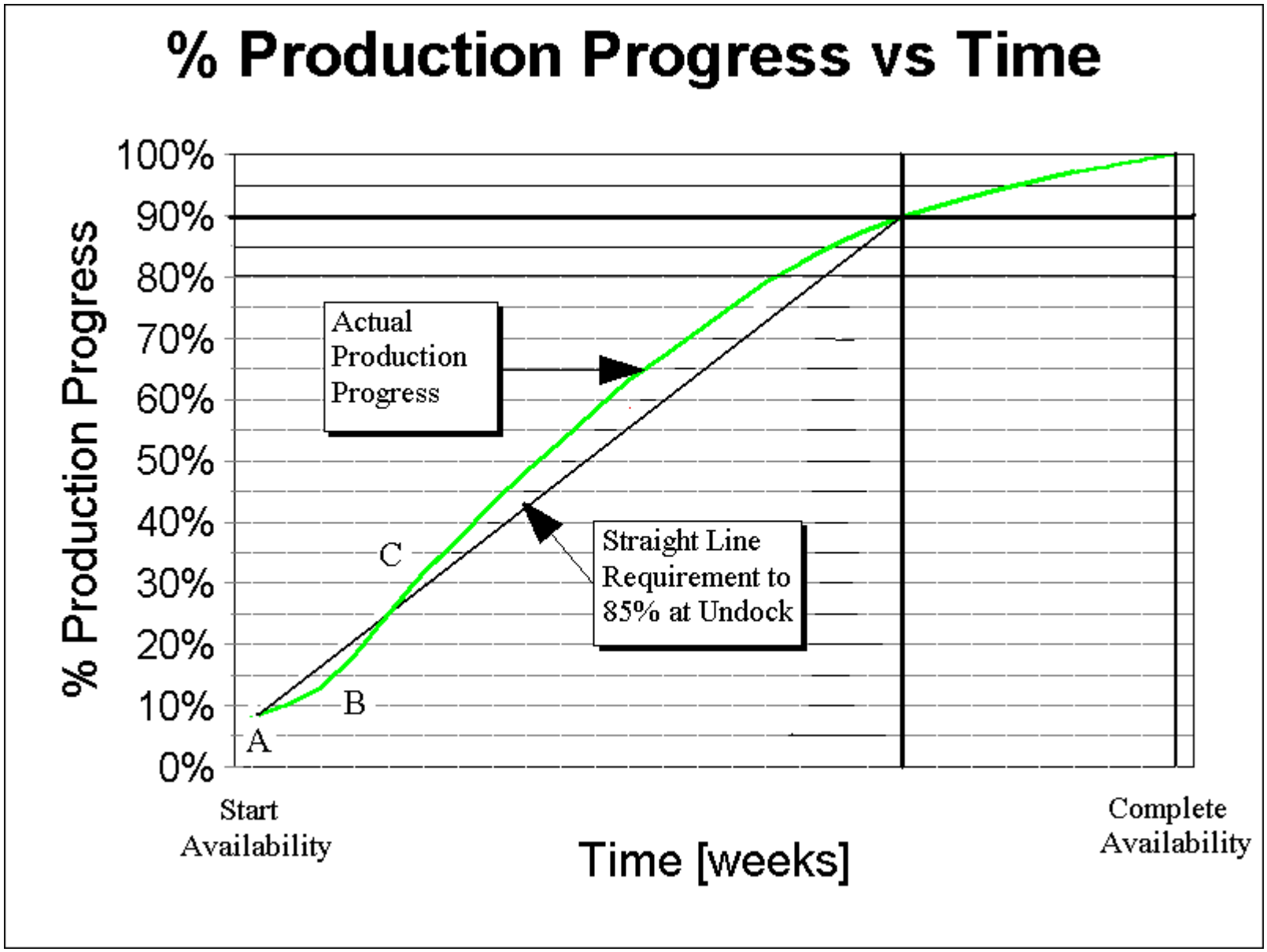


Figure 4.5.4.2.2 Definition of Straight-line Undocking Requirement

Notes to Figure 4.5.4.2.2*:*

Point A: *The actual production progress (BQWP) at Availability start (typically 5 – 10%)*

Point B: *The point in time (number of weeks after Availability start) that the actual rate of production progress (BQWP measured in men per day) equals the straight line rate requirement to undocking (defined below). The Fast Start Strategy assumes this point is reached no later than 4 weeks into the Availability.*

Point C: *The point in time (number of weeks after Availability start) that the cumulative volume (measured in mandays) of production progress equals the straight-line cumulative volume requirement to undocking. The Fast Start Strategy assumes this point is reached no later than 6 weeks into the Availability*

Point D: *The actual production progress at undocking (assumed to be 90% of the 100-700 series SWLIN mandays). Achieving less than 90% at undocking will adversely affect a project's ability to make downstream propulsion plant key events. Corporate strategy for propulsion plant key events assumes undocking with 90% production work complete. Total production work is defined as the projected end-of-project QAC, including expected growth within scope and new work (i.e. it is not solely the expected QAC from issue 1 and 2 of the AWP).*

Sample Calculation: Assume:

Production QAC (for 100-700 series SWLINs only) from second issue of the AWP = 64,000 mandays
New work reserve of 10% = 6,400 mandays
Approximately 7,000 mandays is completed at Availability start (Point A)
Undocking at week 34 into the Availability

1. Total expected production QAC = 64,000 + 6,400 = 70,400 mandays
2. Point D in Figure 4.5.4.2.2 (90% progress at undocking) = 0.90 X 70,400 = 63,360
3. Straight line requirement to undock (from above equation) = $\frac{63{,}360 \text{ mandays} - 7{,}000 \text{ mandays}}{34 \text{ weeks X } 5 \text{ days/week}}$ = 331 MPD

4.5.4.2.3 Developing the Project Specific Fast Start Strategy

A Fast Start Strategy defines the project's plan for achieving the fast start (as defined above) within the first 60 days. The Fast Start execution strategy described in this section defines the minimum requirements for inclusion in a project specific Fast Start Strategy. Through the development of a project specific Fast Start Strategy, the project identifies the standards and expectations for the overall condition of planning at Availability start. Defining these expectations as one of the first steps in planning is a vital step in laying out a solid and credible plan for the remainder of the planning phase and is a fundamental element of the "right-to-left" approach described above.

The Fast Start Strategy aims to minimize the barriers keeping job sites from opening. Ideally, the only things keeping job sites from opening during the fast start window are technical sequence constraints (e.g., fabricate and stage support equipment prior to installing support equipment) and a management decision (i.e., zone manager decides not to work an item on the short range schedule).

Other execution strategies in this BPMP need to be closely integrated with the Fast Start Strategy. As discussed above, the Fast Start Strategy is one of the first execution strategies to be developed and will influence the development of other execution strategies and the executive level project planning timetable (APPENDIX B). Each project team will develop a written project specific Fast Start Strategy between A-12 and A-10. The strategy will be presented to shipyard management early in the planning phase (approximately A-10) as part of the Plan for Planning Brief. The written strategy shall include or address the following minimum elements:

- Completion of rip-outs and shipping (if applicable) for all repairable items within A+8 weeks after Availability start.
- Increasing the cumulative volume of production progress (measured in mandays) to greater than the straight line undocking cumulative volume of production progress (defined above) within six weeks after Availability start.
- All TGIs for work scheduled during the first 60 days after Availability start packaged at Availability start.
- All material required to support scheduled work during the first 60 days after Availability start available at Availability start.
- All pre-fabrication required to support work during the first 60 days after Availability start completed at Availability start.
- Approximately 60% of all work TGIs packaged at Availability start. All work TGIs, for known work, approved at Availability start (unless negotiated lower.
- All system transfers complete approximately 45 days after Availability start.
- All resources required for work scheduled during the first 60 days after the Availability start identified and available at Availability start.
- All tools, equipment and facilities required to support scheduled work during the first 60 days after Availability start available and ready at Availability start.

- All Work Authorization Forms (WAF) required to support scheduled work during the first 60 days after Availability start prepared and presented to Ship's Force prior to Availability start.
- All memorandum of agreements and Standard Work Practices between the shipyard and Ship's Force and other maintenance providers are effective at Availability start.
- Identification of all assumptions. (e.g., assumed straight line undocking rate of production progress based on expected final project QAC)
- Identification of specific lessons learned that are being applied from recently completed. ships (including ships at other shipyards)
- A risk assessment per Section 4.5.2 to identify how the project's assumed performance in each of the key areas compares with recent performance on other ships and to identify specific areas of concern.
- A description of how the project will monitor adherence to the plan during the planning phase and during execution.

The project should ensure that the straight-line undocking requirements of this execution strategy are incorporated into the Resource Leveled Schedule. Specifically, the production progress reflected by Points B and C from Figure 4.5.4.2.2 should be reflected in the Resource Leveled Schedule. Additionally, the applicable elements listed above should be incorporated (e.g., completion of rip-outs for all repairable items within eight weeks after Availability start). Incorporation of these fast start elements will require the project to strategically move work into and out of the first 60-day window of the schedule. Section 4.4.2 provides specific guidance on verifying the proper incorporation of fast start criteria into the Resource Leveled Schedule.

4.5.4.2.4 Prefabrication Work

The 'Prefabrication Work' section of the Fast Start Strategy focuses on the management of prefabrication work for the Project. Prefabrication is defined as all fabrication work associated with a component or component assembly. This work shall be identified in a prefabricate/fabrication (F) phase. This phase is accomplished in preparation for shipboard work and is typically worked prior to ship arrival, but is not limited to the pre-arrival time frame. Additionally, some temporary ship systems and production support services (or "S" phases) require pre-availability manufacture and staging of pieces/parts to ensure rapid installation upon boat arrival. If an "S" phase requires that a component be manufactured, then an "F" phase should be written to manufacture the component. Timely completion of prefabrication work is a key element in achieving a successful "Fast Start" as illustrated in the Nominal Planning Timeline. Effective management of prefabrication work consists of the following key elements:

Identification - Work containing significant potential prefabrication shall be scoped by Production and Engineering prior to initial Job Summary issue to identify and logically group work to be fabricated in "F" phases. Identification of the majority of prefab work should be complete in the A-12 to A-10. Through up-front identification, the prefab (F) phases can be prioritized and accelerated through the Job Summary Approval and TWD issue processes ahead of other shipboard and shop work. Prefab material can also be expedited independent of the shipboard installation material.

Tracking - Once identified by the project team, WPC should maintain a list of all prefab work, material and associated status. WPC will track and progress prefab work through Job Summary approval, TWD issue, packaging and assembly and final release to production. Weekly status of all prefab work should be reviewed by project management personnel to ensure the "fast start" constraint for releasing all known prefab by A-3 months is achieved. WPC will release each prefab task package to the cognizant prefab Zone Manager or inside shop coordinator with scheduled completion dates clearly annotated.

Scheduling – An initial prefabrication schedule shall be established by A-6 and finalized by A-4 based on prefab work identified. The final schedule completion dates should be in agreement with project strategy and inside shop workload, resources and other commitments.

Execution - A Zone Manager should be assigned to track, progress and manage prefab work once released. The assigned zone manager is responsible to ensure accurate progress is maintained, problems elevated and overall schedule is achieved. The product of this plan is a list of all prefabrication items. High risk and significant first-time prefab items shall be clearly annotated including identification of any special resources that will be applied.

4.5.4.2.5 Open and Inspection Work

The 'Open and Inspection Work' section of the Fast Start Strategy consists of a risk assessment of open and inspection work to prioritize and aggressively schedule the conduct of open and inspections early in the Availability. This section will identify those items in the work package that have a high potential for new work. After identifying the open and inspection work and completing the risk assessment, the plan addresses contingency actions for high-risk items and identifies the project's desires for integration of the open and inspects.

This section must include:

- Identification of all open and inspection items in the AWP.
- A risk assignment (high, medium, low) to each item.
- Contingency plan for high-risk items, which may include identifying additional manpower requirements, increasing management on deck plates, locating and/or staging backup material, preparing repair TWDs in advance.
- Scheduling open and inspections early in the Availability to minimize the impact should growth work materialize. The plan should clearly identify the prioritized order of open and inspections based on the risk assignment.

The 'Open and Inspection Work' section of the Fast Start Strategy will help make visible potential bottlenecks for getting new work identified and authorized. Items with high risk and high probability of occurrence may be negotiated into the authorized work package or may lead to a block of time being designated into the schedule for repairs.

To develop the 'Open and Inspection Work' section of the Fast Start Strategy, review the authorized work package, historical data, DL logs and new work from previous availabilities. In addition, sort "inspection" phase TGIs from AIM. From this data sort, evaluate those inspections intended to identify new work and include in this strategy. This section of the Fast Start Strategy should be re-evaluated during the A-6 to A-4 window when the work package is fairly stable and most job summaries are issued.

4.5.4.3 Strategy for Plant/Space Preparation for SS00 and HB00

Note: This strategy has been renamed and modified to include Plant/Space Grooming, Inspection, and Certification (Section 4.5.4.3.1), and preparations for Key Events Start Steaming (Section 4.5.4.3.2) and Habitability (Section 4.5.4.3.3).

This strategy is a project specific agreement with Ship's Force for creating the following:

- A baseline system/space grooming and closeout process
- A specific plan for space grooming, inspection and closeout of the engine room and AMR in support of SS00
- A specific plan for grooming, inspection and turnover of the operations/habitability spaces in support of HB00.
- Milestones or schedule events identified for inclusion in the Resource Leveled Schedule as a placeholder to develop a detailed schedule for completing the space grooming and closeout process. A detailed schedule similar to Figure 4.5.4.3.1 shall be developed for engineering and operations/habitability spaces.

Project Team will brief shipyard management on this strategy within two months prior to starting the grooming process. Additionally, the project should identify their plans for briefing/training the project team and Ship's Force personnel on the expectations of the strategy plan.

4.5.4.3.1 Plant/Space Grooming, Inspection, and Certification

Depot level submarine availabilities, DMPs, EROs and EOHs, have minimum requirements specified by NAVSEAINST 4730.1 (series) and by prerequisite lists, for certification of secondary propulsion plant and supporting systems and required state of readiness of non-nuclear systems to support principal propulsion plant test evolutions. Using the requirements of this plan, shipyard and Ship's Force personnel will execute a cooperative effort to ensure required nuclear and non-nuclear systems and spaces are ready to support principal reactor plant evolutions, integrated propulsion plant testing, and subsequent key events. This process expands the space transfer process to include areas not covered by NAVSEAINST 4730.1 (series). Focus will be on identifying and resolving deficiencies as early in the Availability as possible.

The importance of creating a baseline system/space grooming and closeout process is a key to successful execution of depot level submarine availabilities. This process accomplishes the following:

- Establishes a common, agreed to plan between the Project Team and Ship's Force which allows for planning and the prevention of surprises or differing interpretations or expectations.
- Provides an event in the schedule that can be managed assuring system/space readiness when required in support of propulsion plant testing.
- Identifies the personnel resources necessary to support the grooming, inspection, and space closeout plan.
- Provides time in the Availability schedule for Ship's Force to train and prepare for their Post Overhaul Reactor Safeguards Exam (PORSE) or Reactor Safeguards Exam (RSE).
- Establishes the ship's material readiness condition to support the minimum technical requirements of NAVSEAINST 4730.1 prior to the start steaming key event. The time period (approximately one month) from start steaming to start Integrated Propulsion Plant Test Program (IPPTP) is used to ensure the engine room is in a near fast cruise condition prior to the start of IPPTP. (Note: Different timeline if split-IPPTP is utilized.)
- Allows shipyard to complete the process efficiently and effectively through the use of best practices and the collective experience (lessons learned) of other shipyards.
- Ensures the ship is restored to a material condition that minimizes the downstream burden to Ship's Force and that supports the reduced frequency of depot level availabilities.

The keys to success in this process include:

A strong teaming relationship with Ship's Force. Ship's Force and the shipyard must work closely together throughout the Availability to ensure an agreed upon standard for material condition is obtained in the spaces.

The project team must set and enforce high standards for the material condition of the spaces. History has proven that working to minimum standards is more costly in dollars, personnel resources, and time.

This baseline process will be invoked by this project/Ship's Force specific agreement (signed prior to arrival) that will include:

- Establish existing material, preservation and cosmetic condition.
- Establish standard of cleanliness for the Availability.
- Refer conditions not covered by AWP to TYCOM for resolution.
- Establish procedures for maintaining conditions during Availability.
- Systems Pre-test Inspections (PTIs).
- Key Event Prerequisite Lists (PRL).
- Reactor Compartment Closeout (RC00).
- Joint Shipyard and Ship's Force zone/space inspections.
- Nuclear and non-nuclear plant certifications.
- Management walkthrough inspections.
- Plant/space/system grooming.

An example of a typical system/space grooming and turnover schedule is depicted in Figure 4.5.4.3.1. Project Teams will develop a project specific grooming and turnover schedule as follows:

The detailed schedule shall break the engine room up into the zones shown in Figure 4.5.4.3.1.

For each zone, a grooming period, a joint Ship's Force and shipyard inspection, a project inspection, a deficiency correction period, and management walkthrough inspections shall be scheduled.

During key event and milestone development, the project team should add a milestone or schedule event several months prior to SS00 and HB00 key events. This evolution will produce a detailed closeout schedule similar to that shown in Figure 4.5.4.3.1 (the project specific schedule shall include the zones/spaces and the elements shown in Figure 4.5.4.3.1). These schedule placeholders should occur eight weeks prior to their related key event. A similar schedule shall be developed for the operations and habitability spaces as well.

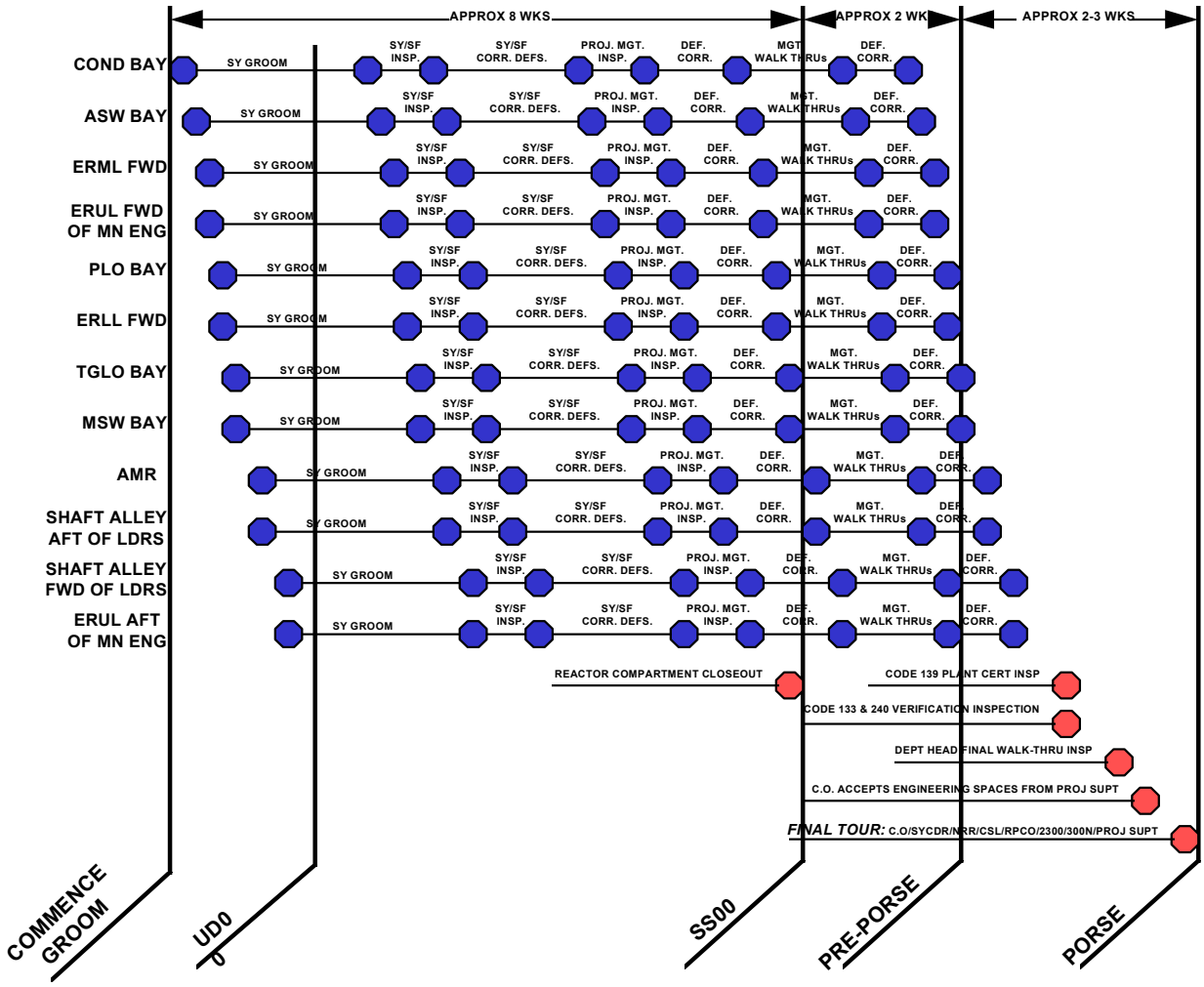


Figure 4.5.4.3.1 Sample Engineering System/Space Grooming and Closeout Schedule

4.5.4.3.2 Start Steaming

The 'Start Steaming' section of the Strategy for Plant/Space Preparation for SS00 and HB00 consists of:

Overview - One key to schedule adherence during DMPs, EROs and EOHs is the ability to execute critical and controlling path propulsion plant work in parallel with undocking work. With the elimination of shore steaming during DMPs, EROs and EOHs, the visibility and drive to execute this work in parallel with undocking is potentially diminished. The start steaming (SS00) key event was implemented as a means for maintaining visibility on propulsion plant work and driving this work to completion in a manner that supports the on-time start of the Integrated Propulsion Plant Test Program (IPPTP).

Note: This section is based on a single IPPTP event. It is recognized that the option of a split IPPTP may be used, provided it meets the same criteria for achievement of SS00.

Objectives - The objectives of the SS00 key event include:

- Drive propulsion plant work to completion in parallel with undocking work. Obtain at least the minimum technical requirements (i.e. operational status) of NAVSEAINST 4730.1 (series) for steaming the engine room prior to the SS00 key event.
- Allow deficiency correction to near fast cruise condition in the window from SS00 to IPPTP (i.e. meet the complete and operational status of NAVSEAINST 4730.1 for criticality testing prior to the start of IPPTP).
- Unencumber Ship's Force in the window from the SS00 key event to the IPPTP key event (approximately one month) to allow for training and completion of pre-PORSE, RSE, and IPPTP prerequisites. While Ship's Force is completing their training and certifications, the shipyard is completing final grooming and deficiency correction to achieve near fast cruise condition. Major work should be complete prior to the SS00 key event with only minor grooming, deficiency correction, and time dependent prerequisites left to complete after SS00.
- Prior to claiming the SS00 key event, outstanding work should be clearly defined with a clear and achievable path to the IPPTP (i.e. major work is complete, significant testing and troubleshooting that could result in major work are complete, etc.).

Implementation - In support of the objectives listed above, the implementation of a SS00 key event shall include the minimum elements listed below. The philosophy of the start steaming key event applies to both nuclear and non-nuclear work; however, the specific details of implementation differ slightly (covered below).

At least one month shall initially be scheduled between undocking and the SS00 key event to ensure mandatory waterborne propulsion plant work and testing are completed and to allow space grooming and non-nuclear space inspections. The grooming and space inspections should culminate in a list of deficiencies, that, when corrected, yield an engine room in a near fast cruise condition. The comprehensive list of space deficiencies is then used to complete the assessment discussed below (i.e. clear path to IPPTP assessment).

Prior to claiming the SS00 key event, the ship shall meet the minimum requirements of NAVSEAINST 4730.1 (series) for bringing steam into the engine room (hot operations testing key event specified in NAVSEAINST 4730.1). The shipyard shall apply the requirements (technical and administrative) of NAVSEAINST 4730.1 to the SS00 key event. All systems required for IPPTP should be transferred to Ship's Force.

At least one month shall initially be scheduled between the SS00 key event and IPPTP to allow for crew training and for the shipyard to achieve near fast cruise conditions in the propulsion plant spaces.

Prior to claiming the SS00 key event, the shipyard shall verify that there is a clear path from the SS00 key event to the IPPTP key event. This is accomplished by screening outstanding work and testing against NAVSEAINST 4730.1 complete and operational requirements for criticality testing. The shipyard should ensure that the required work and testing resulting from this evaluation can be completed prior to IPPTP without adversely affecting crew training and qualification (pre-PORSE and PORSE). The ship's Commanding Officer (and local Type Commander Representative, if applicable) shall concur that the outstanding work and testing can be completed without adverse effect to Ship's Force.

Non-nuclear propulsion plant work is tied to the start steaming key event except as follows:

- Work is technically or strategically required for earlier key events
- Time dependent IPPTP prerequisites mandate later accomplishment
- Selected IPPTP prerequisites where early completion could result in unnecessary expense to maintain the prerequisite item after its initial completion
- Items made "go" (i.e., waived for the event) by the non-nuclear CTE per the requirements of NAVSEAINST 4730.1

Nuclear work is typically tied to cold operations testing, reactor compartment closeout, or the SS00 key event. In any case, the reactor compartment (RC) closeout shall be scheduled prior to the SS00 key event. Completion of cold operations testing and RC closeout prior to the SS00 key event ensures that only minor reactor plant work remains in the window to IPPTP. In general, all planned Shipyard and Ship's Force nuclear maintenance, work and testing required for IPPTP, is complete and certified prior to the SS00 key event, with the following exceptions:

- Time dependent IPPTP prerequisites
- Other IPPTP prerequisites such as installation of shield survey grid markers, data acquisition equipment, etc. when the time remaining until the start of IPPTP is such that early completion of the prerequisite (i.e. prior to the SS key event) could result in an undesired maintenance expense.
- Engine room plant certification inspections by the Nuclear Inspection Department and deficiency correction from these inspections
- Items made "go" (i.e. waived for the event) by the nuclear CTE.

For an item (nuclear or non-nuclear) to be made "go", it must be determined that the item can be accomplished during the time between SS00 and IPPTP without impacting Ship's Force preparations for PORSE, accomplishment of PORSE, or completing remaining prerequisites for IPPTP. The aggregate of items remaining to be done for IPPTP must also be considered when making the determination.

Shipyards should give strong consideration to using a non-nuclear prerequisite list for the SS00 key event. Use of a prerequisite list in this manner has proven to be a useful tool in driving a more disciplined approach to completing the propulsion plant and certifying readiness for the IPPTP program.

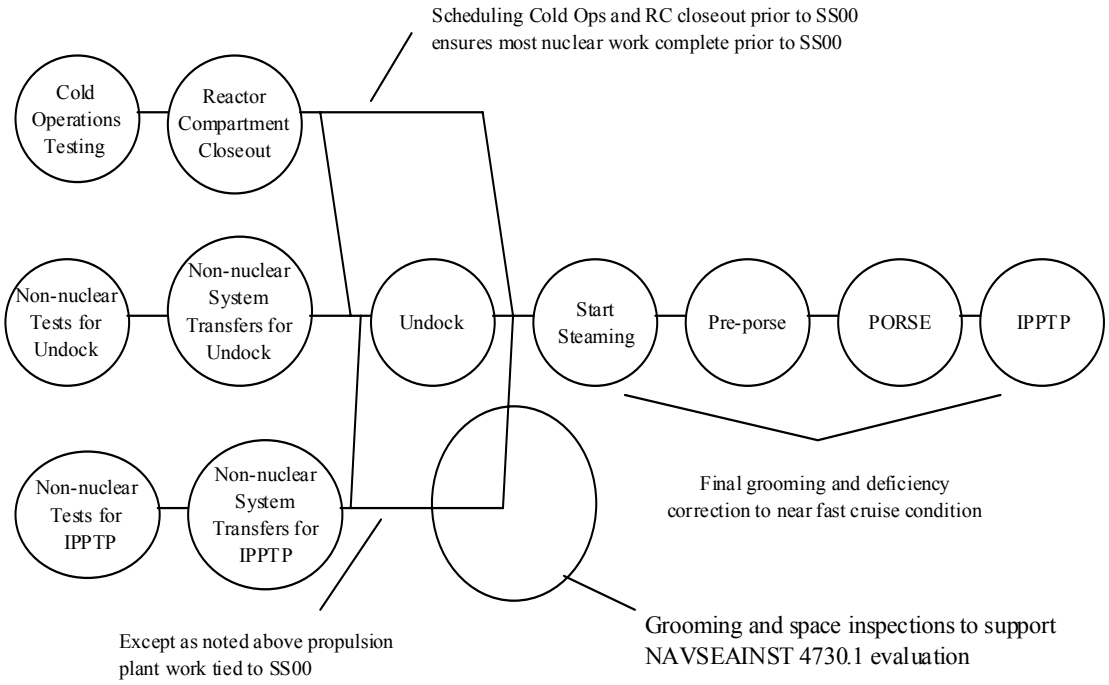


Figure 4.5.4.3.2 Start Steaming Key Event

4.5.4.3.3 Habitability

The 'Habitability' section of the Strategy for Plant/Space Preparation for SS00 and HB00 consists of:

Overview - Habitability is an important key event that occurs in the final stages of an Availability and it is essential that it be completed prior to the commencement of propulsion plant testing. Completion of the engineering spaces is driven by the propulsion plant test program, and is primarily focused on the readiness of systems and spaces for testing. Special attention to habitability and the operations and living spaces provides focus for the overall living and working environment the crew needs during the intense propulsion plant, and follow-on testing periods.

Objective – The objective of the HB00 key event is to:

- Get Ship's Force moved aboard and settled to avoid distractions, delays or disruption during the Integrated Propulsion Plant Test Program (IPPTP). Locked-step final testing commences with IPPTP followed immediately by Dock Trials, Fast Cruise, Sea Trials and Completion. This intense, fast paced end game allows no time for completing/closing-out non-engineering spaces once this final push commences.

Implementation – In support of the objective listed above, implementation of an HB00 key event shall include the minimum elements listed below.

- The project team must develop a plan for the grooming, inspection and acceptance by Ship's Force of the operations/habitability spaces.

- The project team and ship should designate a cognizant Zone Manager and Ship's Force representative for each space/compartment.

- A strategy and schedule for the acceptance of the spaces must be developed jointly with the ship. The strategy should include a shipyard grooming period, a joint inspection, assignment/statusing of deficiencies, authorization of any new work identified by the inspection to the Type Commander, shipyard and Ship's Force deficiency correction period, final acceptance inspection, and formal, documented acceptance by Ship's Force.

- The space grooming and acceptance process should commence at least eight weeks prior to IPPTP (SP00 key event) but additional time may be required if the spaces have been significantly disturbed by the installation of SHIPALTs or other major work.

4.5.4.4 Strategy for Plant Conditions and System Status, Non-Nuclear System Transfer, and Temporary Systems/Services

Note: This strategy covers the plan for Plant Conditions and System Status (Section 4.5.4.4.1), Non-nuclear Systems Transfer (Section 4.5.4.4.2), and Temporary Ship Systems and Production Support Services (Section 4.5.4.4.5).

The final products of this strategy include:

- Work and Test sequence diagrams
- Non-nuclear System Transfer Schedule for the systems listed in Figure 4.5.4.4.2
- Temporary Support Systems Plan, including a list of all required temporary support systems
- Preventive Maintenance Agreement.

4.5.4.4.1 Plant Conditions and System Status

The 'Plant Conditions and System Status' portion of the Strategy for Plant Conditions and System Status, Non-Nuclear System Transfer, and Temporary Systems/Services is developed based on a review of the Authorized Work Package. The review determines what plant conditions (such as cooled down, DHR installed, steam generator drained, etc.) and special system conditions are required during each part of the Availability (to include arrival conditions) to allow the required work and tests to be performed. This plan not only shows what status the plant and systems will be in during different phases of the Availability but also the plan for restoration of these systems following completion of work to support testing and key events. A work and test sequence diagram is then developed showing the plan.

This plan guides the job summary process so that the job summaries reflect the overall strategy for accomplishing the Availability. This document is provided to the ship as early as possible in the planning phase so that the ship knows what to expect during the Availability. The initial plan is developed early in the planning phase (A-10 or earlier) and finalized by A-4.

4.5.4.4.2 Non-Nuclear System Transfer

The 'Non-nuclear System Transfer' section of the Strategy for Plant Conditions and System Status, Non-Nuclear System Transfer, and Temporary Systems/Services consists of two (2) parts: System Turnover and System Turnback. System Turnover (sometimes referred to as System Take-down) is defined as the process of depressurizing, draining, de-energizing, tagging out and transferring operational and tag-out control of a system to the shipyard to facilitate authorized work and testing. System Turnback is the process of verifying work and testing is complete to the extent necessary to return system tag-out and operational control back to Ship's Force sufficiently in advance of Key Events. Upon the completion of the Job Summary process, the level of work within the various ship systems is evaluated to determine the System Transfer (ST) boundaries. The determination may be made that, regardless of the level of work, the simplest and most effective approach is to transfer all non-nuclear systems. The determination of transfer boundaries is by a logical division of ship systems into distinct areas based on isolation/tag-out points and Key Event requirements. Once the transfer boundaries are established, a plan for execution of System Transfers (Turnover and Turnback) must be developed. This plan shall include temporary systems needed prior to individual system turnovers, Arrival testing, Key Event (i.e., Cool-down and Docking) sequencing and early work considerations such as hull cuts. The following key aspects of the System Transfer process are further discussed and illustrated in the WPC Corporate Process Guide:

- A System Transfer Job Summary will be established with a CU Phase for each System Turnover and Turnback to allow integration into the project Resource Leveled Schedule (RLS). Individual Project Teams may elect to supplement the Standard List of System Transfer Component Unit Phases with subordinate phases or scheduling activities to create a more accurate representation of when job sites will open or portions of systems will be ready for return to Ship's Force in the RLS. Some Project Teams may appropriately decide that Turnback CU Phases are not required to maintain an accurate schedule.

- Temporary service CU Phases required to support STs will be established and identified as predecessors to applicable ST CU Phases. The determination, establishment and packaging of prerequisite temporary service TGIs associated with the System Turnovers is key to timely completion of System Transfers and the release of associated work. Any ship system, which could directly affect the reactor plant or conduct of reactor plant testing, will not be taken down until the required non-nuclear interface support systems are installed and operational. Early assignment of a Temporary Service Coordinator is critical to ensure temporary service support requirements are met to achieve the ST completion schedule by A+6 weeks, as part of the Fast Start criteria (Section 4.5.4.2.3).

- System Transfer boundaries and isolations are identified and processed via System Transfer Work Authorization Forms (WAF). All work (and status) will be mapped to the appropriate ST WAF to ensure accountability prior to ST WAF clearance.

Work Authorization Form (WAF) Preparation - System Transfer Work Authorization Forms (WAF) with tagout proposals, will be developed for the individual identified systems during the A-9 to A-4 timeframe. Preliminary system drawings will also be highlighted showing these boundaries. Figure 4.5.4.4.2 below provides a list of standard System Transfer Work Authorization Forms (WAF):

Figure 4.5.4.4.2 - Standard List of System Transfer Work Authorization Forms (WAF)

		DMP/ERO/EOH
ST WP	**System Title**	**Nominal Transfer Time**
1	AHP/EMBT/ALP***	Docking + 3 days
2	MSW	Docking + 5 days
3	ASW	Docking + 2 days
4	STILL/EVAP SYSTEM	Docking + 2 days
5	LUBE OIL SYSTEM	Docking + 4 days
6	MAIN STEAM & AUX STEAM SYSTEMS	Arrival + 7 days
7	COND & FEED SYSTEM	Arrival + 7 days
8	SS HYDRAULICS SYSTEM	Docking + 11 days
9	SCRUB/BURN SYSTEM	Arrival + 7 days
10	O2/N2 SYSTEM	Arrival + 7 days
11	R114 SYSTEM	Docking + 18 days
12	TRIM & DRAIN SYSTEM	Docking + 3 days
13	PLUMBING SYSTEM	Arrival + 6 days
14	FO/COMP SYSTEM	Docking + 1 day
15	TORPEDO HANDLING SYSTEM	Arrival + 6 days
16	LP BLOWER SYSTEM	Docking + 8 days
17	MBT/CAVDR/VV SYSTEM	Docking + 1 day
18	VENT/CAC SYSTEM	Docking + 12 days
19	CW AFT SYSTEM	Docking + 25 days
20	PW/GALLEY SYSTEM	Arrival + 6 days
21	RSS SYSTEM	Arrival + 7 days
22	ATMOS ANAL SYSTEM	Docking + 12 days
23	ERFW SYSTEM	Docking + 13 days
24	EAFW AFT SYSTEM	Docking + 13 days
25	DIESEL SUPPT SYSTEM	Docking + 2 days
26	3 IN LAUNCHER SYSTEM	Docking + 1 day
27	PROP SHAFT SYSTEM	Docking + 4 days
28	MAST/ANTENNA SYSTEM	Arrival + 18 days
29	SALVAGE AIR SYSTEM	Docking + 1 day
30	DEPTH GAGE SYSTEM	Docking + 3 days
31	EXT HYD SYSTEM	Docking + 3 days

Figure 4.5.4.4.2 - Standard List of System Transfer Work Authorization Forms (WAF) (Cont'd)

		DMP/ERO/EOH
ST WP	**System Title**	**Nominal Transfer Time**
32	SPM SYSTEM	Docking + 2 days
33	ANCHOR AND CAP SYSTEM	Docking + 8 days
34	LP AIR COMP SYSTEM	Arrival + 6 days
35	STEERING & DIVING SYSTEM	Docking + 10 days
36	HPACS SYSTEM	Docking + 7 days
37	EAB SYSTEM	Docking + 5 days
38	INTEGRATED ANNOUNCING	Docking + 13 days
39	HATCHES SYSTEM	Docking + 1 day
40	GRAV DRAIN SYSTEM	Docking + 1 day
41	AUX DRAIN SYSTEM	Docking + 1 day
42	AHPAFT/BK#4 SYSTEM	Docking + 22 days
43	ATF SYSTEM	Arrival + 7 days
44	CW FWD SYSTEM	Docking + 8 days
45	SONAR SYSTEM	Arrival + 4 days
46	TORPEDO/FIRE CONTROL SYSTEM	Arrival + 4 days
47	EAFW FWD SYSTEM	Arrival + 4 days
48	400 HZ SYSTEM	Arrival + 3 days
49	LIGHTING SYSTEM	Docking + 12 days
50	60 HZ SYSTEM	Docking + 12 days
51	IC CKT SYSTEM	Docking + 13 days
52	500KW/DC PWR SYSTEM	Docking + 12 days
53	NAVIGATION SYSTEM	Arrival + 4 days
54	RADIO SYSTEM	Arrival + 4 days
55	RADAR/ECM SYSTEM	Arrival + 4 days
56	NAV AND IC SWBDS SYSTEM	Docking + 14 days
57	VIB REDUCER SYSTEM	Docking + 4 days
58	TORPEDO TUBE SYSTEM	Docking + 2 days
59	VERTICAL LAUNCH SYSTEM	Docking + 3 days

4.5.4.4.3 Non-Nuclear System Turnback Process

The System Turnback Process is inherently not as structured and detailed as the Turnover Process. Although it is desirable to have all the work within a given system completed prior to Turnback, it is often necessary and/or advantageous to turn the system back prior to completion of all production work. Turnback of a portion of the system and maintaining control of the remainder of the system and turning it back at a later date may be advantageous. The use of partial Turnbacks of systems as the testing phase approaches allows for larger more straightforward transfers. It is also desirable (for planning purposes) to turn the system back prior to commencing operational testing. However, the advantages of the shipyard keeping and operating the system are often considerable. For these reasons, the point of Turnback is a very fluid decision best made by a CTE in consultation with Ship's Force. It is important to note that Ship's Force must be trained as to the proper significance of the Turnback Process. Often times the process is expanded because of Ship's Force combining pre-operational lineups and checks with the Turnback. The Turnback portion of WAF process is only an administrative function marking the transfer of who may authorize work within said system boundary. Project Personnel and Ship's Force should maintain system pre-operational checks (i.e., System valve lineups, Hand over Hands) independent of work authorization Turnbacks. By doing so, it balances/levels Ship's Force workload during system turnback. System turnback to Ship's Force should be keyed to a specific key event. In nearly all cases, these are limited to four key events: Cold Operations (For new Micro-Processor Reactor I&C), Undocking (For Safety of Ship Systems), SS00 (For Propulsion and Propulsion Support Systems) and Dock Trials (For all remaining systems). It is important that the shipyard's three test programs (Nuclear, HM&E, and Combat Systems) are developed and scheduled to support this system transfer strategy.

4.5.4.4.4 Shipyard Preventative Maintenance Process for Transferred Systems

A Preventive Maintenance (PM) Agreement should always be signed by the Shipyard and Ship to insure that PM requirements are not missed during the Availability. The ship shall maintain their normal PM schedule on all ship's equipment during the Availability with the following exception. The shipyard will be responsible for PM on equipment/components removed from the ship during their time of removal. The shipyard shall also perform PM on AERP and/or new components prior to installation.

4.5.4.4.5 Temporary Ship Systems and Production Support Services

The 'Temporary Ship Systems and Production Support Services' section of the Strategy for Plant Conditions and System Status, Non-Nuclear System Transfer, and Temporary Systems/Services addresses two types of temporary systems. The first, temporary ship systems, are ship support systems that are connected to, or temporarily replace shipboard systems. The timely installation of these systems is necessary to support system transfer/takedown. The second category of temporary systems are those support systems that are installed to facilitate industrial work. These are known as production support systems (services).

The installation of temporary ship systems and production support services aboard ship requires significant coordination. This is true primarily because of the typically critical nature of these services to a submarine, especially in conjunction with the drydocking evolution. However, another driver is the desire to set the right tone for the production work of the Availability. Temporary services, and some facility installation aboard ship, are in the critical path to starting most of the work, therefore, a prerequisite to a smooth transition into the execution phase is the coordinated approach to the installation of these services/facilities. Further, these are often the first jobs observed by Ship's Force in the Availability, allowing the only opportunity to make a good first impression. The project should ensure that responsibility for management of temporary support systems is clearly defined and assigned early. It is strongly encouraged that this designated individual be involved in the preparation of the temporary support system plan.

Early in the planning phase, the project team, in close coordination with the engineering department and the resource shops, reviews the work package to determine all of the temporary or support systems that will be required. These should be listed in the AWP as well. Any supporting material requiring pre-availability manufacture should be tracked as prefabrication work, as discussed in Section 4.5.4.2.4. The project must consider the key facilities for which installation is required for a berthing or docking evolution. Installation of these systems is in the critical path to starting work and, therefore, will require similar preparation and control. Examples would include facilities related to environmental control, drydock collection facilities, freeze seal facilities, and waste collection facilities.

For many reasons Ship's Force must have a thorough under-standing of the temporary services. The services will be installed throughout their ship, and they will be responsible for the operation of many of them. Further, the change in some shipboard systems brought about by the installation of support systems will affect the manner in which they isolate work in affected systems. The most efficient way to introduce and train Ship's Force in these systems is through the preparation of a "Temporary Services Handbook." This handbook includes a list of installed temporary service systems, operating instructions, operational responsibilities table, valve lineups, and one line diagrams. Training on this handbook for Ship's Force shall be conducted.

At approximately A-14 days, a temporary ship system and production support service meeting should be held to review the installation plan and ensure that all material and preliminary installation work is complete and staged in a way to minimize installation time. Note, installation of some temporary support systems are scheduled in detail on special evolution schedules. Verification of temporary services should be conducted by the project team during the transition from planning to execution, including verification that all the services are staged properly, and that the staging TGIs are completed and certified. Any operational checks will be verified to be performed. Service equipment should be staged at the berth/dock in such a way as to minimize installation time. The installation mechanics should be assigned to these evolutions by name; assembled and briefed on the schedule; it should be verified that all the tools, material and skills required are available; and that the appropriate procedures, Work Authorization Forms (WAF) and tag-outs are in order.

Further, risk mitigation strategies should be applied to the planning and installation of these services. Two categories are deserving of special attention: the first category consists of services, which have a history of problems with their installations (e.g., temporary ASW system). The second category is for first-time installation of a service, or when a previously used service has undergone extensive modification (e.g., relocation of the temporary DHR expansion tank from in-hull to off-hull).

The final product is a list of all required temporary support systems. First time systems and systems with a history of problems shall be annotated. The plan shall address training of Ship's Force on the systems and a planned sequence of installation.

4.5.4.5 Plan for Special Attention Jobs and Contract Shop Work Requirements

Note: This consolidated strategy addresses 'Special Attention Jobs' (Section 4.5.4.5.1) and 'Contract Shop Work Requirements' (Section 4.5.4.5.2).

The purpose of this strategy is twofold: (1) Develop a list of all special attention jobs for the project. The list should clearly identify first-time jobs and should identify any special actions taken or planned to manage the jobs. (2) Identify, contract out and control work in three categories:

- Shop 31 Inside Machine Shop work
- Other contract shops within the shipyard
- Critical trade skills

4.5.4.5.1 Special Attention Jobs are defined as follows:

Schedule Risk Jobs - Often short duration critical path work or tests can be accomplished during different parts of the Availability. However, the work or test may take longer or the risk may be higher depending on when it is accomplished due to problems during accomplishment of that work or test. It is important to define those type of jobs, evaluate the factors that effect performance of that work or test and make a decision as to when to accomplish that work or test.

First time jobs - Significant first time work requires additional planning and a strategy developed so that the job is clearly understood, interferences and interfaces identified, contingency material ordered, special skills and tooling identified so that all anticipated problems are resolved and risk mitigated.

Complex or high risk jobs - Major jobs with complex conditions due to special plant conditions, system interface, interface with ship or other maintenance organizations, anticipated growth following opening and inspection, special tooling or skills, unique or special radiological conditions, safety concerns require a strategy to be developed so that all anticipated problems are resolved and the associated risk mitigated.

Jobs with a history of cost, schedule or quality problems - Jobs that have a history of problems due to unanticipated growth, inadequate management, tooling problems, special skills lacking, delays caused by changes in system status or setting of plant conditions, poor or inconsistent estimating practices, require additional planning and should be reviewed for process improvement. These jobs need to be flow charted and detailed sequences developed that will include risk mitigation strategies and plans for special tooling, skills and setting of plant conditions.

The AWP should be reviewed and a list developed of this type of work by A-9 and presented to shipyard management. Strategies for developing the plan for special attention jobs should be prepared between A-9 and A-4. This type of work should then be evaluated for additional detailed planning, which may consist of any or all of the following:

- Detailed special evolution schedules
- Work/Test Sequences
- Flow Charting
- Process reviews which may include flowcharting for developing efficiencies and eliminating bottlenecks
- Special Resource planning (e.g., Tiger Teams, Product Line Management)
- Mock-up Training
- Co-Yard Shipchecks
- Co-Yard planning
- Risk mitigation and quality management strategies per Sections 4.5.2 and 4.5.3.

Examples of special attentions jobs are as follows:

- Sonar Dome removal/installation
- Shaft removal/installation
- Thin Line Towed Array drum installation
- Reactor Coolant Pump replacement
- Sail components removal/installation
- Major electronic removal/installation

4.5.4.5.2 Contract Shop Work Requirements

Some shipyards have found it beneficial to assign portions of the work in an Availability to departments within the executing activity, but not under the direct control of the project team for accomplishment. Such assignment of work is termed "Contract Shop Work" and is typically used as a risk mitigation strategy to address a resource shortage. Use of the Contract Shop Work scheme has been shown to maintain efficient cost and schedule control when properly executed.

At the A-4 timeframe the project team will as a minimum:

- Develop a list of contract work and respective contract shops
- Request the contract shops conduct a job summary review and risk assessment (high, medium, low) for work assigned
- For all high risk work, contract shops will develop risk mitigation strategies

Shop 31 always has a large contracted work package and significantly contributes to the success of the Availability. A sample Shop 31 tracking report is provided in APPENDIX E. As a minimum, the tracking report will include:

- A detailed list of contracted components
- A prioritization of components (priority will be set by the project team)
- Shop 31's risk assessment for each component using historical data, lessons learned, material availability, and use of special tooling or equipment.
- Risk mitigation strategies for all high-risk components.

A written agreement between the project and each contracted shop is strongly recommended to ensure that both parties agree to the conditions of the contract. The contract should address funding, schedule, resources, material (software and hardware) process.

Funding - Both parties will agree on the level of SUPDESK control prior to line item control being transferred to the contract shop. It is recommended that the project retain Level 3 control and the contract shop Level 2. Manhour allowances as shown in TGIs provide the basis to measure cost performance of the contract shop. Should there be disagreement of manhours the contract shop will conduct job scoping meeting with engineering and planning to correct the work scope.

Schedule – A tracking system will be developed and maintained by the contract shop and status regularly reported to the project team. The minimum attributes of the tracking system are: scheduled/actual start date, scheduled/actual completion date, and scheduled/actual return to project date. The report will be used to monitor the contract shop's schedule performance.

Resources – The required Contract Shop resources to execute the schedule will be identified based on the shipyard's WARR and historical resource level schedules from other availabilities.

Material process - The material process includes both the software (technical work document) and hardware (material) which will be used by the contract shop to execute their work. The project team and contract shop will mutually agree to the required level of support that may include engineers, planners, and additional shop personnel.

4.5.4.6 Ship's Force and Contractor Work Integration Plan

Note: This new strategy is a consolidation of the 'Outside Activity Work Integration Plan' and the 'Ship's Force Task Integration Plan.'

This strategy describes the process that will be followed by the Naval Supervising Authority (NSA) to develop an integrated schedule for depot level submarine availabilities, DMPs, EROs and EOHs. The integrated schedule is the schedule the NSA will use to analyze schedule performance by all maintenance providers (i.e. Ship's Force, SUPSHIP contractors, Intermediate Maintenance Activities, Alteration Installation Teams (AITs), TYCOM sponsored contractors, etc.).

NAVSEA AND FLEET REQUIREMENTS. The governing instructions regarding the Integrated Schedule Development process for depot level availability scheduling are presented in this section.

The function of the NSA is defined in the Fleet Modernization Program Management and Operations Manual (NAVSEA SL720-AA-MAN-010) as follows:

> "The naval industrial activity responsible for the execution of Regular Overhauls, Complex Overhauls or other industrial availabilities which will result in configuration changes to the ship with attendant logistics support impacts. The NSA may be the overhauling Shipyard or SUPSHIP (ACO or PCO) as appropriate."

Sections 2, 6 and 9 of this manual address the specific oversight and management responsibilities of the NSA as applied to schedule, material, financial, and logistics control. This manual addresses the NSA's accountability to NAVSEA regarding the conduct of all work covered by the Fleet Modernization Program (FMP) which from a production standpoint includes all Title K alterations, machinery alterations, ordinance alterations, AITs and some elements of Title D alterations.

Scheduling requirements are contained in draft NAVSEAINST 4850.xx, Requirements for Scheduling CNO Availabilities, which is currently in review at NAVSEA 04X for issue. The following sections of the draft are quoted below and demonstrate the expectation that shipyards will produce a schedule that integrates all work that will be accomplished during the Availability:

> "3. The execution of availabilities assigned to Naval Shipyards within applicable cost, quality and schedule parameters requires the use of effective integrated, resource leveled to plan and monitor the execution of work, and properly manage critical shipyard resources. An integrated, resource-leveled schedule is a technically accurate sequence of work that considers resources and duration available to optimally accomplish work. An integrated schedule contains all shipyard and significant ship's force and other non-shipyard work items that must be accomplished during an Availability. A schedule is resource-leveled when the workload is within the committed workforce capacity. It is not a work list, but rather a plan that incorporates strategies and clearly reflects discrete timeframes when work items will be accomplished.

Compliance with the minimum schedule requirements of this instruction will:

> f. Integrate shipyard, applicable ship's force, and other non-shipyard maintenance activities (contractor, Alteration Installation Team (AITs) and Intermediate Maintenance Activities (IMA), etc.) work which potentially impacts shipyard schedules into one Availability schedule."

Enclosure (1) requirements:

> "6. e. Component Unit Phase Schedules (Availability schedules) shall show ship's force industrial work and Reactor Maintenance requirements which have direct impact on Availability Key Events. Schedules shall be provided to ship's force. Work to be performed by ship's force must be identified to the Shipyard, by ship's force, in a timely manner to support schedule development and issue. For large availabilities, such as aircraft carrier Planned Incremental Availabilities, Ship's Force should provide sufficient manning during planning and execution to support the integrated schedule development and maintenance.
>
> Availability schedules shall show non-Shipyard industrial work that has direct impact on Key Events. The responsible non-shipyard maintenance organization (contractor, Alteration Installation Team (AITs) and Intermediate Maintenance Activities (IMA), etc.) shall be provided a timetable by the shipyard. The non-shipyard maintenance organization is responsible to provide the work schedule and current status for inclusion in the integrated schedule by the shipyard. The Naval Shipyard Work Integration Filter, enclosure (2), provides guidance on what work shall be added to the integrated schedule and how the work shall be broken down to be incorporated into the schedule.
>
> Ship's Force and the other maintenance providers shall provide physical progress to the shipyard on a regular basis (normally weekly) at the level work is broken down. Organizations are responsible for providing responsive feedback to the project schedule. They shall be represented in the project management team and routinely receive required scheduling products. The project management team will clearly identify procedures for developing and maintaining the project's master schedule to the organizations performing the work. This will include the method to update the schedule network with progress on a routine basis."

The directives of the scheduling instruction are reinforced in the Joint Fleet Maintenance Manual (CINCLANTFLT/CINCPACFLTINST 4790.3). This document does not govern the actions of the shipyards but provides ships' Commanding Officers with the expectations of their chain of command. It is critical that the Project Superintendent and Work Integration Leader understand the content of Volume 2, Chapter 3 of the Joint Fleet Maintenance Manual which provides the fleet guidance on CNO availabilities. Section six of this chapter discusses the responsibilities of Ship's Force during the execution of an Availability. One of the stated responsibilities is to "Ensure Ship's Force work is integrated into the industrial activities schedule."

Several current NAVSEA instructions that address scheduling for naval shipyard availabilities provide valuable insight into past difficulties experienced in completing availabilities and the need for schedule discipline. The perspective gained from these instructions help provide some understanding of the evolution of the present scheduling system.

NAVSEAINST 4700.8a, Ch 1 of 24 Jan 1983, Policy for Performance of Depot Level Naval Ship Availabilities, states the following:

> "3. Poor depot level performance on naval ship availabilities is continuing to be a major problem for NAVSEA. We are plagued by inadequate schedule adherence resulting in late overhaul completion dates, questionable quality of workmanship and uncontrolled growth in work during overhaul"
>
> Enclosure (1) Policies:
>
> "2.d Field Commanders (Naval Shipyard Commanders and SUPSHIPs) are in charge of ensuring that overhauls are planned and executed on schedule"
>
> "3.a.(1).(a) An important mission of the Naval Shipyards and SUPSHIPs is to do what is right for the Navy. This means that Shipyard Commanders and SUPSHIPs will do everything possible to make each ship overhaul a success, within the constraints of law and regulation. They are expected to take the extra action (i.e., "go the extra mile") to ensure that the overhaul succeeds."

NAVSEAINST 4850.7 of 30 August 1982, Requirements for Scheduling of Naval Nuclear Propulsion Plant Production Work, establishes the naval nuclear scheduling policies for naval shipyards as follows:

> "2. Existing schedules for production work in the [six] naval shipyards engaged in the overhaul of naval nuclear propulsion plants vary in scope, content and detail. Such variations make assessment of yard schedule performance by NAVSEA and by local shipyard management difficult. Accordingly, it is necessary that a minimum set of standard requirements be established. These requirements will result in the following:
>
> a. Shipyard management can properly assess the yard's schedule performance to identify corrective actions or additional resources, as required."
>
> Encl (1) Schedule Requirements:

> "3.b.7 Shipyard schedules shall explicitly state ship's force involvement in shipyard work where applicable; relevant schedules shall be provided to ship's force for review and incorporation of ship's force work items which must be scheduled on a compatible basis with shipyard work. Work to be performed by the ship's force shall be identified to the shipyard in a timely manner."

NAVSEAINST 4850.9 of 28 February 1984, Requirements for Scheduling of Naval Ship Non-Nuclear Production Work, establishes the naval ship non-nuclear scheduling policies for naval shipyards as follows:

> "2. Existing schedules for non-nuclear work in the [eight] naval shipyards vary in scope, content and detail. Such variations make assessment of yard schedule performance difficult. Promoting commonality in shipyard scheduling improves the ability to assess shipyard performance and supports communication among shipyards. Accordingly, it is necessary that a minimum set of standard requirements be established to support the following objectives:
>
> a. Provide benchmarks by which shipyard managers can better assess overall status on a weekly basis.
>
> b. Assign responsibility for schedule performance.
>
> e. Promote uniformity of scheduling techniques in naval shipyards.
>
> f. Integrate ship's force and IMA work into shipyard schedules."

INTEGRATED SCHEDULE PROCESS OVERVIEW.

Work integration is not only development of an integrated schedule but joint planning, joint execution and continual dialog between the various maintenance providers and the ship. A "good integrated schedule" can never substitute for good teaming and communication with the ship. It is imperative that the Shipyard and Ship's Force team members receive adequate training in Team Building, Shipyard scheduling philosophy and products and Work Control processes. During early planning it is imperative that each non-shipyard work activity provides a single Point of Contact to facilitate communication on interface issues.

During execution, co-location of the work integration team with work and test control facilitates the same process to be used for all maintenance providers for release, progressing and certification of work. It is also very important that shipyard Zone Manager and Ship's Force Zone Manager communicate regularly during execution to coordinate "deck plate" schedule interfaces that cannot be foreseen in a schedule. Experience has shown that inadequate communication at that level results in interface work not getting the necessary weekly review and interrupts the smooth flow of work. The process for developing an integrated schedule is shown in Figure 4.5.4.6-1.

PLANNING PROCESS

Since little opportunity is provided to plan the Availability during the execution phase, an intentional effort to capture all maintenance activities work sequencing and priorities shall be incorporated in the integrated schedule prior to the start of the Availability.

Forming and Training the Work Integration Team

The Shipyard Work Integration Leader will be assigned at approximately A-12 (part time leading to full time approximately A-6) to train and provide guidance to the Ship (Availability Coordinator and MIC team) and to manage coordination of AITs in accordance with NAVSEA Technical Specification (NSTS) 9090.310 (latest revision) (Alterations to Ship Accomplished by Alteration Installation Teams), SUPHIP contractors and other government sponsored contractors.

The Shipyard Work Integration Leader is responsible for coordination of all training of Work Integration Team members in the topics of project management philosophy, principles of work integration, the guidance of this manual, use of SFIS and AIM data base, shipyard work controls (Codes 246 and 2340 leads for training) and schedules and is responsible for managing the process from the beginning of planning through execution.

The Availability Coordinator for the ship (LDO) will be assigned at A-12 to the ship. The Work Integration Leader will train and familiarize the Availability Coordinator with Shipyard work processes and will set up a training program that coincides with the Availability Coordinator's attendance with Project Management College Phase I.

The Work Integration Leader will liaison with the SUPSHIP/FISC representatives as work is contracted out. It is imperative that the project team invests sufficient time to adequately develop the subcontractor specifications and integration philosophy prior to releasing bids for contracts.

The Ship Availability Coordinator as part of the Work Integration Team will be responsible for the following:

- Planning Ship's Force work including reviewing the AWP and screening out work that the ship does not plan to accomplish, clarifying the scope of JCNs, estimating and breaking down the work in assisting the shipyard for AIM entry.
- Obtaining commitment from the Ship work centers on actual dates that the work and PMS will be performed
- Developing milestones for ship's force work
- Identifying desired schedules and schedule outputs for ship work
- Working with the Shipyard in training a group of Ship's Force personnel to perform work control functions.

Memorandum of Agreement/Standard Work Practices

Memorandum of Agreement (MOA) between the Shipyard and Ship (or Type Commander instruction that promulgates Shipyard developed Standard Work Practices (SWP)) delineate Shipyard and Ship's force duties and responsibilities during preparation for and execution of an Availability. These are typically Shipyard policies and practices that the Ship is not familiar with. The Shipyard must provide these MOAs or SWPs to the ship early in planning and train the ship on the policies and practices contained therein. The list of MOAs or SWPs for a DMP, ERO or EOH includes the following:

- Reactor Plant Work and Quality Control
- Reactor Plant Instrumentation and Control System Alignment and Turnover
- Radiological Control
- Non-Nuclear Test Program
- Non-Nuclear Work Authorization
- Steam Plant Cleanliness
- Piping System Cleanliness Level II and Level III
- Environmental Protection
- Occupational Safety and Health
- Hotwork
- Shipboard Security
- Radiography
- Space Closeout and Nonnuclear Ship's Systems
- Maintenance Coordinator and Integration
- Subsafe

Identifying all Work and Testing and Other Schedule Impact Evolutions/Certifications

The Work Integration Team must collectively study the AWP to understand the impact of all maintenance providers' work on one another. In addition, the team must consider all other Ship's evolutions; certifications and requirements that may impact schedule performance during the Availability. The AWP does not capture the full measure of work that Ship's Force will be required to do. In addition to the repair and installation work that is usually well documented in the AWP, the ship has Preventive Maintenance Schedule (PMS), other calibrations, evolutions and certifications that may be required but are not listed in the AWP:

Propulsion plant PMS dates must be obtained from the ship by A-4 (vice quarter-by-quarter) so it can be integrated with the other work to prevent impact on key events. Review all PMS for the quarter before the Availability, during the Availability, and quarter after the Availability. Also, equipment that will be laid up must be identified so that the PMS is not scheduled for that equipment. For equipment placed in lay-up during the Availability (IEM), start-up PMS and testing shall be entered into AIM in order to support key events.

The Ship must perform a number of certifications prior to becoming operational. Preparation for these certifications will require a level of training to be achieved and may require special Preventative Maintenance to be accomplished. The Joint Fleet Maintenance Manual CINCLANTFLT/CINCPACFLTINST 4790.3), Chapter 3 Appendixes, provided by ship type, list the expected certifications that the Ship will be required to perform. These certifications include major evolutions such as PORSE/RSE and specific weapon certifications. Additionally, Trial and Inspection, and the dock and sea trial requirements are listed in Appendices S, U, V, AN, and AO of the Joint Fleet Maintenance Manual. Early in the planning phase the Project Team must become familiar with these requirements and schedule the certifications the ship will be required to accomplish. The training and PMS requirements can then be properly programmed and a more realistic completion date for the completion of industrial work can be achieved. The Ship may have other special evolutions that will be performed during the Availability that could impact the performance of the work in accordance with the schedule such as change of commands, tours by dignitaries, special drills, etc. These must be identified by A-4 so that any impact on the schedule can be documented through the use of schedule activities.

The Work Integration Team shall identify all contractor work (SUPSHIP, AIT, Original Equipment Manufacturer (OEM), Reactor Plant Prime Contractor (RPCO) component contractors, Type Commander contractors and any other contractor) that will be accomplished during the Availability.

Memorandum of Agreement may be necessary to ensure contractor compliance with shipyard practices and requirements that they are not familiar with, and delineate specific Shipyard duties and responsibilities. Any requirements necessary for the contractor to perform which will affect the Shipyard's ability to operate legally must be contained in the contract in order to hold the contractor liable to perform that requirement.
Identify risk factor for each contractor job (based on past performance, importance to critical path work, etc.) similar to shipyard work. These risks need to be mitigated with the Contract Sponsor/contractor during the Availability planning.

NAVSEAINST 4350.2B requires that all contractors working on naval vessels be approved before they are allowed to work shipboard. The Work Integration Leader is responsible to ensure this requirement is met before contractor personnel work aboard.

Examples of jobs that are often worked by contractors and must be included in the schedule are as follows:

- HPAC overhaul
- 500 KW SSMG cleaning/repair
- Tank Capacity Gage repair/replace
- CO H2 Burner repairs
- CO2 Scrubber repairs
- O2 Generator work
- AN/WLR-8 repair/test
- AN/BRD-7 repair/test
- VLS support
- CSAP conducted dockside or at sea

The Work Integration Leader acts as the Maintenance Coordinator for AIT management. In preparation for this role, the Work Integration Leader must review and become familiar with the Fleet Modernization Program (FMP) including OPNAVINST 4720.2 (series), Fleet Modernization Program Policy, NAVSEAINST 4720.11 (series), Shipboard Installation and Modification performed by Alteration Teams and NAVSEA Technical Specification 9090-310 (latest revision), Alteration to Ships Accomplished by Alteration Installation Teams. The timeline for AIT funding and development is shown in Figure 4.5.4.6-2.

The Work Integration Leader in coordination with the Project Superintendent/Project Engineering and Planning Manager must develop a complete AIT list by the Final Planning Meeting (FPM) and become familiar with the scope of each Alteration.
After the contractor is awarded, the Work Integration Leader together with the Regional Maintenance and Modernization Coordinator Office (RMMCO) gatekeeper must validate the AITs qualification and pedigree to meet the requirements of the NAVSEA Technical Specification 9090-310 (latest revision). A list of all contractors and government activities with a NAVSEA approved quality system is located at the Alteration Management Planning website.

The Work Integration Leader should attend the AIT Conference (normally just following the FPM) along with the AIT managers.

The Work Integration Manager should work with the AIT sponsors to ensure that all AIT schedules are submitted to the NSA by A-6 months as required by NAVSEA Technical Specification 9090-310 (latest revision) section 3.2.4 so that the schedules can be incorporated into the integrated schedule by A-4. It is very important that these schedules are provided at A-6, so that the NSA can integrate them into the master schedule early enough for all maintenance providers to review the integrated schedule and plan their work, testing and Ship's Force training prior to the start of the Availability.
A MOA should be prepared and signed by the AIT Manager, Shipyard and Ship prior to allowing the contractor on the ship.

A Work Integration Leader / AIT Coordinator checklist is included in Figure 4.5.4.6-3.

Ship's Force Work Integration System (SFIS)

Ship's Force Work Integration System (SFIS) is a Microsoft Access database originally developed for managing ship's force work at Portsmouth Naval Shipyard and turned over to the Naval Systems Support Group (NSSG) for configuration control and support. The program supports pre-availability deficiency collection described in APPENDIX D (*Begin Work Discovery Period),* the Authorized Work Package (AWP) SWLIN 002Y07 (*Deficiency Management System),* and compartment closeout and pre-event walk-through deficiency collection (Section 4.5.4.3, Strategy for Plant/Space Preparation for SS00 and HB00). The SFIS database is divided into the following three sections:

- DMTS – Deficiency Management Tracking System. This section is used to track deficiencies identified in work discovery periods. Items can be assigned to SY or SF for correction. The DMTS section will be maintained by the Project. This system is loaded into the AWP in Issue 3 to the AWP.
- IDL – Inspection Deficiency Log. This section is used to identify deficiencies identified by the ship and shipyard during technical assessment, Material Condition Assessment Program (MCAP) inspections (pre-arrival, weekly, final walkthrough, management and NRRO), Ship's Force inspections, Groom Team inspections, and Space Closeout. (Note: A separate hard copy Steaming Log will be used in place of the IDL for IPPTP). Items can be assigned to shipyard or ship's force for correction. The IDL section will be maintained by the Project.
- SFW – Ship's Force Work. This section is for tracking minor Ship's Force tasks that need to be tracked, but do not warrant entry into AIM (items should not be tracked in both databases). Deficiency items assigned to ship's force in the DMTS and IDL section are also automatically displayed in this section. The ship and Project should agree on what other tasks will be tracked in SFW (they may include gage calibration, small valve maintenance, qualifications, etc.). Utilize the filter (described below) to determine which ship's force work items should be entered into SFIS and what should be entered into AIM. The SFW section is maintained by ship's force with oversight by the Work Integration Leader (WIL).

Training on how to use this program should be provided by the shipyard as part of their Availability training plan. Execution of this training and implementation of SFIS for the Availability should be tracked in the project planning timeline (PPTT).

Filtering Work into the Integration Schedule

The Project Team (shipyard, Ship's Force, and SUPSHIP (if applicable)) will determine what work items and the level to which work is broken down to be included in the schedule. Figure 4.5.4.6-3 provides a logic diagram, acting as filter, that should be utilized to evaluate the work items screened to other maintenance providers. All work identified in the AWP, Reactor Plant PMS maintenance (quarterly and greater) and other major Ship's Force evolutions will flow through the filter and be evaluated for entry into the schedule. The filter captures those work items that have the potential to impact the schedule at the key event level and thereby jeopardize the outcome of the Availability. These are the work items that the Project Superintendent, acting as the NSA must be aware of. The Project Team may choose to include all work items in the schedule. This will provide the benefit of a more detailed picture during execution and increased ability to manage key events and assist the Ship in managing their work. Some level of filtering should be always be performed to eliminate non-work items such as line items which provide Ship's Force material and funding only.

The project team should develop a ship specific list of standard ship's force tasks to be entered in AIM/PSS. Note pre-availability training should be entered into the PPTT. This list should be developed with the ship through the Ship's Availability Coordinator. The Shipyard should provide a draft initial list at FPM for the Ship to comment on and provide back at approximately A-3. The ship specific list should be developed from the standard set broken down into four categories listed below:

Training:

- Pre-availability (PPTT)
- Arrival
- Nuclear I&C Equipment (Shipyard and vendor)
- Prime Standard Alignment
- Combat System
- Sonar
- Fire Control
- PORSE/RSE work-up
- Phase II Crew Certification
- Fast Cruise

Work:
- Maintenance
- PMS/RPPMS (quarterly and greater)
- Off-load
- Valve Protection
- Diesel Layup
- Diesel Startup
- Carbon Steel Pipe Inspection
- Preservation
- System Transfer (Undock)
- Tag-out transfers (Undock)
- System Transfer (Propulsion Plant Testing)
- 400/500 Series System Transfer
- Move Aboard

Testing:
- Switchgear
- Time Response

Inspections and Certifications:
- ISIC Arrival
- Radiation Health
- Quality Assurance
- Diesel
- Salvage
- Battery
- Dock Trials
- Space Grooming
- Pre-PORSE/RSE
- PORSE/RSE
- Gallery Inspection
- Navigation Certification
- TEMPEST
- Phase I Crew Certification
- Phase II Crew Certification

For the NSA, the integrated schedule will be the tool used for execution of all their work including resource leveling; therefore, the work break down will need to accomplish these goals. Other maintenance providers (i.e. SUPSHIP/FISC contractors, AITs, IMAs, TYCOM sponsored activities, and other government sponsored activities) may choose to use supplementary schedules as tools to more adequately schedule and resource level their work. The level of work break down in the integrated schedule for their assigned work will be as necessary to integrate with the other maintenance providers and provide progress reporting to the NSA.

Work Break Down and Data Entry into AIM

All work identified in the AWP shall be entered in AIM at the Ship's Work Line Item Number (SWLIN) Line Item level. (Initial package will be auto-loaded.) Additional non-shipyard work (Ship's Force evolutions and PMS, SUPSHIP/FISC contractors, AITs, IMAs, TYCOM sponsored activities, and other government sponsored activities) will be evaluated to determine if it is required to be entered into the integrated schedule. The Work Integration Filter, Figure 4.5.4.6-3, shall be used for this determination. Detailed CU phases will be entered into AIM for non-shipyard work that interfaces with shipyard work, testing, or key events. Re-use AIM products (especially PMS) from previous availabilities as much as possible. This will result in savings in cost and time but also will capture previous lessons learned. Each CU phase will generate scheduling activities and support Test Event Readiness.

If schedule entry is required, the Work Integration Filter as supplemented by the following guidelines shall be used to determine work break down and entry into AIM:

Work will be sufficiently broken down so it can be scheduled and accomplished without interruption. Work that supports a key event will be broken down so the CU phases/Schedule Activities do not cross the key event.

Separate AIM job summaries for each non-shipyard maintenance provider will be created. The shipyard will integrate non-shipyard work in shipyard AIM job summaries when action is required by other maintenance providers to support shipyard work.

Accomplishing activities shall analyze each maintenance provider's work package and identify interfacing work.

Specific breakdown for each of the non-shipyard maintenance provider's work shall be as follows:

Ship's Force propulsion plant work and testing will be scheduled by creating CU phases in AIM. Review all PMS for the quarter before the Availability, during the Availability, and quarter after the Availability. CU phases shall be created for quarterly and less frequent Reactor Primary plant PMS and semi-annual and less frequent for Secondary plant PMS including items deferred until the Availability and items that are prudent to do during the Availability which are scheduled for the quarter after the Availability. PMS items for equipment that is laid up during the Availability shall not be scheduled. For equipment placed in lay-up during the Availability (IEM), start-up PMS and testing shall be entered into AIM in order to support key events.

Remaining Reactor and Secondary plant PMS will be reviewed and all depot level PMS items and items affecting work, testing, or key events will be added into AIM. Work and maintenance items will be broken down to support shipyard work and testing.

Ship's Force non-propulsion plant work and testing will be scheduled by developing CU phases in AIM. Work and maintenance items will be broken down to support other maintenance provider's work and testing. Non-propulsion PMS will be added by creating CU phases in AIM only if it is accomplished as part of shipyard work or is a required re-test of shipyard or other maintenance provider's work, or start-up PMS and testing for equipment placed in lay-up during the Availability (IEM). Ship's Force work shall be sufficiently broken down so that all inter-relationships can be sequenced in the schedule.

The work break down will normally consist of two CU phases including replacement/overhaul and testing. For habitability work (e.g., painting, floor covering, bunk replacement, etc.) and other items agreed to mutually by the Project Team, work will be broken down with one CU phase per work item by compartment.

In general, non-interfacing SUPSHIP/FISC contractor work will be entered as a CU phase or CU phase assembly per contract specification item. The shipyard will break down work and develop CU phases in AIM for SUPSHIP/FISC contractor work that interfaces with the shipyard so interrelationships can be sequenced in the schedule. SUPSHIP/FISC contractor work that interfaces with other maintenance providers' work will be evaluated by the Project Team to determine if further work break down is required in order to manage and progress the work. If the work is further broken down, the team will determine if additional CU phases in AIM or Scheduling Activities in PSS will be developed. If the Project Team determines that the work integration justifies the use of AIM Test and Event Readiness, then the shipyard will develop CU phases in lieu of Schedule Activities.

RMC/IMA work and testing will be scheduled by creating CU phases in AIM. RMC/IMA work, in general, ship to shop work shall be broken down into four CU phases including removal, shop overhaul, reinstallation, and testing.

In general, AIT work will be entered as a CU phase or CU phase assembly per AIT. AIT work will be broken down by primary compartment effected to identify interfaces with other maintenance providers. The shipyard will develop additional Schedule Activities in PSS, or CU phases in AIM as appropriate for AIT work that interfaces with other maintenance providers.

In general, government sponsored activities work will be entered as a CU phase or CU phase assembly per work item. This work will be broken down by primary compartment effected to identify interfaces with other maintenance providers. The shipyard will develop additional Schedule Activities in PSS, or CU phases in AIM, as appropriate, for the work that interfaces with other maintenance providers.

Ship's Force Participation in the Ship Preservation Plan

Past projects that have produced the most successful preservation programs have been those that have utilized crew manpower integrated with the shipyard preservation plan. Specifically, the project team should consider ship's force as a manpower resource for the total preservation work of the Availability but should not break up the preservation work into separate shipyard and ship responsibilities. Supervision and responsibility for the preservation should remain entirely with the project team zone managers and shipyards paint shop supervisory personnel. Since the preservation effort is a task that is conducted across all work boundaries (space and systems), it is recommended that the project team identify a single manager as the preservation coordinator for the entire ship. Likewise, the ship should identify an individual to coordinate ship's force participation in the preservation plan.

Schedule Development and Issue

The Work Integration Team should come to agreement on milestones for contractor work and key Ship's Force evolutions and certifications based on the AWP. Following the scheduling of the non-shipyard work and prior to resource leveling, proper cross-ties shall be made in the integrated schedule by applying the planning strategies that were developed earlier. The schedule must include all critical predecessors, successors and cross-ties between all maintenance activities work. Refer to the process in Figure 4.4.1.

EXECUTION PROCESS

The Work Integration Team manages entry of all new non-shipyard work during execution and the release, progress and closure / certification of all this work. The Integrated Work Test Control becomes the "one-stop shop" for coordination of Work Authorization Forms (WAF) and certifying closure of the shipyard, ship and all maintenance provider's work.

Releasing Work

The Shipyard and Ship's Force will be integrated into one Integrated Work Control group. All WAFs, system isolation and tag-outs (including contractor) will be coordinated through this group. The Integrated Work Control group will co-locate during the pre-availability work period at approximately A-1 month.

Progressing Work

All non-shipyard work activities will report physical progress at the level work is broken down.

Ship's Force Zone Managers will report progress weekly to the Work Integration Team for progressing in AIM for each Ship's Force CU phase.

SUPSHIP/FISC contractors or other Government sponsored activities will report progress weekly to the integrated Work Control group for progressing in AIM for each CU phase or shipyard scheduler progressing for each Schedule Activity.

RMC/ IMA will report progress weekly to the Integrated Work Control group for progressing in AIM for each CU phase or shipyard scheduler progressing for Schedule Activities.

AITs will report progress weekly to the Integrated Work Control group for progressing in AIM for each CU phase or shipyard scheduler progressing for each Schedule Activity.

Certification of Work

Following completion of work, each maintenance activity including the ship will report to the integrated WPC group for clearing the tag-out and closing the WAF. The integrated WPC group will issue a Short Form TGI (or similar work certification form for that work item) for the maintenance activity to sign certifying that the work is complete. Following certification of work completion, Work Packaging and Control will update AIM to reflect closure and certification of the work.

Figure 4.5.4.6-1: Work Integration Schedule Development Process

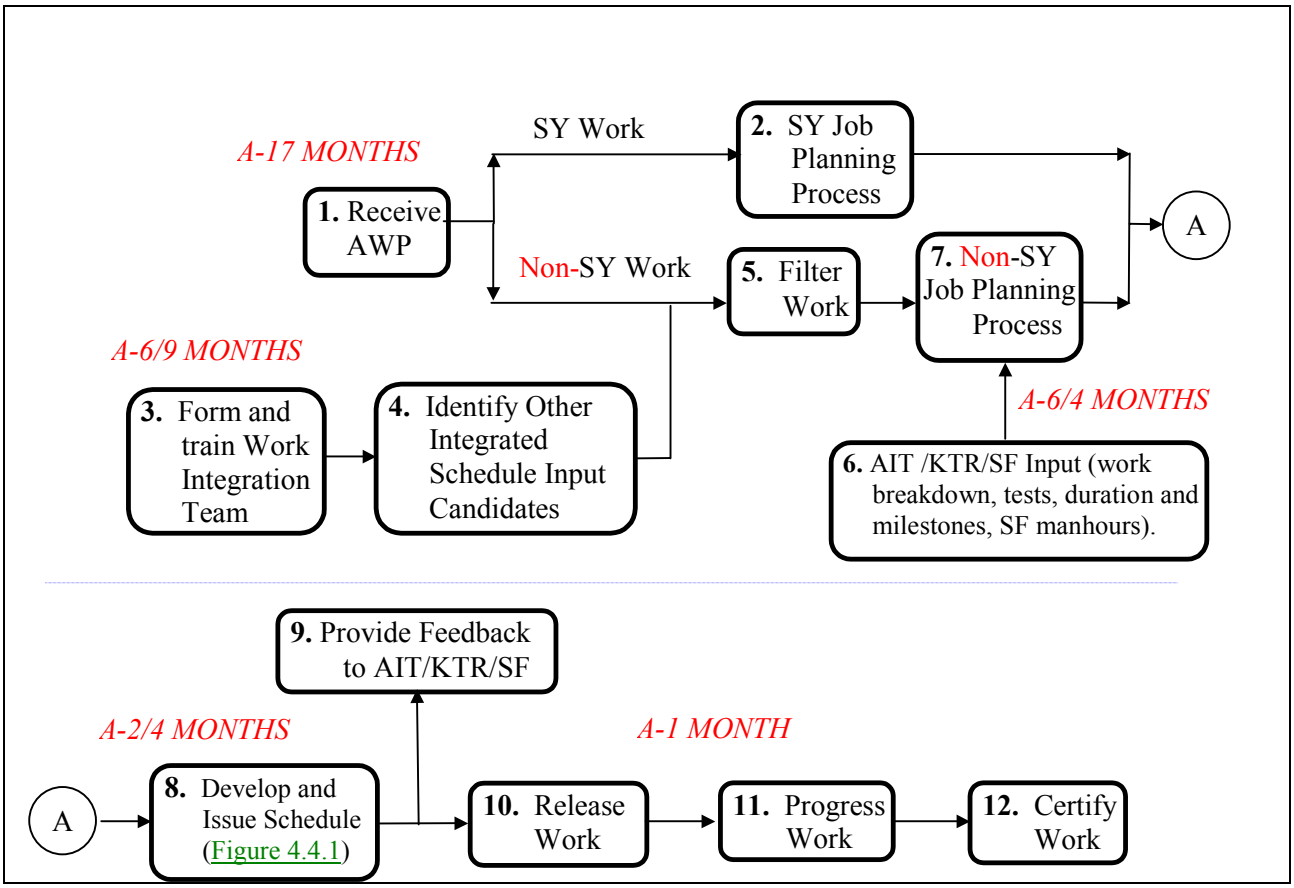


Figure 4.5.4.6-2: AIT Funding and Development

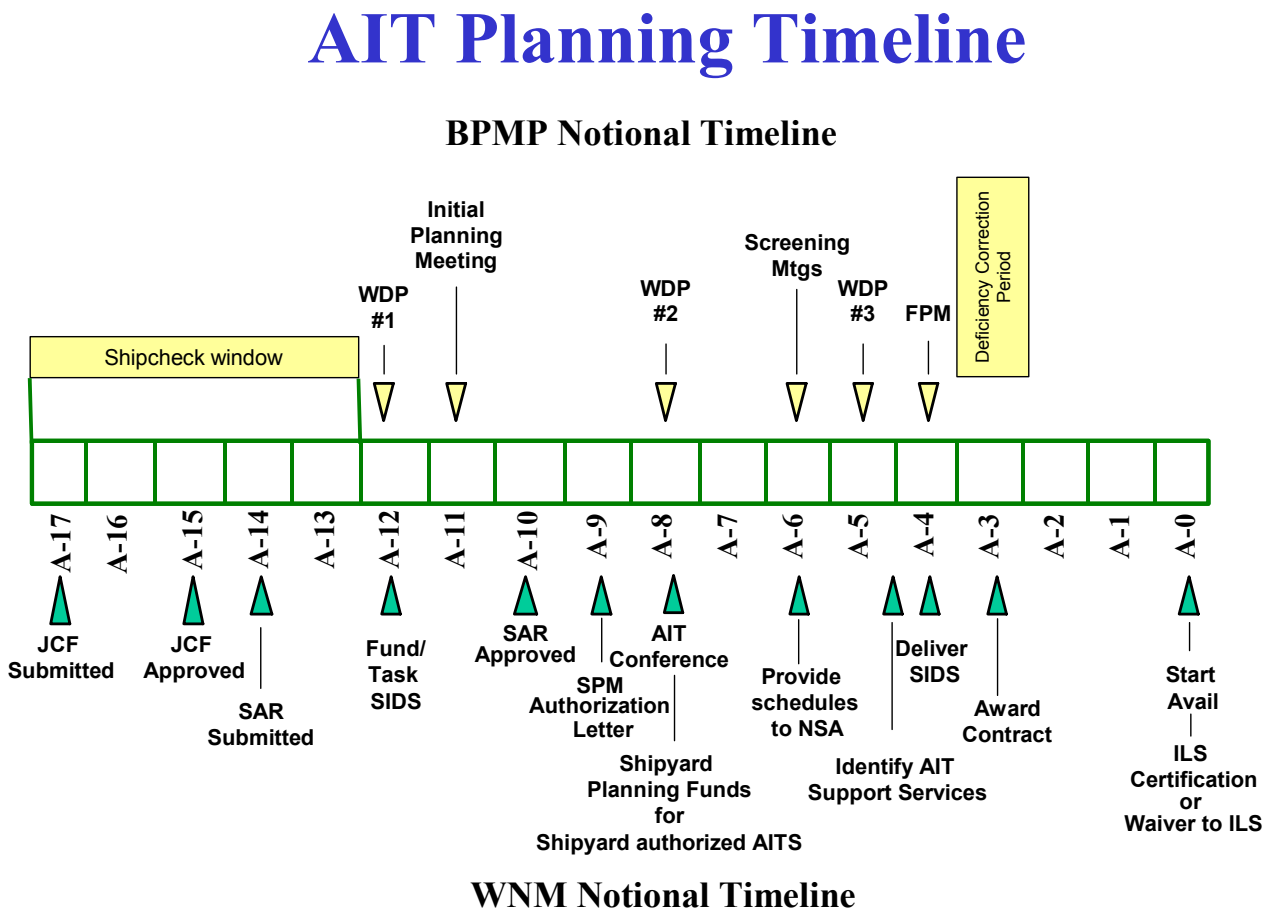
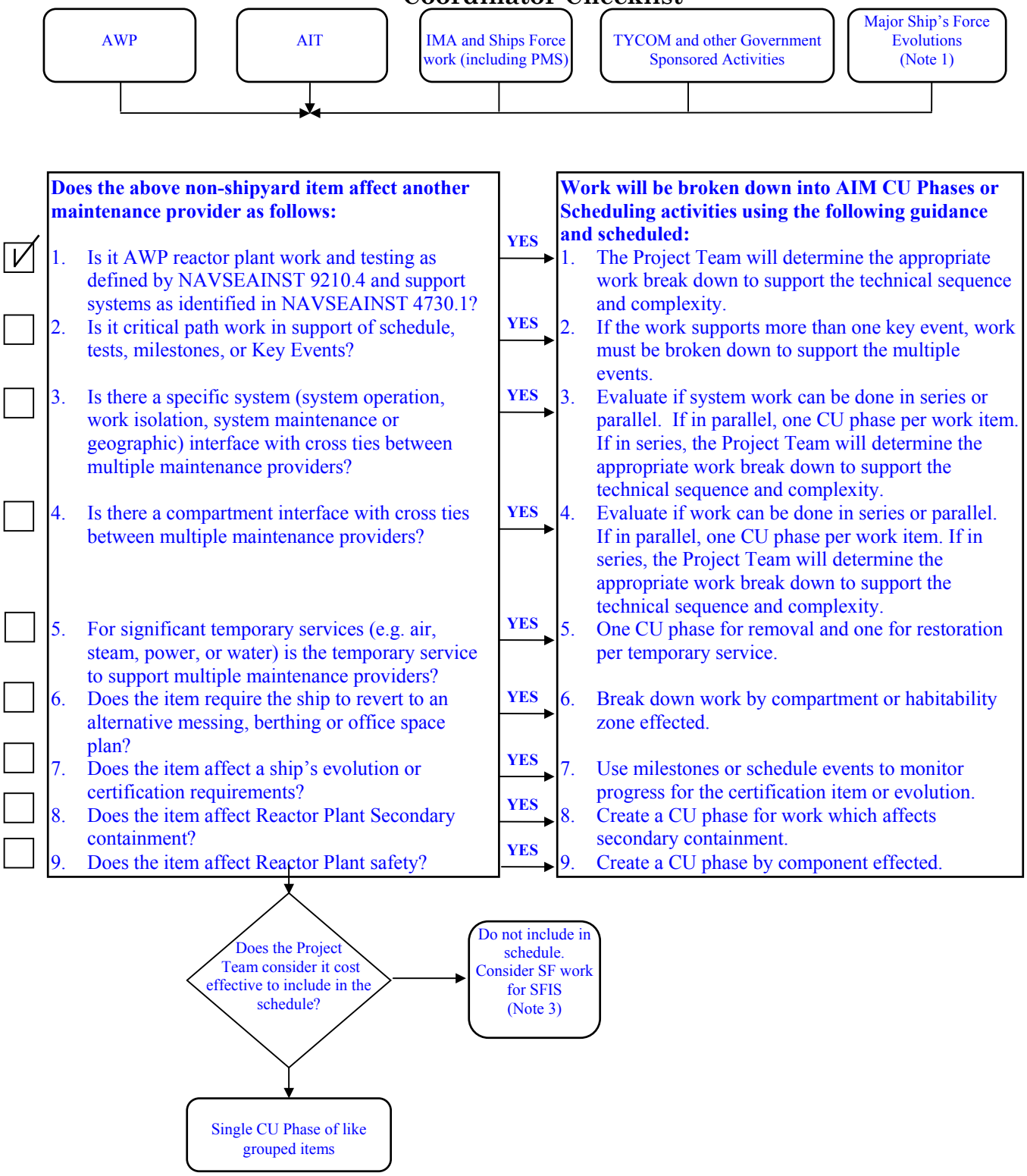


Figure 4.5.4.6-3: Work Integration Leader/Maintenance Coordinator/AIT Coordinator Checklist



NOTE 1. SHIPS FORCE EVOLUTION (e.g. CERTIFICATIONS, CHANGE OF COMMAND, RSE/PORSE, etc.)
2. e.g. JCN'S FOR MATERIAL OR SWLINS FOR FUNDING ONLY
3. WHEN NEW WORK ITEMS ARE ADDED, THE WORK THAT DROPPED THROUGH THE FILTER WILL HAVE TO BE RE-EVALUATED BY THE FILTER
4. CHECK LIST - MULTIPLE CHECKS RESULT IN BREAKING DOWN WORK TO MEET ALL INTERFACE CONCERNS.

4.5.4.7 Communications Strategy

The ability of the project team to communicate effectively is a critical success factor in the development and maintenance of the project team, and ultimately the project. Communication takes many forms, and can be as simple as a phone call or as complex as a detailed planning timetable. This communication strategy outlines how information will be shared resulting in effective communications among team members and with outside organizations.

The following topics should (as a minimum) be addressed in a project communications strategy:

- Schedules to be developed and shared between organizations
- Meetings that will occur including time, participants and purpose
- Distribution requirements for letters and memoranda
- Special briefings
- Events requiring notification
- Use of communication tools (i.e., e-mail, pagers, radios, etc.)

The following information illustrates how some of these topics can be addressed.

1. Schedules

The ship and all involved organizations must know what the plan is and what they must do to support the plan. This should be accomplished by the project communicating current schedules and priorities to all appropriate organizations.

Key Event schedules should be issued to the customers' organizations and all organizations managing project work.

The ship and all involved organizations will be provided copies of special schedules such as temporary support system schedules, fast start schedules, individual job schedules, critical path schedules, high level tasks, executive summary schedules as required.

The Daily Production Schedule is the primary method for controlling production work on a daily basis. This will be promulgated to all activities conducting work and reviewed each week.

2. Project Meetings

An essential part of communications in the project involves regularly scheduled meetings in which the project team members interface. The following is a partial listing of some of meetings that should be conducted and their periodicity: daily production meeting, nuclear/non-nuclear interface meeting, backshift planning meeting, weekly cost and schedule reviews, project quality meeting (weekly). Through these meetings, the work of the project is controlled, key personnel both internal and external to the project are allowed to interact, and information is promulgated to allow for closer coordination proper integration of every project effort.

The single most important meeting for project managers to ensure production is progressing as required to support scheduled events is the Daily Production Meeting (i.e., Daily Production Plan of the Day). At this meeting, the project should focus on the KEY ITEMS that are expected to be accomplished in the next one to three days.

The meeting should be SHORT (no more than 20 to 30 minutes for both nuclear and non-nuclear issues) and PRECISE. It is not a meeting to review and discuss the entire schedule for the upcoming week or even next few days. It is a time to provide clear expectations of what is expected to happen, resolve or assign responsibility to resolve any issues/problems and discuss coordination of items for the short term. A short-range schedule (one to three days) may be produced if desired. A list of the priority issues facing the project for that day would also be sufficient. At the end of the meeting, however, it should be PLAINLY CLEAR to all participants what actions should occur that day and who is responsible for accomplishing what actions. Minimum attendees should be as follows: APSs, ZMs, CTEs, PEPM, scheduler, Trouble Desk representative and Ship's Force representative.

3. Distribution Requirements for Letters and Memoranda

Distribution of memoranda and letters associated with the project should be carefully determined on a case-by-case basis. All organizations that are directly affected by the information contained in the communication should be included on distribution. Consideration should also be given to distributing documents to organizations that could benefit from the information contained in the communication. When uncertainty arises concerning what distribution to make on a particular document the project superintendent and/or DMP/ERO/EOH Coordinator should make the final determination.

The DMP/ERO/EOH Coordinator should be on the distribution for all letters and memoranda that leave the project. The Coordinator makes internal distribution on the ship as required. The Naval Reactors Representative is on the distribution list for all letters and memoranda concerning nuclear matters.

4. Special Briefings

Special briefings should be conducted to appraise senior shipyard management of the status of the project at critical points in the Availability (e.g., undocking, IPPTP). The ship's Commanding Officer, the Shipyard Commander, the TYCOM rep, the Naval Reactors Representative, and the NAVSEA Shipyard Representative should be invited to all periodic progress reviews.

5. Events Requiring Notification

Emergency situations - The project team agrees to the terms of Ship's Force and shipyard emergency notification procedures. The Project Superintendent and designated Ship's Force representative must be notified immediately of any emergency situation occurring on the ship when in the shipyard. Provisions for notification of the Engineering officer, Naval Reactors Representative, and NAVSEA Shipyard Representative are also to be specified.

Significant Delays in Ship's Schedule - The ship's Commanding Officer, Shipyard Commander, TYCOM Rep and the senior management from all involved organizations are informed when a key event date is determined to be in jeopardy.

Significant deviation from or delay in the Daily Production Schedule - Upon discovery of any situation, which creates a deviation from the daily production schedule the cognizant organization should notify the applicable zone manager. If not resolved, the applicable Assistant Project Superintendent should be notified.

6. Memoranda of Agreement (MOA)/Standard Work Practices

All MOAs and standard work practices should be briefed to zone managers, assistant project superintendents and the DMP/ERO/EOH Coordinator to ensure a complete and consistent understanding of the content and intent of each MOA. Similarly, the DMP/ERO/EOH Coordinator with the assistance of the project team if required should brief Ship's Force. All MOAs should be issued prior to Availability start.

7. Communication Tools

- All key project team members should be issued pagers.
- The Project Superintendent and DMP/ERO/EOH Coordinator jointly maintain updated phone lists of all managers' phone numbers including pager, cell, home and work phone numbers.
- All key project team members should be assigned e-mail addresses.

- The project team should consider issuing cellular phones to all key personnel including first line supervisors.
- Fax machines

General Communication Standards

"Seek first to Understand." Many communication problems can be directly attributed to misunderstandings and inaccuracies. These are less likely to occur if feedback is utilized. For example, ask questions to determine if the message was received as intended or ask the receiver to restate the message.

Simplify Language - Structure messages in ways that make them clear and understandable. Consider the audience for whom the message is intended. Jargon can facilitate understanding when is used with group members who speak that language but it can cause innumerable problems when used outside that group.

Listen Actively - Listening is an active search for meaning, and requires intellectual effort. The goal is to receive the full meaning of a communication without having it distorted by premature judgments or interpretations.

4.5.4.8 Combat System Availability Planning and Execution Strategy

Note: This new strategy was developed as a result of the Corporate Combat Systems Test Team efforts to standardize Combat Systems work package development and testing. The CSO, as the subject matter expert, is tasked with the development of this strategy for each project.

The Combat Systems work package planned for an Availability is normally not in the controlling path during the planning phase. However, history has shown that late identified work and alterations often push the Combat Systems area into or near the critical path of our submarine availabilities. The Combat System Availability Planning and Execution Strategy addresses three areas that historically have been Combat Systems problem areas: the Combat Systems Assessment Plan (CSAP), Combat System modernization, and off station repair of Combat System component parts.

The Combat Systems Assessment (CSA) is critical both in identifying work in order to drive test failures out of the end of Availability Work Period and to verify "ready for sea" systems and portions of systems not worked during the Availability but laid up for extended periods.

The end of Availability CSA verifies that Combat Systems not otherwise tested during the Availability are tested and verified to be ready for sea. The requirement that equipment laid up in excess of six months be tested and certified ready for sea is contained in NAVSEA Instruction 9093.4. The requirement that systems laid up but not worked during the Availability be tested late in the Availability has the potential for identifying new work which can affect the end of overhaul schedule. The Project team must develop and follow a plan that results in combat system light off and the CSA starting with enough float in the schedule to correct some test failures late in the Availability. If the pre-availability CSA is accomplished successfully these test failures will be limited to electronic component failures with low probability of affecting the Projects end of Availability schedule.

Combat Systems modernization has on occasion presented a problem due to the late breaking nature of some alterations. Review of the drivers behind combat system modernization indicates that late authorization of some combat system alterations is unavoidable. The Project team must have a strategy in place with the flexibility to deal with this in a realistic fashion. Project manning, schedule, work interference and interface with other work and organizations must all be considered.

Off station repair of Combat Systems components is mandated by the AWP for some equipment and also is a prudent decision for some work tasked to the Shipyards. Although the expertise of a depot or original equipment manufacturer may save costs and schedule it also brings with it the inherent risk of being dependent on the off station organization to meet the Project Schedule. History has shown that the Project team must maintain communications with the assigned repair organization on a regular basis to avoid the surprise of late equipment delivery. Each Project should tailor this section to reflect actual components farmed out for repair and to assign internal actions and milestones for checking progress on these off station repairs. Overall responsibility for the Combat Systems strategy rests with the Combat System CTE assigned to the Project. However, it is vital that the other lead Project Team members become intimately familiar with the Combat Systems Strategy and their responsibilities in accomplishing it.

A draft "Combat System Availability Planning and Execution Strategy" that can be tailored by the CTE for each availability can be found on the corporate BPMP web site: http://nssg.nnsy.navy.mil/subhome/ and select “BPMP Site”.

4.5.5 Development of Optional Execution Strategies

Figure 4.5.5 identifies optional execution strategies which project teams may elect to develop to support and enable specific project activities. This list is not all inclusive and should not prohibit the Project from developing additional strategies as deemed necessary. The attributes and format of optional strategies should be consistent with the requirements specified in Section 4.5.1. Examples of these optional strategies can be found on the corporate BPMP web site: http://nssg.nnsy.navy.mil/subhome/ and select BPMP Site'.

Figure 4.5.5 "Optional Execution Strategies"

Optional Execution Strategies
Financial Plan
OSHE Plan
Locker Strategy
Sail Work Strategy
Painting and Preservation Plan
Tank Work Strategy
IPPTP Strategy
Shipboard Cleanliness Plan
Facilities and Special Tooling Strategy
Padeye Installation Strategy
Technical Availability (TAV) Strategy
Personnel Exposure Control (MANREM) Strategy
Lessons Learned Strategy
Multiple Shift Management Strategy
Critical Path Management Plan
Essential Elements for Success Plan
Destructive Weather Plan
Multiple Shift Strategy
Muster Plan
Trouble Desk Management Plan
Overtime Management Plan
RC Work Coordination Strategy
Hull Cut Strategy
Hatch Strategy
Combat Systems Planning and Execution Strategy
Baseline Submarine Preservation Strategy

4.5.6 Shipyard Standard Procedures, Instructions and General Practices

Figure 4.5.6 identifies the former execution strategies whose requirements have been integrated into Standard Procedures and Instructions or General Practices at each yard. The project and process owners need to review applicable procedures/instructions/practices during the recommended timeframe for required actions. If a shipyard procedure, instruction or practice has not been established, the project and responsible process owner will develop written guidance to address the subject requirements disseminated in Sections 4.5.6.1 through 4.5.6.14.

Figure 4.5.6 "Shipyard Standard Procedures, Instructions and General Practices"

Shipyard Standard Procedure/Instruction/ General Practice	BPMP Section	Recommended Review Timeframe
Pre-Arrival Work Discovery Plan	4.5.6.1	A-15 to A-12
Plan for Developing Software Schedules	4.5.6.2	A-15 to A-12
Work Definition Plan	4.5.6.3	A-15 to A-12
Material Management Plan	4.5.6.4	A-15 to A-12
Proactive Performance Metrics Plan	4.5.6.5	A-12 to A-10
Key Event and Milestone Management	4.5.6.6	A-12 to A-10
Work Packaging Strategy	4.5.6.7	A-12 to A-10
Integration of New Work Strategy	4.5.6.8	A-10 to A-7
Crane Utilization Strategy	4.5.6.9	A-10 to A-7
Hazardous Material Sampling Plans	4.5.6.10	A-10 to A-7
Transitioning from Planning to Execution	4.5.6.11	A-8 to A-4
Test Integration Plan	4.5.6.12	A-7 to A-4
Special Evolution Schedule Strategy	4.5.6.13	A-6 to A-4
Plan for Using Scheduling Tools	4.5.6.14	A-8 to A-6

4.5.6.1 Work Discovery Testing, Inspection, and Technical Assessment Plan

Successful execution of the depot level submarine availabilities is dependent upon identifying and correcting deficiencies during the pre-Availability Work Discovery periods. The goal is to have a ship enter the shipyard with a minimum amount of maintenance unknowns. To accomplish this goal, three work discovery periods have been developed and are conducted prior to the Availability start. Development of a detailed plan is crucial, as the scheduling and coordination of the Work Discovery periods are very complex. In order to support a successful Work Discovery program, a pre-arrival test, inspection and technical assessment plan must be developed no later than A-18 months.

As stated above, a Work Discovery program is required to thoroughly define the required work package (AWP). This will allow efficient planning and minimize emergent repairs and schedule impact caused by failures during the crucial final test phase of the Availability of components not originally included in the authorized work package. An accurate assessment of the material condition of a submarine preceding an Availability is essential to allow the customer to evaluate, authorize and determine the means of deficient condition correction. Conditions identified during the Work Discovery period, not covered by the work package, may be corrected by forces afloat prior to the start of the Availability, assigned to the shipyard for correction during a pre-availability deficiency correction period, added to the AWP for correction during the Availability, or deferred. Also, fewer components are replaced/overhauled during maintenance periods, consequently there is a greater probability that an undiscovered problem will not be fixed prior to the time-critical test phase. The Type Commander is less likely than in the past to pre-schedule maintenance that is marginally required. At the same time the fleet has fewer submarine assets to cover operational requirements, and must have the ships returned on schedule to avoid incurring large costs in terms of rearranged schedules and missed lower priority commitments resulting from vessels extended in a shipyard instead of operating at sea.

This material condition Work Discovery period is invoked by the BPMP Timeline and consists of standardized tests and inspections prescribed by Submarine Maintenance Engineering, Planning and Procurement (SUBMEPP). Past PAT programs were more extensive than today's due to the original lack of material condition data and history of failure rates. As material condition data was compiled via the normal Planned Maintenance System (PMS) and feedback from early test periods and availabilities, those PATs which provided little useful data, (i.e. either never or always failed) were altered or deleted. If the PAT always failed, the tested component was added to the baseline work package for the Availability type in question.

As operating cycles have been extended, running equipment beyond the time limits for which history has been compiled, PATs may need to be added or modified based on individual shipyard experience. In the Combat Systems Electronics areas, though, PATs are being used less in favor of normal PMS performed by Ship's Force under Fleet Technical Support Center supervision to provide crew training in addition to material condition evaluation. (See Section 4.5.4.8 for Combat System Availability Planning and Execution Strategy.)

Timing of the work discovery periods is prescribed by the BPMP Timeline and varies from as early as pre-deployment for some nuclear PATs and inspections to as late as post deployment for the remainder. Required at-sea and in-port Work Discovery Periods must be scheduled taking into consideration the ship's operating schedule, scheduled up-keep periods, availability of other activities, i.e., Squadron, Performance Monitoring Team (PMT), Fleet Technical Support Center Atlantic (FTSCLANT), Naval Surface Warfare Center Carderock Division (NSWCCD), as well as various nuclear and non-nuclear codes throughout shipyard. A logical sequence and duration of tests, inspections, prerequisites and ship's conditions must be determined and scheduled. The results of these efforts are displayed in schedule form with Event Description, Ship's Conditions, Procedure, Cognizant Activity, and Remarks data fields. This schedule is promulgated in rough form for comments to the various activities who will execute it and when all comments resolved, issued. Team composition, equipment and materials to execute the program are designated and travel plans arranged.

4.5.6.2 Development of a Schedule for Issuing Software Products

The development of a schedule for completing software products is a key element of the plan for planning discussed in Section 3.4. This execution strategy produces a schedule for issuing and approving job summaries and CU phases, ordering material, issuing task group instructions (TGIs), and assembling TGIs. Figure 2.3-2 provides an example schedule for illustrative purposes. The project specific schedule developed by this execution strategy should be similar in content to that provided in Figure 2.3-2.

In developing a schedule for software products, there are four key aspects to consider (two fixed constraints and two variables):

Total Number of Products to Complete - For some software products, the Fast Start Strategy provides specific expectations for the percentages of products developed by certain dates. The project must determine the actual number of products expected, as this will define the required workload. For a given Availability type and size, the total number of products is considered fixed and not a variable under the project's control.

Process Efficiency - Each process for developing software products has an inherent efficiency. This efficiency can be expressed in terms of number of products per day per person. Without substantive changes to the process, efficiency is considered a constraint vice a variable under the project's control.

Window of Opportunity for Accomplishment - A window of opportunity is defined as a period or "window" of time bounded by prescribed external constraints. For example, if the initial approved work package is issued at A-21 and the initial planning meeting is scheduled for A-12, then the window of opportunity for issue of the associated job summaries is the seven month window from A-20 to A-13. Within its end points, a window of opportunity for accomplishment is a variable within the project's control.

Applied Resources - The number of resources applied to developing software. Applied resources are a variable within the project's control.

The following assumptions shall be used in developing schedules for software development:

- JS01 is approximately 90% of known work (unless more accurate project specific numbers are known)
- JS02 is approximately 10% of known work (unless more accurate project specific numbers are known)
- JS01 issued prior to final planning meeting
- Separate product issue lines should be developed for SHAPEC, the executing activity EPD products and the executing activity NEPD products. These lines reflect the differing planned start dates and rates of product issue of the various engineering groups.
- All job summaries and CU phases approved by A-2.5
- Separate schedule lines are developed for job summary issuance and job summary approval. The time period between issuance and approval should be consistent with demonstrated past performance
- High leave periods, including holidays, should be factored into the plan
- 60% of TGIs assembled at Availability start
- 100% of non-test TGIs received at Availability start. On a case basis, engineering codes may negotiate with the project for alternate TGI approval schedules. However, the following criteria should be used in deviating from the 100% nominal expectation:
    1. Solid justification for the need should be identified (e.g., workload leveling)
    2. Project concurrence that the lower number does not adversely affect other elements of the plan for planning
    3. The lower number does not inhibit the project from achieving the requirement for 60% of packages to be assembled by Availability start (i.e., due to a lack of TGIs available for assembly).

4. Agreement by the shipyard leadership team is obtained during the project's briefing of the plan for planning.

Using Figure 2.3-2 as a guide, the project shall take the following steps to develop the project specific schedule for issuing software:

- Identify the total number of expected products. This should include consideration for expected growth (i.e. total expected from JS01 and JS02). The expected totals are to be estimated in consultation with engineering (SHAPEC, EPD and NEPD), a review of the work package, and historical data from similar availabilities.
- Identify known constraints on the timeline (i.e. those listed above).
- Identify windows of opportunity for each of the product types using the assumptions and constraints listed above.

Provide the windows of opportunity for job summaries, TGIs, and material ordering to each of the applicable engineering codes (SHAPEC, EPD and NEPD). Each engineering code is to develop schedule lines within the windows of opportunity based on their resource availability. After development by engineering, the project should verify that the plan supports their needs and adequately considers high leave periods. Additionally, the project should confirm that the engineering resources are actually available to support the plan.

For assembly of work packages, the project shall determine the shipyard's past demonstrated performance (process efficiency) in assembling packages (measured in number assembled per day per packager). Based on the process efficiency and the number of available packagers, develop a schedule line within the window of opportunity. The schedule should yield at least 60% assembled at Availability start. Projects should not assume notable improvements in process efficiency until such improvement is actually observed.

4.5.6.3 Work Definition Plan

This execution strategy shall consist of a project specific timeline of work definition milestones using the elements of Figure 4.5.6.3. Figure 4.5.6.3 provides nominal times for the work definition events. In developing a project specific timeline, a project should clearly understand the ramifications of not following the nominal times shown in Figure 4.5.6.3. Where times other than those shown in Figure 4.5.6.3 are used, the project shall specifically identify these differences to shipyard management during the plan for planning briefing discussed in Section 3.4.

The work definition process is a unique integration of planned maintenance requirements, modernization, screened corrective maintenance actions, and ship schedules. The outputs to this process include ship specific Availability work packages and associated advance planning products. The work definition process is derived from a foundation based upon the NAVSEA class maintenance plan and type commanders nuclear and non-nuclear baseline Availability Work Package.

The complexity and cost of nuclear submarine major depot availabilities has resulted in the need for a more efficient and effective work definition process. This effort needs to start well in advance of the commencement of the Depot Availability. The work definition process is the foundation upon which the depot maintenance availabilities are predicated. The strategy for executing this process is to firmly define and authorize all known work as early as possible in order to provide adequate planning time for properly integrating work into the execution schedule. The nominal work definition planning milestones are selected to support the "Fast Start Strategy". Specifically, the timeline supports job summary and CU phases approval by A-2.5 months, a resource leveled schedule at A-2 months, and 100% of all work TGIs issued for known work at A-0. The requirements of this process should reduce the cost of Availability planning and support the re-use of advance planning products. These work definition requirements are contained in APPENDIX D. The SSN 688 Class SHAPEC will focus on the development of the non-nuclear advance planning products in accordance with existing instructions (e.g., AIM) and supporting CNO schedules. Executing Activities will do the same for nuclear and other non-SHAPEC SWLINs.

The actual work definition process begins with a nuclear and non-nuclear fiscal year standard work package review meeting and the development of the FY Standard Work Package that establishes the initial baseline work requirements for all ships scheduled for CNO scheduled maintenance availabilities in that given fiscal year. This action begins at least 26 months prior to the beginning of the fiscal year in which the specific Availability will be conducted. This start to the overall process will ensure a consistent approach to the identification of known work for both SHAPEC and the executing activity and allow for the maximum reuse of baseline planning documents. This portion of the process is new and unique in that, it strives to reach consensus on the identification of "baseline" work being performed. This concurrence at the beginning of the process will allow for the maximum re-use of planning products and for simultaneous planning of multiple availabilities.

The high level process flow is as follows:

Work Definition and Integration

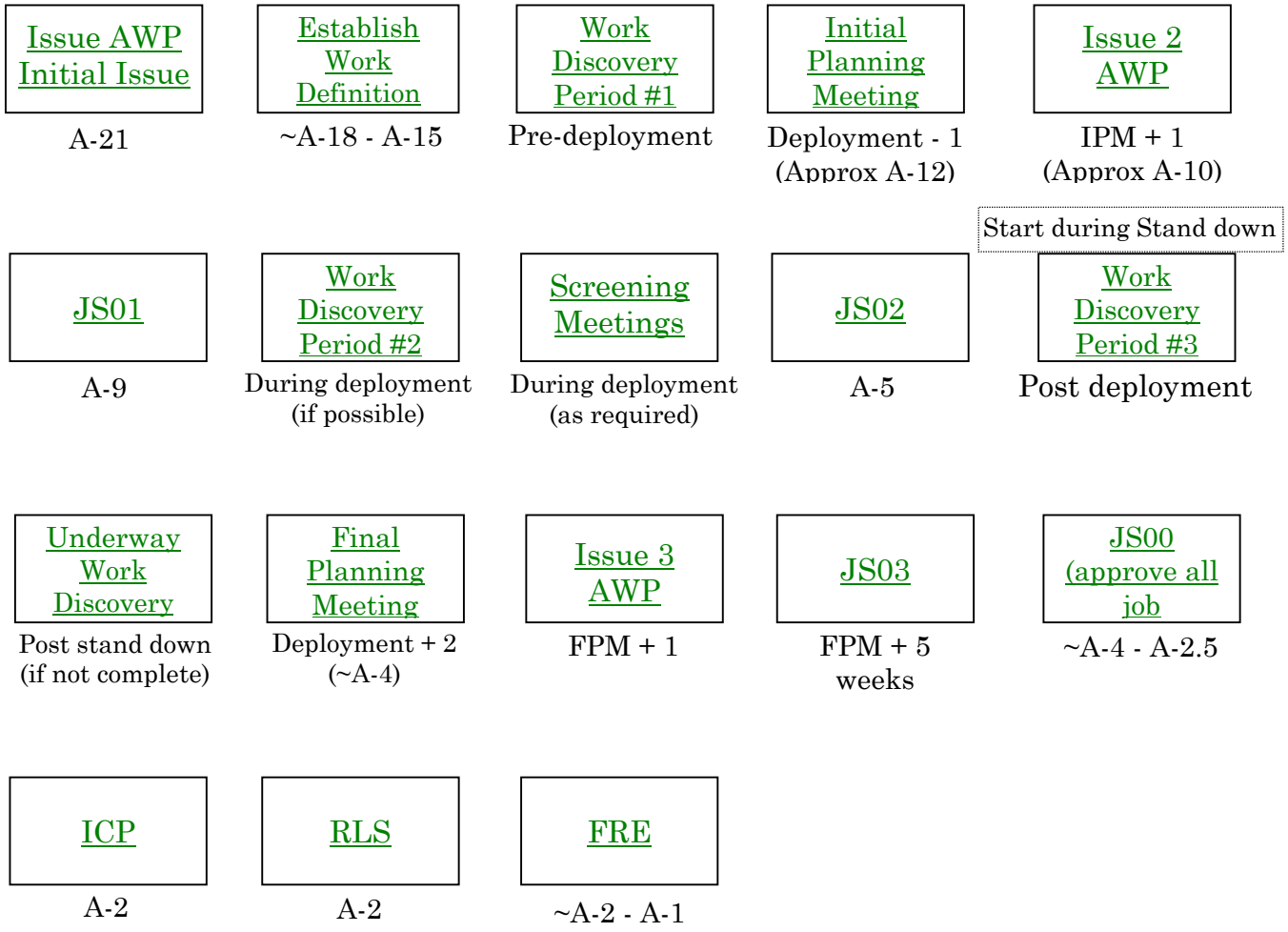


Figure 4.5.6.3

The ship specific work definition process begins when the initial authorized AWP is issued at A-21, to support the start of downstream planning initiatives by SHAPEC and the executing activity, and continues through the arrival conference at A-0. The availability of the ship and Ship's Force to accomplish the work discovery period in the required time frame is important to allow adequate advance planning for ship unique corrective maintenance.

The implementation of this strategy for work definition within the established timeline will ensure early identification of all known work and adequate time for both SHAPEC and the executing activity to provide all advance planning products to support the Fast Start Strategy. Additionally, it will allow for achieving efficiencies through co-planning multiple availabilities and use of a universal planning product line that can be implemented "as-is" at each executing activity.

A primary product of the work definition plan is the development of a ship specific set of "work definition" milestones at the FY standard work package review meeting. It is intended that the establishment of these milestones will allow for the ability to coordinate multiple ship efforts (e.g., co-planning). The project team, in close coordination with SHAPEC, SUBMEPP, the type commander and NAVSEA, must review the work definition milestones established at the FY standard work package review meeting to ensure that both SHAPEC and the executing activity have the ability to meet the Fast Start Strategy milestones.

4.5.6.4 Material Management Strategy

Material Management Overview - The project material management strategy manages material from the time of requisition by the engineering and planning department until final delivery to execution for fabrication or installation. This process also provides for movement and storage of rip-out and consumable type material, kitting and pier support and final disposition of excess material at job completion. The project team must determine the level of manning (as part of the WPC manning plan) and the overall project specific material management plan (as part of the final Project Management Plan) according to the Availability type, size, duration and project facilities. Figure 4.5.6.4 summarizes the four (4) sub-processes which make up the baseline material handling strategy. The Corporate Work Packaging Control (WPC) Process Guide, APPENDIX G, provides additional detailed level process flow charts, descriptions, manning plans and metrics.

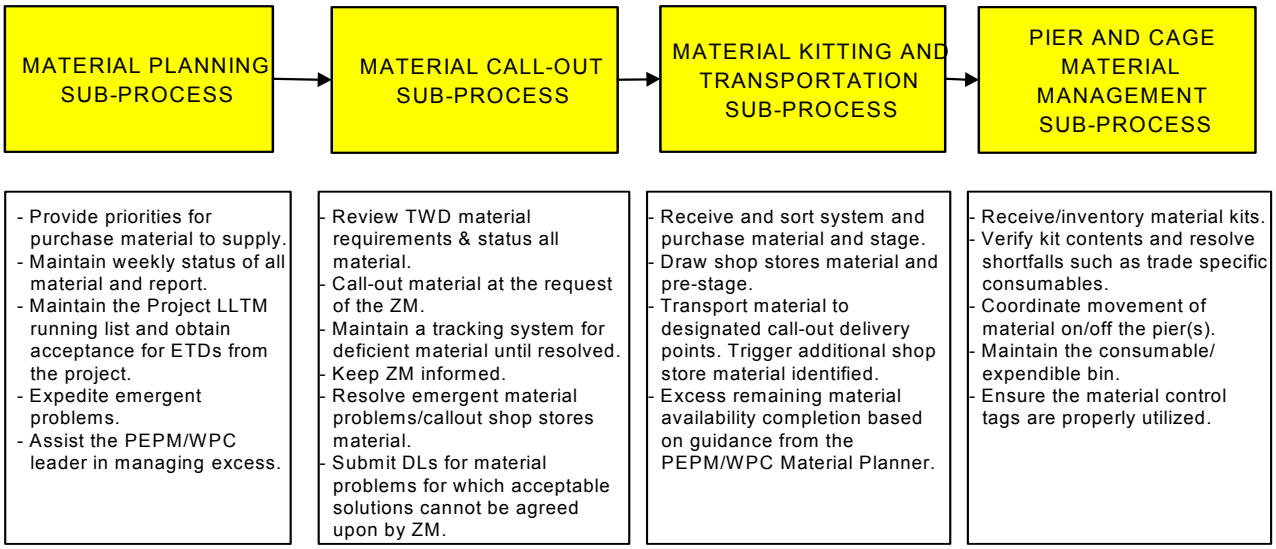


Figure 4.5.6.4 Material Management Process High Level Diagram

Material Planning - Material planning personnel are co-located with supply department purchase and expediting personnel. A dedicated material planning representative is assigned to each project early in the planning process about the time material ordering commences (approximately A-15 in accordance with the Nominal Planning Timeline). The material planning representative is responsible for maintaining the Long Lead Time Material (LLTM) list with input from cognizant technical codes, prioritizing purchase work load based on input from the PEPM and publishing weekly project material status to the project management team and other shipyard management personnel.

Material Callout - Material call-out personnel located in WPC, review Technical Work Documents (TWDs) to determine material requirements and the status of the listed material during the Task Packaging and Assembly process. Material items not on hand with ETD dates which do not support CU Phase schedule start dates must be resolved with the Zone Manager (ZM). TWDs with unresolved material problems (i.e., ETDs not accepted by the ZM) shall be reported to the Trouble Desk for resolution (substitution, alternate source, fabricate vice purchase, etc.) via DL. The material call-out process produces a material kit request of ready-for-issue (RFI) material to kitting personnel to ensure material items are delivered to the project cage or other designated delivery point based on ZM request. The material callout process also solves emergent material problems and processes all call-outs for additional shop stores material needed to eliminate the need for “walk-up” material chits by production personnel.

Material Kitting and Transport - After receipt by the Supply Department, material is forwarded to designated project specific long-term staging areas by supply personnel. Material kitters assemble kits as specified by the kit request prepared and submitted by the call-out process. Material kitters prepare kits based on the requests and transport to the designated delivery point. Kitters, when designated by the project's material plan, track and deliver shop fabricated material and rip-out material as part of the material kit for shipboard installation task packages.

Pier/Cage Support - Project material cages are established for each project to provide a secure short-term lay-down area for material arriving from kitting until issuance to the mechanic. Pier/Cage support personnel are responsible for inventorying and signing for material kits from kitting, adding additional trade specific consumable type material, maintaining an organized method to manage kit location, issuance (as well as partial kit issuance), assisting in the transport of forklift material and maintaining the consumables bin. The waterfront material handlers manage material to and from the pier through coordination with crane teams and transportation personnel. Pier Support personnel provide for transportation of rip-out material for disposal, repair, storage or shipment as designated by material control tags or forms which are affixed to all material leaving the vessel by the mechanic.

Excess Material Management - Excess material is primarily generated as the result of canceled/sub-contracted work or completed jobs for which all material requisitioned was not used. WPC, the PEPM, Material Manager and BSPO play a key role in ensuring the process is adhered to for reducing excess material.

Material Management Metrics - Project specific metrics for material management must be established as part of the PMP and implemented at about A-12 months in accordance with the Nominal Planning Timetable, Figure 2.3-3. Executive level tracking should indicate the percentage of total material items RFI. The goal is to be at approximately 90% at A-0. Project specific metrics should include tracking material in the following categories:

- Purchase Items: Required, Ordered, Awarded, Due, RFI
- System Items: Required, Ordered, Backordered, Due, RFI
- Shop Stores Items: Required, Available, Issued (staged with DMI)
- AERP Equipment Status
- Long Lead Time/Critical Material Status
- GFE Material
- CCRP Components

The Corporate WPC Process Guide provides baseline Material Management metrics to be maintained.

4.5.6.5 Proactive Performance Metrics

A minimum set of proactive planning and execution performance metrics are required for SSN 688 Class DMPs, EROs and EOHs. This baseline set of metrics will provide like comparisons between like availabilities and between shipyards. Additional metrics may be added at the discretion of each project or shipyard as needed for local control.

APPENDIX F contains a matrix of time-phased metrics including what, where and how data is collected as well as sample metric displays.

4.5.6.6 Key Event and Milestone Management Plan

The products of this plan and the schedule for completion are as follows:

Project specific network of key events and milestones (A-12 to A-9)
Work to Test Sequences (A-15 to A-12)
Project specific start steaming strategy (A-12 to A-6)

Project specific habitability strategy (A-12 to A-6)

4.5.6.6.1 Baseline Key Event and Milestones

A key event is an event within the project schedule, which cannot slip without seriously impacting the overall schedule and possibly delaying the completion of the project. Key events are also used to evaluate the status of a project in an upper level summary format and are the primary mechanisms for informing the customer of project status.

The key event network is the set of technically sequenced significant events at the highest level of scheduling reflecting project requirements and goals. A key event describes the technical conditions that must exist to status the Event as complete. This definition assists in determining which component unit (CU) phases logically precedes the key event. The key event network is the foundation on which the detailed project network is constructed.

Milestones are events that support key events in the project's critical and controlling paths. The milestone events are work completion oriented or test completion oriented. Work to test items assigned to a milestone, are defined to an identifiable boundary, such as a single system, a geographic zone or a test procedure.

In order to support schedule benchmarking among the shipyards, a standard milestone designation system is used which supports the NAVSEA directed key event designations. A baseline set of key events for SSN 688 Class DMPs, EROs and EOHs has been developed through experience for each type of Availability. Logic diagrams of these baseline key event sequences are depicted in Figures 4.5.6.6.1-1 and 4.5.6.6.1-2. Figure 4.5.6.6.1-3 contains notional CNO schedule periods, in weeks, for EROs and DMPs. The scheduled durations provided are for guidance and reflect key event strategies that support CNO notional Availability durations of 22 months for EROs and 12 months for DMPs. Projects will have to adjust key event dates to accommodate individual variances such as holiday periods, other project schedules, personnel resource availability, etc. These are the minimum events that will be used and additional events may be added to suit special project or AWP requirements. A listing of these key events and milestones, with definitions is provided as APPENDIX J.

The project shall develop a project specific network of key events and milestones. The network shall be compared against past performance on other ships, including others completed by other shipyards. The project shall identify in this plan where dates and durations represent best ever performance for the shipyard. Additionally, the plan shall specifically identify how high leave periods and holidays have been factored into the network.

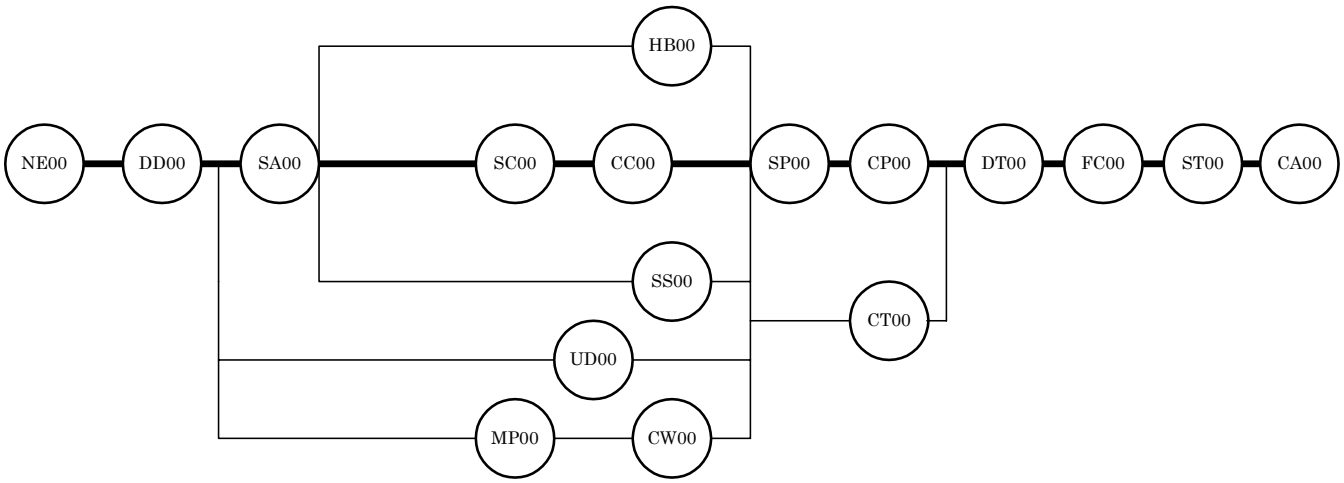


Figure 4.5.6.6.1-1 SSN688CL Baseline DMP Key Event Schedule/Sequence

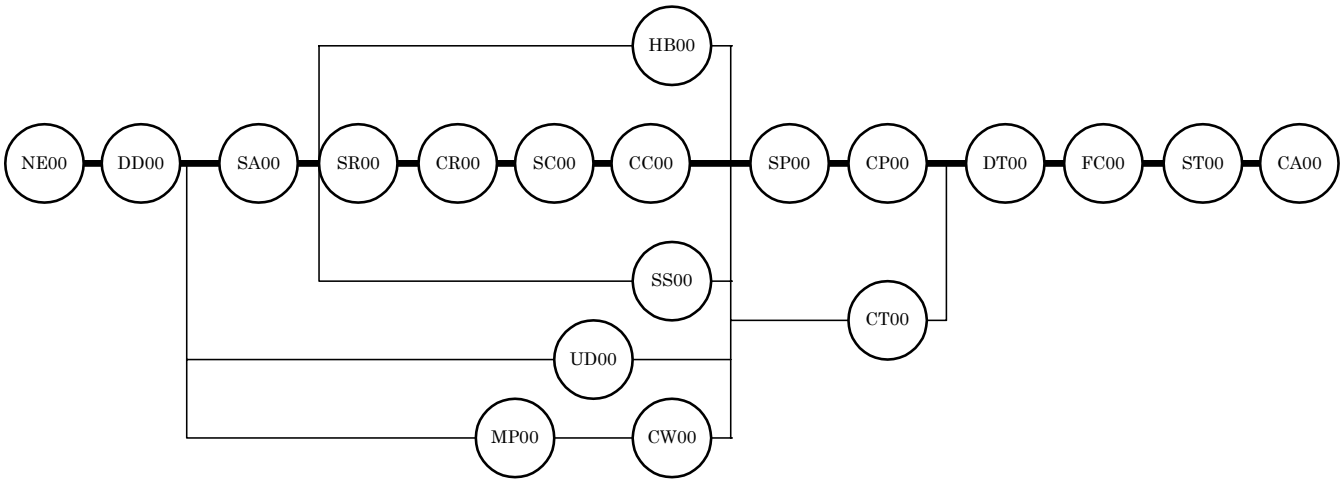


Figure 4.5.6.6.1-2 SSN688CL Baseline ERO Key Event Schedule/Sequence

NOTIONAL CNO SCHEDULE DURATIONS IN WEEKS			
KEY EVENT	**DESCRIPTION**	**DMP**	**ERO**
NE00	**NEST DOCKSIDE (ARRIVAL)**	**PRIOR TO SA00**	**PRIOR TO SA00**
DD00	**DOCK SHIP**	**PRIOR TO OR AT SA00**	**PRIOR TO OR AT SA00**
SA00	START AVAILABILITY	A-0	A-0
SR00	START REFUELING	N/A	A+18
CR00	COMPLETE REFUELING	N/A	A+46
SC00	START COLD OPERATIONS	A+28	A+58
CC00	COMPLETE COLD OPERATIONS	A+29	A+59
UD00	UNDOCK SHIP	A+35	A+64
SS00	READY TO STEAM	A+39	A+74
CW00	START COMBAT SYSTEMS TSTG.	A+38	A+61
MP00	COMP. MAST & ANTENNA INSTL.	A+39	A+63
HB00	HABITABILITY	A+40	A+73
SP00	START INTEGRATED PROPULSION PLANT TESTING	A+44	A+84
CT00	ALL COMBAT SYSTEMS DOCKSIDE TESTING COMPLETE.	A+46	A+79
CP00	COMPLETE INTEGRATED PROPULSION PLANT TESTING	A+47	A+90
DT00	COMP. DOCK TRIALS	A+48	A+92
FC00	START FAST CRUISE	A+50	A+94
ST00	START SEA TRIALS	A+51	A+95
CA00	COMPLETE AVAILABILITY	A+52	A+96

Figure 4.5.6.6.1-3

4.5.6.6.2 Work to Test Sequences

Work/Test Sequences are PERT charts that provide a quick visual overview of the work and test plan for Project, Ship, and Shipyard managers and provide a framework for development of cross-ties in the schedule. The products produced are as follows:

- High level (total ship) brief work/test sequence of critical path work (repairs and Ship Alts) on major systems showing the technical sequence between work, testing and key events.
- Work/test sequence (PERT chart) showing all nuclear systems which have work or testing and the technical relationships between the work, testing and key events. This sequence shows all special plant conditions (i.e. plant cooled down, DHR installed, steam generator drained, etc.) and system status (including plan for restoration of the systems to support testing and key events) throughout the Availability (Section 4.5.4.4).
- Work/test sequence (PERT chart) showing all non-nuclear plant systems which have work or testing and the technical relationships between the work, testing and key events.
- Work/test sequence (PERT chart) showing all non-nuclear work and testing in the sail and forward of the plant and the technical relationships between the work, testing and key events.

Work/test sequences (PERT charts) for special attention jobs (Section 4.5.4.5). Work/test sequence (PERT chart) for each job summary showing relationships between CU Phases within the job summary. Work/Test Sequences provide a visual "top down" high level framework that will govern the planning and execution of the entire project so that products produced from the "bottom up" such as job summaries and the schedule will meet the goals that the project has set. Work/Test Sequences are initiated following review of the Authorized Work Package and prepared in parallel with the job summary process. Work/Test Sequences are used to validate the job summaries and provide a framework for the development of cross-ties in the schedule. Work/Test Sequences are further developed as the Authorized Work Package is further defined and as more details of each job are understood during the job summary process. Work and Test Sequences are developed by scheduling personnel with assistance from the Assistant Project Superintendents (APS), Chief Test Engineers (CTE), and Project Engineers (PE) under the leadership of the Project Engineering and Planning Manager (PEPM).

4.5.6.7 Work Packaging Strategy

The goal of WPC is to efficiently define, assemble, and release Task Packages to production which include the necessary technical information, funding, material, and work authorization for safe and efficient execution of work planned for an Availability. In addition, WPC must provide an equally efficient means to overcome non-labor resource problems, resolve technical and administrative deficiencies and schedule conflicts. WPC is also responsible to maintain the necessary control and accountability required to identify and monitor outstanding work to support event certification. Based on these responsibilities, WPC is critical to the efficient execution of an Availability and must receive constant input from various areas of expertise including scheduling, engineering, planning, quality assurance, supply and production.

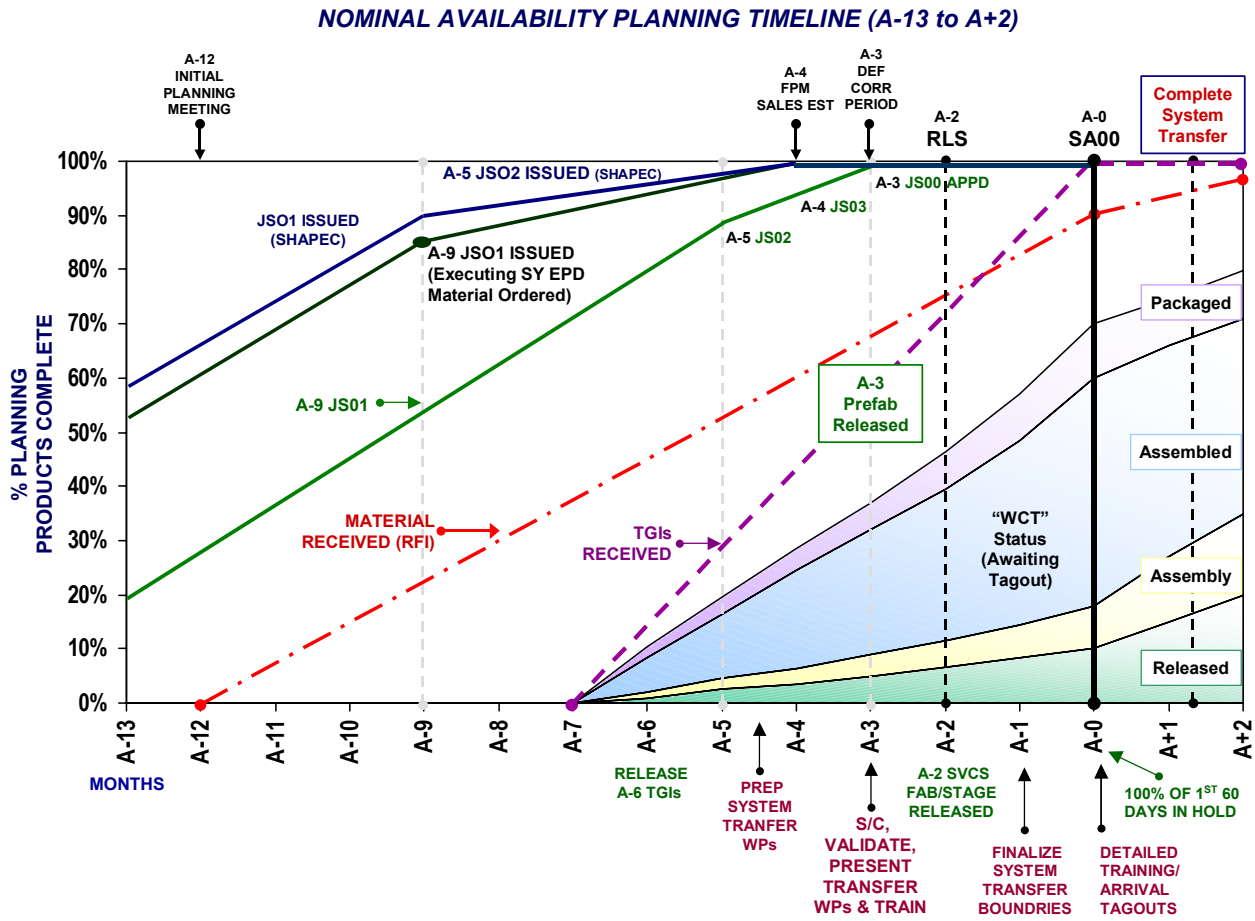
The WPC process must produce complete task packages to allow production personnel to efficiently execute first time quality work under the "fast start" strategy. The "fast start" strategy includes a standardized methodical approach for each major Availability during the planning period in order to rapidly open job sites and increase production progress to greater than "straight line" undocking requirements within six (6) weeks of Availability start. Key elements of the Fast Start Strategy which directly affect (or are achieved by) the WPC process listed below and illustrated in Figure 4.5.6.7-1.

WPC Related Key Elements of the Fast Start Strategy

- A Resource Level Schedule (RLS) at A-2 months
- All pre-fabrication required to support work during the first 60 days after Availability start completed at Availability start (A-0)
- All tools, equipment and facilities required to support scheduled work during the first 60 days after Availability start available and ready at Availability start (A-0)
- 100% of all TGIs, for known work, received at A-0
- Material required in the first 60 days after A-0 received and staged at A-0
- 100% of all TGIs required in the first 60 days assembled and in "hold" status at A-0
- Approximately 60% of all work TGIs assembled at A-0
- Work Authorization Forms (WAF)/System Take-Downs and associated tagouts required between A-0 and A+2 months, prepared, coverage checked, prioritized and ready at A-0
- System Take-Downs complete at approximately A+45 days
- System status and plant conditions plan finalized by A-6.

The Work Packaging and Control Corporate Process Guide (for SSN 688 Class Major Availabilities), APPENDIX G, provides the methods required to achieve the "fast start" strategy utilizing current AIM concepts and software. This guide is intended to be utilized in conjunction with the AIM Work Packaging and Control software and provides detailed level process flow charts, description, manning plans and metrics to assist in achieving the "fast start" strategy.

FIGURE 4.5.6.7



Work Packaging Process - As illustrated in Figure 4.5.6.7-1, WPC is a multi-faceted organization that is made up of four (4) primary sub-processes: (1) Task Packaging, (2) Work Control, (3) Material Management and (4) Problem Resolution. Normally, a Nuclear and Non-nuclear WPC leader/manager is assigned to the project team to oversee these sub-processes. Guidance is provided from the Project Team on execution issues, Project Engineering and Planning Manager execution issues. Project Engineering and Planning Manager (PEPM) on technical and material issues, the Chief Test Engineer (CTE) on work authorization issues and the Project Scheduler on sequence and schedule issues.

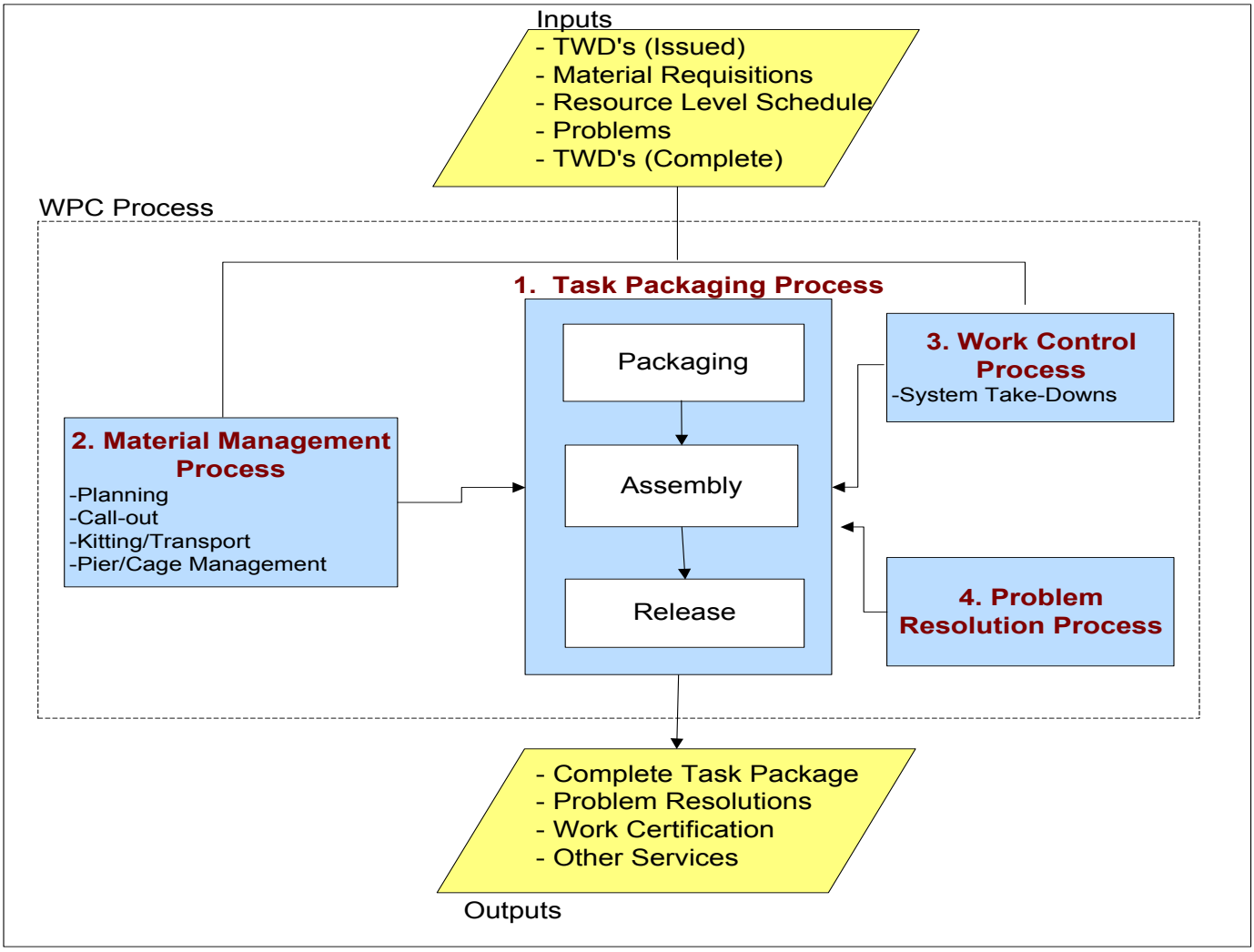


Figure 4.5.6.7-1 Work Packaging and Control High Level Process Diagram

The following is a description of the four (4) primary sub-groups of WPC.

Task Packaging - The primary function of Task Packaging is to identify and group work which can be efficiently released and executed together based on the Task Packaging Strategy (TPS), assemble all necessary supporting information and work authorization, and to package and release in an organized fashion to execution personnel. Task Packaging is accomplished through three (3) main sub-processes:

- Task Package Development
- Task Package Assembly
- Task Package Release

Completed TWDs and any associated DLs are returned to Work Packaging from Execution supervisors. Work Packaging is responsible for ensuring that the required level of review is accomplished by the appropriate personnel and the TWD is complete and certified. The level of review for TWD certification and the performing organization of that review is determined by the type of work and applicable NAVSEA and shipyard requirements. This certification includes verification that all required data is entered and within the criteria specified and all signature requirements are met. Work Packaging also maintains completion/certification status in Document Tracking and is the primary source of work document status in preparation for Key Event and Test readiness.

*Material Managemen*t - Material management is a key aspect of WPC in providing "one-stop shopping" for the mechanic in obtaining all required material to accomplish assigned work on time and in an efficient manner. Effective material management is accomplished through four (4) main sub-processes:

- Material Planning is the process of filtering material requisitions as they are originated and comparing them to required delivery dates to meet the schedule, prioritizing long lead time or critical material for delivery to meet the schedule and resolving JML technical problems.
- Material call-out is accomplished by WPC and is the process of maintaining material status, specifying what material to kit and scheduling delivery of the kit through the Zone Manager.
- Material Kitting and Transport receives kit requests from the WPC material call-out process, assembles subject material and transports the kit to the designated location.
- The Pier/Cage Management process receives material kits for final delivery to the mechanic, adds required consumable trade specific items and coordinates the movement of material to and from the pier.

Work Control - Tagout/Work Control personnel are responsible for the work authorization portion of the packaging process. Normally, Ship's Force personnel are also assigned to this sub-group (as part of the Management Information Center, MIC) to assist in preparation and authorization of Tag-outs and Work Authorization Forms (WAF). Work packagers must consult work control personnel on a regular basis to ensure work intended to be packaged together can be authorized together based on system configuration, temporary service isolations, testing considerations, plant conditions and System Take-Down (STD) strategies, and System Status and Plant Conditions Plan. Non-nuclear Work Control personnel must ensure that system take-down boundaries are initially established broad enough to encompass as much of the overall planned work as feasible (based on available Job Summary information) in order to minimize the number of Work Authorization Forms (WAF) required.

Problem Resolution - During execution of prefab and shipboard work, problems are directed to the Trouble Desk verbally or via the combination Deficiency Log (DL)/Deficiency Report (DR) form for screening, prioritization, and assignment to expedite the problem resolution process. DLs are used to document the resolution of problems that affect the technical content, certification or lessons learned within the scope of the TWD. DRs are used to identify deficiencies outside the scope of the TWD and will usually require customer authorization via the BSPO as new work. Some problems submitted on the DL/DR form involve general shop information and do not affect any of the above and are therefore not formally documented.

WPC Startup - WPC should be manned and capable of startup in accordance with the Nominal WPC Manning Plan (see WPC Corporate Process Guide) and Nominal Planning Timeline in order to achieve "fast start" and execution strategies of the comprehensive Project Management Plan (PMP). Generally, the core WPC team from one Availability will be rolled to the next Availability with some overlap to package prefab and services while completing the previous Availability. The WPC startup plan falls under the cognizance of the PEPM and shall be developed as part of the PMP and defined with regard to the planning schedule in the Project Planning Time Table (PPTT) with specific attention given to the packaging and issuance of prefab work, System Take-Down (STDs), establish plant conditions and installation of temporary services. The WPC leader/manager should be assigned early enough in the planning stages to participate in the PMP development concerning the WPC startup plan and the project specific Task Packaging Strategy.

WPC Manning - The number of personnel required in WPC will vary throughout the different phases of the Availability. Consideration to budget must be given with respect to NAVSEA guidelines regarding direct service bench marks as outlined in NAVSEA letter serial 072-206 dated 1 DEC 1997 (or latest revision). The time at which WPC personnel are assigned to the project will also vary depending on the type of Availability and type of work planned, resource availability and project execution strategies. Figure 4.5.6.7-2 illustrates the functional make-up of a typical WPC Team. The Corporate Process Guide provides baseline WPC manning profiles based on these functional areas, rolled up to the current applicable NAVSEA direct service bench marks.

Work Packaging and Control (WPC)			
PACKAGING (WPC Leader)	**MATERIAL (WPC Leader)**	**WORK CONTROL (CTE)**	**TROUBLE DESK (PEPM)**
- Packagers - DocumentTracking - QA/Certification	- Callout - Expediting - Kitting - Pier/Cage Attendent - Material Transport	- Code 246 Reps - Code 2340 Rep - Ship's Force Reps	- TD Manager - Engineers/Techs - Cog. Engineers - Planner Support

Figure 4.5.6.7-2 Functional Makeup of a Nominal WPC Team.

Initial Products - The major products required to enable WPC to commence include approved Job Summaries and CU phases, the Project Management Plan (PMP) with project specific Task Packaging Strategy, received TGIs and corresponding material. For example, initial TGIs required at WPC startup include prefabrication, assemble and stage phases for pre-arrival work and temporary service hookup followed by 100% of the first 60 days of TGIs based on the RLS.

WPC Reference System - A reference system known as the Technical Information Center (TIC) shall be established by the WPC Manager with assistance from the PEPM. The TIC should have hard copies and electronic access/printing capability of drawings, Technical Manuals, Standards, etc. The Technical Information Center should be equipped with the required hardware, software and computer hook-ups needed to access the different drawing and Technical Manual databases. The TIC should initially be populated with those references identified through the Job Summary and TGI writing process.

Ship's Force Integration - In order for WPC to operate efficiently, Ship's Force participation is required as follows:

- Liaison for Ship's Force training on WPC/Tagout processes.
- Routing Work Authorization Forms (WAF) and Tag-outs to appropriate divisions for processing (Work Control).
- Packaging/statusing of Ship's Force work that is integrated in the Resource Leveled Schedule.
- Providing interface in accomplishing OQE/Document control requirements.

In addition, participation/collocation in the WPC process provides Ship's Force personnel required information on a regular basis such as:

- Informational as well as official copies of work and test documents.
- Access to the Technical Information Center (TIC) to obtain references.
- Access to shipyard instructions governing the Availability as well as flowcharts of shipyard processes.

- Scheduling and critical path work information.

This integration of Ship's Force is facilitated through execution of the Management Information Center (MIC) process. The purpose of the MIC is to provide a continuous interface between Ship's Force and the project through co-location of MIC personnel within the applicable functional areas of WPC. The Submarine Shipyard Availability Manual (SSAM), volume II, section 300 provides the specific requirements, duties and responsibilities of the MIC.

4.5.6.8 Integration of New Work Strategy

Accurate identification and adjudication of new work significantly contributes to the success of an Availability. New work is defined as "any work not authorized at or work authorized subsequent to the final planning meeting". Every project team must commit themselves to quick resolution of all new work items.

The New Work Strategy is the Project team's plan to manage and resolve new work requests. It is a written step-by-step procedure with specified time frames for adjudicating new work requests. The strategy should also identify work items, or components, that have a high potential to become new work jobs. Conduct a review of new work authorized on previous and ongoing availabilities. Discuss with ship's company any work they are assigned that they may not have the capability to perform. A risk assessment should be conducted to assess probability and impact of potential new work items to schedule. A risk assessment should be conducted to assess probability and impact of potential new work items to schedule. The risk assessment can bring forth work items that need to be added to the package or contingency software development. This strategy should be developed in the A-10 to A-7 planning window and must be briefed to shipyard management.

As a reminder to personnel responsible for developing new work estimates, include in the strategy and discuss a list of miscellaneous costs that are many times overlooked in new work estimates. Examples are delay and disruption.

A sample New Work Strategy is included at the Corporate BPMP website: http://nssg.nnsy.navy.mil/subhome/ and select 'BPMP Site'.

4.5.6.9 Integrated Crane Utilization Plan

The Availability of and the efficient use of a crane during the execution of the DMP/ERO/EOH is essential to its success. The project must commit itself to this end. The crane and rigging shop's commitment, is their clear understanding and support to the specific role cranes play in the success of the project. The Availability of a portal crane for every day's use during the DMP/ERO/EOH is highly desirable. However, due to cost considerations this is not cost effective. Projects should develop with resource shops the most advantageous crane usage schedule with respect to other work going on in the shipyard.

The Integrated Crane Utilization Strategy is the Crane Division and Project team's strategy for most efficient and cost effective use of the crane. The plan, issued approximately A-7 months, will include a method for constant written and oral communication between the project and crane-rigging shops. The strategy will address three key elements:

Crane availability and operational condition
- Identify scheduled crane and track maintenance
- Identify other project demands and number of cranes available
- Review of historical maintenance problems

Minimizing on line time and maximizing use when crane is on line to reduce cost
- Developing a schedule, limiting days and times crane will be in use
- Detailed planning for all major, potentially dangerous and special evolution lifts
- Identifying periods of high use

Reducing blind lifts
- Mitigation strategies for high risk evolutions
- Establishing requirements contracts for outside crane service.

4.5.6.10 Hazardous Material Sampling Plans

The Project Team will develop a Hazardous Material Sampling Plan at the A-10 to A-7 period. This plan will be developed by the PEPM and APS who will review the AWP and establish a list of hazardous materials which could affect the Availability.

At A-7, the APS will chair a meeting with representatives from Code 106 (OSHE), Squadron, Ship's Force and the resource shops to expand on the following:

- A list of potential hazardous materials.
- What are the requirements for the handling and disposal of the hazardous materials?
- Develop an execution plan (timeframe) to obtain sampling prior to Availability start.
- Resource shops shall identify training requirements and establish a training program to support the plan.

Identify and use lessons learned to prevent problems encountered by previous availabilities.

4.5.6.11 Strategy for Transitioning from Planning to Execution

The transition of the project's efforts from that of planning to that of execution (approximately A-2 to A-0) is one of the most intense periods in the life of the project and is critical to the success of the Fast Start Strategy. The project should, at the very outset and then with routine modification, develop a plan of action and milestones (POA&M) for this transition. Such a plan should take into account the following concerns as a minimum:

- Bringing foremen on board
- Briefing foremen on project's expectations and transition POA&M
- Reviewing work with foremen and walking job sites
- Foremen conducting detailed review of assigned work packages
- Obtaining mechanic commitments by name
- Assigning mechanics by name to fast start jobs
- Preparing and staging Work Authorization Forms (WAF)
- Developing tag-outs with Ship's Force as work is packaged
- Validating material/special tools required for first 60 days are staged
- Validating temporary service preparations are in place
- Validating crane service is scheduled
- Validating 100-hour schedule preparations are in place
- Validating fast start schedule preparations are in place

4.5.6.12 Test Integration Plan

The purpose of this process is to provide structure and guidelines for the development of a test schedule for a given Availability. The test schedule is the foundation of a project's overall schedule. It sequences work-to-test, test-to-test and test-to-key events/milestones. A flow chart of this process is provided as Figure 4.5.6.12.

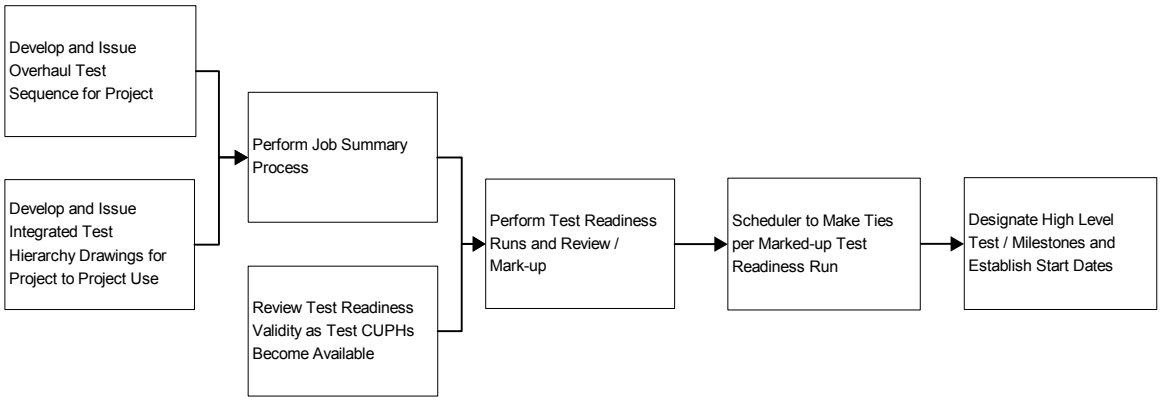


Figure 4.5.6.12 Test Schedule Development Process

Assumptions:

During the Job Summary (JS) Process, the work-to-test relationships (WTRs) are created for all work requiring system/component re-certification via test CU Phases (CUPH). Thus creating all of the tests comprising the test schedule.

An Overhaul Test Sequence, which delineates what portions of systems are required for each Key Event, will be developed for use in test schedule development.

System Integrated Test Hierarchy Drawings, which show the relationships between tests within a given system and the first cross-ties to the tests of other systems, are crucial to ordered development of a overhaul test schedule.

The Test Readiness function of AIM, through the "identify cui" portion of CUPH Maintenance, must be validated in order to provide sufficient cross-connecting of job summaries to create an effective project schedule.

Pieces of the Plan include:

Job Summary Process - During the AWP JS process, all CUPHs are evaluated as to the need for recertification. This determination results in the creation of test CUPHs to perform the required recertification. During the JS process predecessor/successor ties are established between work and test CUPHs. Additionally, tests within a JS will be sequenced as applicable at this time. Some cross-ties between JSs are made when test CUPHs are associated/prorated between JSs. This level of cross connecting the various JSs is insufficient for development of a successful schedule. It is during the JS process that tests are tied to key events as predecessors. The overall test sequence is the tool used to make this determination.

Test Readiness - A review of all established test for the thoroughness of the "identify cui" process is vital. Test Readiness validity is predicated upon identifying all cuis within a given test's boundary. Copying/rolling over tests from a previously validated project is a significant savings of manhours in this process. With JSs complete, test readiness reports can be generated and the CUPHs which are designated as required for a given test will then be given to a project scheduler. The scheduler can then establish the predecessor/successor ties which will thoroughly integrate the JSs into a coherent project schedule.

High Level Tests/Milestones (HLT/M) - Key Events are given specific start dates, but all of the individual CUPHs dates are front loaded with a specified "float". The float involved can be significant and make management of large quantities of work difficult. In order to help mitigate this problem, certain tests can be designated "High Level Tests or Milestones". Normally these are tests of critical systems which are strategic to the timely advance toward the next key event. These HLT/Ms will then be given planned start dates, removing some of the float and giving the project team an effective tool with which to manage the schedule throughout the Availability

Review and Adjustments - The schedule must be reviewed on an ongoing basis, periodically adding or removing constraints to maintain a test sequence/schedule that supports efficient progress to key events.

The test integration plan should clearly identify the shipyard's historical performance in completing tests (e.g., number per week sustained over time). The test integration plan should identify the project's target for the number of tests they plan to execute versus time, including a curve showing the planned testing profile. During the resource leveled scheduling process, this number will be used to validate that the schedule is executable.

4.5.6.13 Identification and Use of Special Evolution Schedules

Special evolutions, i.e., ship arrival, dry-docking, berth shifts and undocking, require special attention. These evolutions generally cover a time period of several days, involve large numbers of nuclear and non-nuclear (as well as shipyard and Ship's Force) tasks, and require careful coordination and sequencing. To successfully accomplish these high-risk evolutions, project teams will develop special evolution schedules (100 - hour schedule) for the evolutions listed above as a minimum. Additional 100 - hour schedules may be utilized at the project's discretion. Any complicated, high-risk evolution should be considered for a 100 - hour schedule regardless of the actual duration of the evolution. What is important is that a single, integrated, master schedule of ALL tasks be prepared to assure that each task is accomplished in its specific order and no task is overlooked. Project should designate a Special Evolution Coordinator that has primary responsibility for development and execution of the given special evolution. Additionally, a lead POC from the project and Ship's Force should be assigned for each shift.

A sample 100 - hour schedule is included in APPENDIX I.

4.5.6.14 Scheduling Tools, Schedule Maintenance, and Float Utilization Strategy

4.5.6.14.1 - Scheduling products consist of the scheduling Network (database) used to develop the reports used by the Project team. Various reports are developed and used to perform the scheduling process. For a complete discussion of these reports, see Section 4 of APPENDIX C.

4.5.6.14.2 - Schedule Float analysis is used to evaluate the Project Schedule. A complete discussion of this action is contained in Section 4 of APPENDIX C.

4.5.6.14.3 - Maintaining the Schedule

One of the most important issues in maintaining a Project Schedule is the accurate reporting of status and progress of the work being accomplished. On a daily basis, the AIM database interfaces with other databases, such as, SUPDESK, Cost/OSE and PSS. Expenditures at the CU Phase task level and percent of progress at the overall CU Phase level have a direct impact on the calculation of remaining duration and quantities of resources required to complete that work.

As time moves forward and work that is schedule to start does not get started on time, there is a tendency for a bow wave of work to start growing during the current work week. When scheduled work does not get started on time and begins to move to the right, the available float in that path begins to diminish. It may be necessary for the Project Team to reevaluate that work to determine whether or not it has been scheduled for an appropriate time frame. If available float and resources exist in the network, non-critical work may be moved down-stream if necessary.

During the execution of a project, many changes are made to the scheduled network. Changes in the scope of work and the addition of new work to the Network will have an affect on resource requirements and the amount of work scheduled in the current time frame. If the new work is emergent critical work, it should be left in the current work window. If not, selective dating can be used to place the new work in an appropriate time frame for accomplishment. Daily statusing of work in progress has a direct affect on the calculation of remaining time and resources required. As the Project moves forward, it may be necessary for the project team to reevaluate the workload/work force profile in order to ensure that the required resources are available to execute the scheduled work. In some cases, the Project may elect to redistribute the remaining workload to eliminate any differences between the work and available resources.

4.5.6.14.4 Scheduler Manning Requirements

During the initial planning phases of the project, there should be at least one (1) Nuclear experienced scheduler and one (1) Non-Nuclear experienced scheduler for the remaining engineering and miscellaneous work. At approximately A-2, an additional scheduler should be assigned to the project to schedule and maintain all of the non-shipyard work. Depending on the status of the planning effort, the Project may elect to add a fourth scheduler in order to separate the engineering and miscellaneous (sail, torpedo room) work.

4.6 Development of the Internal Control Price

4.6.1. Overview

The Internal Control Price (ICP) is the shipyard internal budget for the project and is used to develop the Sales Estimate and/or Fixed Price Offer to the customers. The ICP is derived from the labor and material budgets identified for each job summary. The project budget is the commitment by the project team to execute the work. Project budgets must have project team commitment and buy-in to ensure success.

The ICP is a standard product with the following attributes:

- It is the project cost performance goal
- It provides a financial risk assessment for each job summary
- It consists of the job summary estimate plus the project reserve
- It is the basis for developing the Sale Estimate and Fixed Price Offers for the project
- It is the aggregate of the CU Phase budgets in each Job Summary, plus the overall project reserve applied to each job summary.

The budget for each CU Phase should be the standard estimate for that work as developed by an engineered estimate of the work, backed up by comparing or benchmarking previous estimates and returned costs for similar work. Standard estimate does not mean the lowest possible estimate for accomplishing the work, assuming best performance, under optimum conditions. It is the engineered estimate for accomplishing the work assuming good performance under normal and usual circumstances.

During the job summary review process, the project reserve is established. This reserve is designed to provide a pool of funds to cover budgetary risk. The size of this reserve should be commensurate with the risk associated with accomplishing the work at the budgeted cost. It is critical to establish the reserve accurately and objectively. If the reserve is too small, it increases the risk of project exceeding its ICP. If the reserve is too large, it ultimately, reduce the customer workload to the shipyard. Project risk reserves are never issued as allowances.

The following issues are important in understanding and applying an appropriate project reserve:

- The reserve is established by conducting a risk analysis and applying a labor and material cost reserve to each job summary prior to the job summary being approved. The reserves are then aggregated to a total that becomes the Project ICP Reserve.
- The risk analysis is based on the probability of accomplishing work within the budget. High risk equates to a reserve of 10% of the budget; medium risk equates to 5%; and low risk is characterized as 0%. The Project Superintendent and the BSPO Representative handle exceptions to this on a case basis.
- The Project ICP Reserve is expressed in mandays for labor and in dollars for all non-labor costs.
- It is the responsibility of the Project Superintendent to establish and manage the Project ICP Reserve, with the assistance of APS and Zone Managers.
- The Project ICP Reserve is never used to compensate for what the project deems as poor estimates.

The development of the Project ICP Reserve should be documented during the Job Summary review process to assist in providing the rationale for the size of the reserve during ICP approval meetings. Conceptually the development of the project ICP is shown in Figure 4.6.1 below.

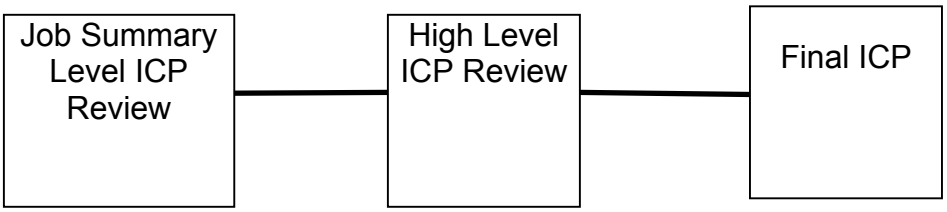


Figure 4.6.1 ICP Development Process Flowchart

4.6.2 Job Summary Level Risk Assessment

Risk assessment to determine the ICP should be performed in an objective manner. Use of the following steps and the risk assessment work sheet, Figure 4.6.2, will provide a good method for determining the ICP risk factors at the Job Summary level.

Labor - Evaluate each question against the known work. Place a check in the appropriate box adjacent to the question. After completing the 20 questions total the "yes" answers and enter the total in the box at the bottom of the yes column. Count up the number of blocks checked "yes" on the Risk Assessment Worksheet. If more than 15 questions are answered "yes", the estimated the Job Summary needs to go back to the Job Summary Planning Team for additional planning until the confidence level can be raised.

If the number of “yes” answers is less than 7, the estimated probability for success is high and a Risk Factor of 0% is applied.
If the number of “yes” answers is between 7 and 12,the estimated probability for success is moderate and a Risk Factor of 5% is applied.
If more than 12 questions are answered “yes”, the estimated probability for success is low and a Risk Factor of 10% is applied.

Material - Evaluate each question against the known work. Place a check in the appropriate box adjacent to the question. After completing the 7 questions, total the “yes” answers and enter the total in the box at the bottom of the yes column.

If the number of “yes” answers are zero or one, the Project considers the work as low risk and a Risk Factor of 0% is applied.
If the number of “yes” answers is 2 or 3, the Project considers the work as medium risk and a 5% Risk Factor is applied.
If more than 3 questions are answered “yes” or if question seven is answered “yes”, the Project considers the work as high risk and a 10% Risk Factor is applied.

Figure 4.6.2

RISK ASSESSMENT WORKSHEET

Job Summary Number_____ **Job Summary Name**_____

NO	DETERMINING LABOR FACTORS	YES	NO
1.	Complex work		
2.	First time worked at shipyard		
3.	Historical difficulty		
4.	Potential for impact on other jobs		
5.	Firewatch required		
6.	Potential for unidentified interference		
7.	Potential for radiological problems		
8.	Can job generate unplanned hazardous waste		
9.	Can job require unplanned hazardous material		
10.	Does job have potential for unplanned environmental problems		
11.	Are special support systems required		
12.	Are special qualifications/training required		
13.	Does job have unusual radiological concerns		
14.	Is there a potential for manpower shortages		
15.	Could there be unusual space limitations or constraints		
16.	Is this work integrated with non-shipyard work		
17.	Would test failure severely impact schedule or cost		
18.	Potential for schedule delay due to work or test		
19.	Could job generate new work		
20.	Does job require special tooling		
	Total yes:		

NO.	DETERMINING MATERIAL FACTORS	YES	NO
1.	Does job require lltm		
2.	End use material **has not** been ordered		
3.	Are estimated delivery dates for material **unacceptable**		
4.	Are large amounts of material sourced to shop stores		
5.	Are large quantities of material vendor supplied items		
6.	Does job require shipyard manufactured material		
7.	Does job have the potential to generate unplanned shipyard manufacture of material. (if yes is marked, material factor is considered high risk)		
	Total yes:		

4.6.3 High Level ICP Risk Assessment

Once an ICP has been developed at the Job Summary level and the aggregate total has been totaled to provide the entire Project Reserve, senior shipyard and project managers should review the ICP at the project level.

Factors which should be considered during this review include evaluation of the:

- Most expensive jobs (e.g., the top ten most expensive SWLINs)
- Execution and risk mitigation strategies for the highest risk jobs.
- Execution and risk mitigation strategies for the critical and controlling path jobs.
- Project resource management plan.
- Project financial management plan.
- Benchmarking results for selected Job Summaries.
- Project direct support budgets.
- Project change management plans for new work.

After review and buy-in is provided by the senior shipyard managers, final approval of the ICP should be given by the Shipyard Commander.

APPENDIX A

Sample Phased Manning Plan
(Nuclear and Non-Nuclear)

Appendix A *Sample DMP Project Team Phased Manning Plan (Nuclear and Non-Nuclear)*

USS TYPICAL (SSN-DMP)

SHAPEC

SPPG — WD 3

Est Wk Def Timeline

PROJECT TEAM POSITION	AWP1 A-20	A-19	A-18	A-17	A-16	A-15	A-14	WD 1 A-13	IPM A-12	A-11	AWP 2 A-10	WD 2 JS01 A-9	A-8	A-7	Scrn Mtg A-6	U/W Disc JS02 A-5	FPM A-4	JS00 JS03 A-3	ICP RLS A-2	FRE A-1	SA00 TG00 A+0	A+1	A+2	A+3	A+4	SC00 A+5	UD00 A+6	SS00 A+7	IPPTP HB00 A+8	DT00 A+9	FC00 ST00 A+10	CA00 A+11	A+12
PROJECT SUPT															1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
DPTY PROJ SUPT															1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
APS (NON-NUC)						0.25	0.25	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	
BSPO (NON-NUC)	0.5	0.5	0.5	0.5	0.5	1	1	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
ZONE MGR (NON-NUC)								2	3	4	4	4	4	4	4	4	5	5	7	7	7	7	7	7	7	7	7	5	4	4	3	2	
PEPM															1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
APEPM (NON-NUC)						0.25	0.25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
CTE (HP&A)											0.5	0.5	0.5	0.5	0.5	0.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
ACTE (HP&A)																		0.5	1	1	2	2	2	3	3	3	3	3	3	2	1		
STENN (HP&A)																				2	3	3	3	3	3	3	3	3	2	2	1		
STD (HP&A)																										1	1	1	1	1	1		
CTE (CSO)											0.5	0.5	0.5	0.5	0.5	0.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
ACTE (CSO)																			1	1	1	1	1	1	1	1	1	1	1	1	1	1	
STD (CSO)																											1	1	1	1	1	1	
PROJ. ENGR. (NON-NUC)																		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
TROUBLE DESK (250)																			2	2	3	3	3	3	3	3	3	2	2	1	1	1	
TROUBLE DESK (260)																			3	3	5	5	5	5	5	5	5	5	5	3	3	1	
TROUBLE DESK (270)																			2	2	2	2	3	3	3	3	3	3	3	3	1	1	
TROUBLE DESK (290)																			2	2	6	6	10	6	6	6	6	6	6	6	4	4	
WPC SUPV (NON-NUC)														1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	
WORK PKGRS (NON-NUC)															1	2	2	4	7	7	11	12	15	15	15	15	15	8	7	6	4	1	
CONTROL DESK (DCG)																0.25	0.25	0.25	1	2	2	2	2	2	2	2	2	2	2	2	2	2	
WORK CONTROL GROUP																		1	1	2	3	6	6	6	6	6	6	6	6	4	4	2	
PQE (NON-NUC)																		1	1	1	1	1	1	1	1	1	1	1	1	1	1		
SCHEDULER (NON-NUC)								0.5	1	1	1	2	2	2	2	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	1	0.5	
BUDGET / RESOURCE MANAGER																	1	1	1	1	1	1	1	1	1	1	1	1	1				
SUPVR , X-11 (NON-NUC)																		1	1	1	3	3	3	3	3	3	3	2	2	2	1		
SUPVR , X-17 (NON-NUC)																					1	1	1	1	1	1	1	1	1	1	1	1	
SUPVR , X-26 (NON-NUC)																			1	1	2	2	2	2	2	2	2	2	2	2	1	1	
SUPVR , X-31 (NON-NUC)																		0.5	0.5	1	2	3	3.5	3.5	3.5	3.5	3	2	1	0.5			
SUPVR , X-38 (NON-NUC)																		1	1	3	3	3	5	5	5	5	3	3	2	2	1	1	
SUPVR , X-51 (NON-NUC)																				1	2	2	2	2	2	2	2	2	2	2	2	1	
SUPVR , X-56 (NON-NUC)																		1	1	1	2	2	3	3	3	4	3	3	3	2	1	1	
SUPVR , X-64I (NON-NUC)																					1.5	1.5	1	1	1	1	1	1.5	1.5	1	1	0.5	
SUPVR , X-64PF (NON-NUC)																					1	1	1	1	1	1	1	1	1	1	1	0.25	
SUPVR , X-64SW (NON-NUC)																		1	1	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1	
SUPVR , X-67 (NON-NUC)																				1	1	1	1	1	1	1	1	1	1	1	1	1	
SUPVR , X-71 (NON-NUC)																		1	1	2	3	3	6	6	4	4	3	3	3	3	3		
SUPVR , X-72 (NON-NUC)																			1	1	2	2	2	2	2	2	2	2	2	1.5	1		
SUPVR , X-99E (NON-NUC)																				1	1.5	1.5	1.5	1	1	1.5	1.5	1	1	1	0.5	0.5	
SUPVR , X-99P (NON-NUC)																			1	1	1.5	1.5	1.5	1	1	1.5	1.5	1	1	1	0.5	0.5	
ASSIST. SHOP PLANNER																					5	5	5	5	5	5	5	5					
CLERK															1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
NON-NUCLEAR MPD TOTALS	0.5	0.5	0.5	0.5	0.5	1.5	1.5	5.5	7	8	9.5	10.5	10.5	11.5	16.5	18.75	22.75	33.75	53	64.5	95.5	100.5	114.5	110.5	108.5	111.5	108	94.5	85.5	74	58.5	38.75	0

Est Wk Def Timeline

PROJECT TEAM POSITION	AWP1 A-20	A-19	A-18	A-17	A-16	A-15	A-14	WD 1 A-13	IPM A-12	A-11	AWP 2 A-10	WD 2 JS01 A-9	A-8	A-7	Scrn Mtg A-6	U/W Disc JS02 A-5	FPM A-4	JS00 JS03 A-3	ICP RLS A-2	FRE A-1	SA00 TG00 A+0	A+1	A+2	A+3	A+4	SC00 A+5	UD00 A+6	SS00 A+7	IPPTP HB00 A+8	DT00 A+9	FC00 ST00 A+10	CA00 A+11	A+12
APS (NUC)															1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
ZONE MGR (NUC)						1	1	1	1	1	1	1	1	1	2	2	2	3	4	5	5	5	5	5	5	5	4	4	3	2	2		
BSPO (NUC)									0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
PROJ. ENGR. (NUC)						0.5	0.5	0.5	0.5	0.5	0.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
JPL (NUC)						0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	1	1	1	1	1	1	1	1	0.5	0.5				
CTE (NUC)										0.5	0.5	0.5	0.5	0.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
ACTE (NUC)																	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	
STE (NUC)																			1	2	3	3	3	3	3	3	3	3	3	2	2		
STS																										0	0	3	3	0	0	0	
WPC SUPV (NUC)														0.25	0.25	0.25	0.5	0.5	1	1	1	1	1	1	1	1	1	1	1	1	0.5		
WORK PKGRS (NUC)														0.25	0.5	0.5	1	2	2	4	4	4	4	4	4	4	4	4	3	2	2	1	
PQE (NUC)																		1	1	1	1	1	1	1	1	1	1	1	1	1	1		
SCHEDULER (NUC)									0.25	0.25	0.25	0.5	0.5	0.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
SUPVR, X-11 (NUC)																			1	1	2	2	2	2	2	2	2	1	1	1	1		
SUPVR, X-17 (NUC)																					0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
SUPVR, X-26 (NUC)																				1	1	1	3	3	3	3	1	1					
SUPVR, X-31 (NUC)																					1	1	1	1	1	1	1	1	1				
SUPVR, X-38 (NUC)																			1	1	3	3	3	3	3	2	2	1	1	1			
SUPVR, X-56 (NUC)																		1	1	2	3	3	3	3	3	3	3	3	3	2	1		
SUPVR, X-64I (NUC)																				1	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0.5	0.5		
SUPVR, X-67 (NUC)																	0.5	1	1	1	2	3	3	3	3	3	3	3	3	2	1		
SUPVR, X-71 (NUC)																					1	1	1	1	1	1	1	1	1	1	1		
SUPVR, X-72 (NUC)																				1	1	1	2	2	2	2	2	1	1	1			
SUPVR, X-99E (NUC)																			0.5	1	1	1	1	1	1	1	1	1	1	1	0.5		
SUPVR, X-99P (NUC)																			0.5	1	1	1	1	1	1	1	1	1	1	1	0.5		
NUCLEAR M PD TOTALS	0	0	0	0	0	2	2	2	2.75	3.25	3.25	4	4	4.5	7.75	7.75	10	14.5	20	29.5	37.75	39.25	42.25	42.25	42.5	41.5	38.5	38	35	24.5	19.5	6.5	0
DMP MPD TOTALS	0.5	0.5	0.5	0.5	0.5	3.5	3.5	7.5	9.75	11.25	12.75	14.5	14.5	16	24.25	26.5	32.75	48.25	73	94	133.25	139.75	156.75	152.75	151	153	146.5	132.5	120.5	98.5	78	45.25	0

APPENDIX B

Baseline Executive Level Project
Planning Timetable

Baseline Executive Level Project Planning Timetable

PLNG Event #	PLANNING EVENT DESCRIPTION (Action Required)	ACTION REQUIRED BY BPMP SECTION	RESPONSIBLE ACTIVITY/CODE	COMPLETE ACTION BY	NOTES	PREREQUISITE PLANNING EVENTS
E1000	FY Std Work Package Review Mtg	4.5.4.2	SUBMEPP	A-26	Nominal - A-26 to A-34 Window	
E1100	Begin Development of Executive PPTT	3.6	Executing Activity	A-26	Coincides with FY STD WP Review	
E1010	Issue Initial Approved Work Package	4.5.4.2	SUBMEPP	A-21	Issue 1	E1100
E1200	Provide Funding	4.5.4.2	NAVSEA/TYCOM	A-21	Required for Planning and Material Ordering	
E1300	Establish Project	4.5.4.2	BSPO Rep	A-21	AIM & Financial	E1010, E1200
E1310	Issue Version 1 of PMP	3.7	BSPO Rep	A-20		E1300
E1320	Initial Key Event Schedule	4.5.4.5.1	BSPO Rep	A-20		E1300
E1400	SHAPEC Begin J.S. Prep	4.3.1	SHAPEC	A-20	Nominal	E1300
E1500	Conduct Shipcheck	4.3.2	SHAPEC/EPD/ NEPD	A-20	Nominal - A-20 to A-13 Window	E1300
E1410	EPD & NEPD Begin J.S. Issue	4.3.1	EPD/NEPD	A-19.5	Nominal - Includes MATL Ordering	E1400
E2000	Stand up Initial Project Team	3.3.1	Exec Activity	A-15	Project Support & PEPM	E1300
E2100	Begin Development of Plan for Planning	3.1	Project Team	A-15		E2000
E2200	Begin Approval of Job Summaries	4.3.1	Project Team	A-15		E1410
E2175	Begin Planning Status Reporting	4.5.6.14.3	Project Team	A-14	Incorporate Fig. 2.3-2 and 2.3-3 Items	E2000
E2110	Update Executive Level PPTT	3.6	Project Team	A-13		E2100
	Work Discovery Period #1	4.5.4.2	EPD/NEPD	A-13	Nominal (pre-deployment)	

Baseline Executive Level Project Planning Timetable (Cont'd)

PLNG Event #	PLANNING EVENT DESCRIPTION (Action Required)	ACTION REQUIRED BY BPMP SECTION	RESPONSIBLE ACTIVITY/CODE	COMPLETE ACTION BY	NOTES	PREREQUISITE PLANNING EVENTS
E3110	Deficiency Screening Conference	4.5.4.2	TYCOM	A-13	Nominal - must complete by IPM	E3100
E2120	Complete Time Phased Resource Plan	3.5	Project Team	A-12.5	Time Phased Resource Plan for Planning	E2100
E2130	Complete Initial Project. Team Training Plan	3.3.3	Project Team	A-12.5		E2100
E2140	Complete Plan to Develop Exec Strategies	4.5.4.1	Project Team	A-12.5		E2100
E2150	Complete Project Work Definition Plan	4.5.4.2	Project Team	A-12.5		E2100
E2160	Complete Fast Start Strategy	4.5.4.2	Project Team	A-12.5		E2100
E2170	Complete Plan to Develop. Software Schedule	4.5.6.2	Project Team	A-12.5		E2000, E2175
E2180	Issue Version 2 of PMP	3.7	Project Team	A-12.5		E2100 thru E2170
E3000	Plan for Planning Brief to Mgmnt	3.1	Project Team	A-12		E2180
E3310	Complete Performance Metrics Plan	4.5.6.5	Project Team	A-12		E2140
E3315	Complete Material Management Plan	4.5.6.4	Project Team	A-12		E2140
E3120	Conduct Initial Planning Meeting	4.5.4.2	TYCOM	A-12		E3010, E3020, E3110
E3010	Conduct Planning Meeting	4.5.4.2	SUBMEPP	A-11		
E3320	Complete Work Packaging Strategy	4.5.6.7	Project Team	A-10		E2140
E3130	Issue 2 AWP	4.5.4.2	SUBMEPP	IPM+1 NLT A-10	Issue 2	E3120

Baseline Executive Level Project Planning Timetable (Cont'd)

PLNG Event #	PLANNING EVENT DESCRIPTION (Action Required)	ACTION REQUIRED BY BPMP SECTION	RESPONSIBLE ACTIVITY/CODE	COMPLETE ACTION BY	NOTES	PREREQUISITE PLANNING EVENTS
E3020	Complete JS01 Job Summary Issue	4.5.4.2	SHAPEC/EPD/ NEPD	A-09		E1400, E1410, E1500
	Work Discovery Period #2	4.5.4.2	EPD	A-08	Nominal (during deployment if possible)	
E3325	Complete Hazardous Mtl Sample Plan	4.5.6.10	Project Team	A-08		E2140
E3330	Complete Integration of New Work Strategy	4.5.6.8	Project Team	A-07		E2140
E3335	Complete Crane Utilization Strategy	4.5.6.9	Project Team	A-07		E2140
E3040	Determine Arrival Date	4.5.4.2	Project Team	A-06		
E3050	Issue Quality Management Plan	4.5.3	Project Team	A-06		E2140
E3210	Complete Key Event and Milestone Mgmnt	4.5.4.5	Project Team	A-06	Management Strategy	E2140
E3215	Complete Prefabrication Plan	4.5.4.2.4	Project Team	A-06		E2140
E3220	Complete Sys Status & Plant Cond Plan	4.5.4.4.1	Project Team	A-06		E2140
E3225	Complete Special Attention Job Plan	4.5.4.5.1	Project Team	A-06		E2140
E3140	Complete JS02 Job Summary Issue	4.5.4.2	SHAPEC/EPD/ NEPD	A-05		E3130
	Work Discovery Period #3	4.5.4.2	EPD	A-04	Nominal (Post-deployment)	
E3150	Complete JS00 Job Summary Approval	4.5.4.2	Project Team	A-04		E3020, E3140
	Underway Work Discovery Period			A-04		

Baseline Executive Level Project Planning Timetable (Cont'd)

PLNG Event #	PLANNING EVENT DESCRIPTION (Action Required)	ACTION REQUIRED BY BPMP SECTION	RESPONSIBLE ACTIVITY/CODE	COMPLETE ACTION BY	NOTES	PREREQUISITE PLANNING EVENTS
E3230	Complete Plant /Space Inspection & Closeout Plan	4.5.4.3.1	Project Team	A-04		E2140
E3235	Complete Test Integration Plan	4.5.6.12	Project Team	A-04		E2140
E3240	Complete Sys Xfer/Takedown Plan	4.5.4.8	Project Team	A-04		E2140
E3245	Complete Temporary Support Sys Plan	4.5.4.4.5	Project Team	A-04		E2140
E3250	Complete Special Resource Requirement Plan	4.5.4.5.1	Project Team	A-04		E2140
E3255	Complete Outside Activity Work Integ Plan	4.5.4.6	Project Team	A-04		E2140
E3260	Complete SF Task Integration Plan	4.5.4.6	Project Team	A-04		E2140
E3265	Complete Open and Inspection Plan	4.5.4.2.5	Project Team	A-04		E2140
E3340	Complete Special Evolution Schedule Strategy	4.5.6.13	Project Team	A-04		E2140
E3345	Complete Transition Plan/Exec Strategy	4.5.6.11	Project Team	A-04		E2140
E3350	Complete Plan for Using Schedule Tools	4.5.6.14	Project Team	A-04		E2140
	Complete All Job Summaries(JSO3)	4.5.4.2	SHAPEC/EPD/ NEPD	A-03		
E3400	Deficiency Correction Period	4.5.4.2	Ship's Force	A-03	Nominal - Depends on Ship Schedule	E3110
	Complete All Job Summary Review (JS00)	4.5.4.2	SHAPEC/EPD/ NEPD	A-03		

Baseline Executive Level Project Planning Timetable (Cont'd)

PLNG Event #	PLANNING EVENT DESCRIPTION (Action Required)	ACTION REQUIRED BY BPMP SECTION	RESPONSIBLE ACTIVITY/CODE	COMPLETE ACTION BY	NOTES	PREREQUISITE PLANNING EVENTS
E3355	Complete Communications Strategy	4.5.4.7	Project Team	A-02		E2140
E3510	Complete Development of ICP	4.6	Project Team	A-02		E3500
E3600	Resource Leveled Schedule	4.4.1	Project Team	A-02		E3150,E3210 THRU E3265
E4000	Readiness to Start Brief to Mgmnt	4.1	Project Team	A-02		E3600,E3310 THRU E3355, E3510
E3500	Establish Final Review Estimates	4.5.4.2	BSPO Rep	A-01		E3150
E4100	All Work TGIs Approved	4.5.4.2	SHAPEC/EPD/ NEPD	A-0		E3150
E4200	Arrival Conference	4.5.4.2	Exec Activity	A-0		E3130, E3400, E3600

APPENDIX C

Integrated Resource Leveled Schedule Development Process

For SSN 688 Class Depot Modernization Period, Engineered Refueling Overhaul and Engineering Overhaul Availability Improved Planning and Execution

Integrated Resource Leveled Schedule Development Process

1. Overview of Schedule Development Process
    a. What is an Integrated, Resource Leveled Schedule?
    b. Development of a Project Network
    c. Development of a Resource Pool
    d. Distributing the Workload
2. Scheduling Definitions
3. Schedule Development Process
    a. Define the Authorized Work Package
    b. Establish Project in AIM
    c. Identify Key Events and Milestones
    d. Develop Job Summaries
    e. Validate the Project Network
    f. Develop Available Resource Pool
    g. Schedule the Project
    h. Evaluate the Schedule
    i. Develop Mitigation Strategies
4. Maintaining the Schedule
    a. Products/Reports
    b. Float Analysis
    c. Maintenance

Enclosures: (1) Use and Guidelines for Activity Priority Codes
(2) Resource Scheduling Metrics
(3) Sample Executive Schedule

1. Overview of Schedule Development Process

a. *What is an Integrated, Resource Leveled Schedule?*

An Integrated, Resource Leveled Schedule is a technically accurate sequence of work which work, which considers resources and duration available to optimally accomplish work. The overall process of developing an Integrated Resource Leveled Schedule is depicted by Figure 1. An integrated Schedule contains all Shipyard and significant Ship's Force and other non-Shipyard work items which must be accomplished to complete the Availability. A Schedule is resource leveled when the workload distribution matches the committed workforce. It is a tool for planning work, evaluating the rate of progress for completing work, managing resources, and predicting the ability of the project to achieve planned objectives. It is not a work list, but instead clearly reflects discrete timeframes when work items will be accomplished. To support the Fast Start strategy a Schedule will have the following characteristics:

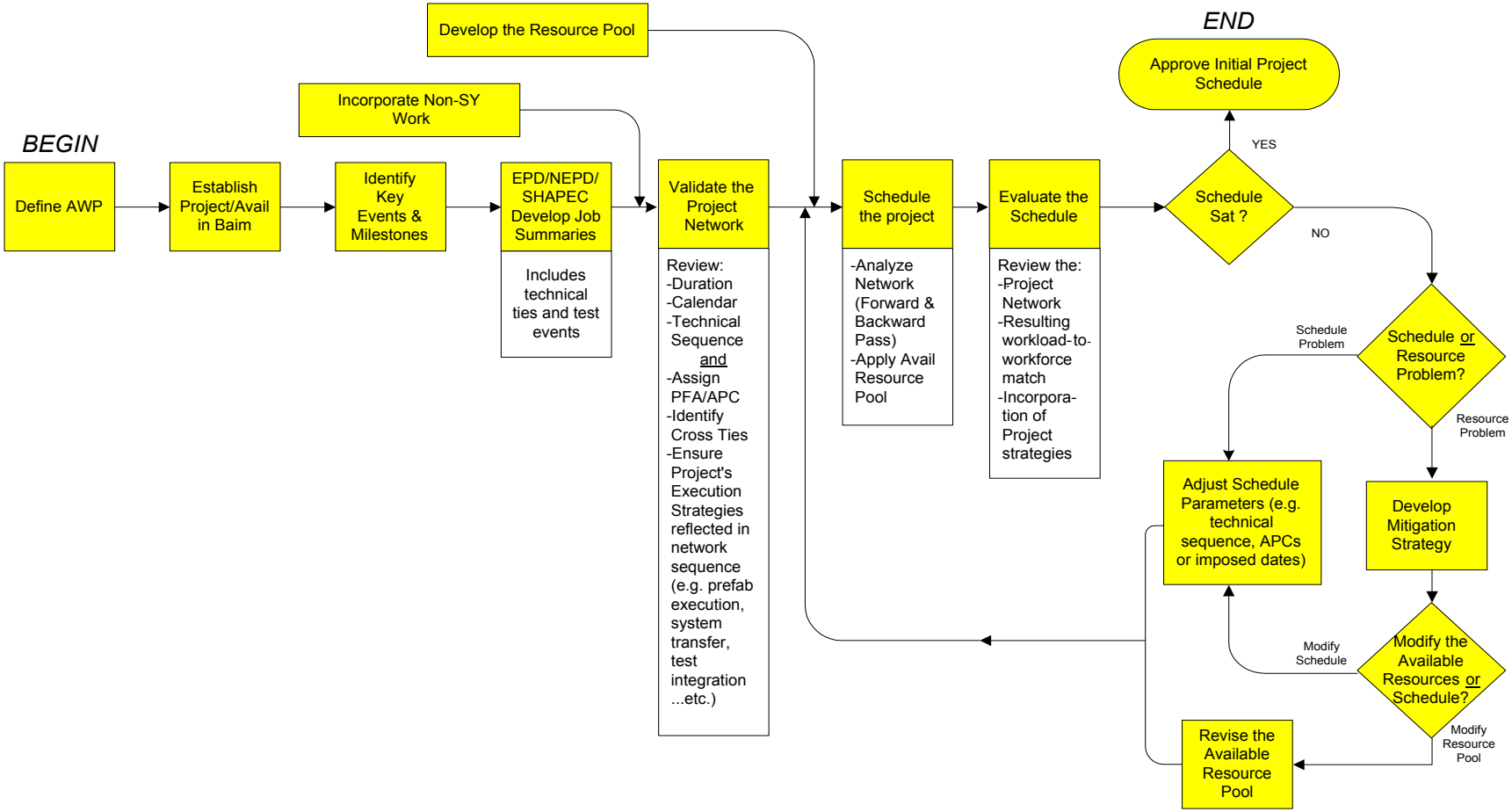
- Incorporates project team execution strategies to facilitate efficiently starting work
- Increases required manning in concert with increasingly available open work sites so that BQWP will be at or above the "straight line" level by A+6 weeks
- Accomplishes 80-85% of all work by undocking
- Matches workload distribution (BQWS) to committed resources

> *Note: "Committed" in this context means that personnel resources are available through on-board resources, borrows from other yards, overtime, or contracting of work. To be committed, each production shop shall verify that resources are or will be available to support the project's workload plan. Where known shortfalls exist, individual shops shall have a credible plan for obtaining the resources and shall specifically identify to the project the consequences and potential risks of the plan (e.g., shop will exceed overtime budget, borrows will exceed the number readily available in the past, resources will be taken from lower priority projects, etc.).*

b. *Development of a Project Network*

The process of developing an integrated, Resource Leveled Schedule is complex and iterative. The building of a Schedule begins with the creation of a Key Event, Milestone, and Test Network. As Job Summaries are developed Component Unit (CU) Phases are created to accomplish the required work items. The establishment of these phases produces the end-use Work Breakdown Structure (WBS). An effective WBS is the foundation for a successful schedule. Phases within a summary are technically sequenced in the manner that they must be accomplished in order to get the work done. During the Job Summary review process, the technical ties between the summary CU Phases are reviewed and the cross-ties between CU Phases from different Job Summaries are established. The CU Phases are, in turn, sequenced in the best manner possible to support the Key Event, Milestone, and Test framework.

Figure 1:
Schedule Development Process Flowchart



This process of establishing and reviewing correct technical relationships between the CU Phases produces a Network to be used for further development of the Schedule. Following individual job summary reviews, cross-ties are developed between job summaries to reflect appropriate sequences.

A key element in developing a credible, executable schedule is the use of realistic durations for accomplishing each individual CU Phase. Determination of the time-span allocated for each duration should be based on the actual time that it is expected to take to accomplish the necessary work. This does not mean a lengthy duration is assigned to simply allow more time to accomplish the work. Increasing durations will reduce available float. Durations must be determined in a judicious, carefully considered manner. Consideration should reflect the manner in which the work will be performed and the historical performance of similar work. Application of realistic durations provides a more accurate determination of actual available float, produces a more credible schedule, provides a more realistic distribution of required labor resources, and will reduce the amount of schedule maintenance required during execution.

The Project Team must decide which scheduling tool will be used as well as deciding which work items will be included in the Integrated Schedule. The Project has the following options: (1) Developing Job Summaries in AIM which results in Component Unit (CU) Phases for each work phase and also a scheduling activity in Project Sequencing and Scheduling (PSS) software, or (2) by creating schedule activities directly in the PSS database. Other maintenance providers (i.e., AITs, and TYCOM sponsored activities) may choose to use additional supplementary schedules as tools to more adequately schedule and resource level their work. However, the power of the Integrated Schedule lies in having the scheduled work items tied together so that when an unexpected delay occurs in one maintenance provider's actual execution, the effect of this delay can be seen across the Availability. This capability is lost when different scheduling tools are used for the different maintenance providers.

The CU Phase is the most basic building block within the AIM database. CU Phases are increments of work or activities which are created by writing a Job Summary. Within a Job Summary, CU Phases are attached to one another through constraints which serve as hard links. The type of constraint used contains schedule meaning for when successor activities may start in relation to predecessors. When CU Phases between Job Summaries are constrained to one another, the link is referred to as a cross-tie. If constraints and cross-ties are made based on the technical/physical requirements of the work being accomplished, then a true picture of what must be done to complete the Availability is created. As execution delays or accelerations occur, the constraints and cross-ties will cause all down stream activities to be readjusted in time. When the Project Team creates Activities in the Schedule for all maintenance providers and is diligent in creating constraints and cross-ties, a true picture of when each maintenance provider has a "window of opportunity" to accomplish assigned work is created.

The CU Phase is also of importance to the Chief Test Engineers (CTE). Through a process separate from the scheduling process, the CTE associates each CU Phase in the AIM database with the Test or Key Event the phase is required to be accomplished for. During Test Event readiness reporting, the CTE uses the result of this process to determine if the ship is ready to enter a specific test phase. This method of automated database accountability has replaced hand over hand system integrity checkouts. The importance of maintaining the database as accurate as possible becomes crucial to support this function. As a Project begins to consider entering non-Shipyard work into the AIM database for scheduling reasons, it must be keenly aware of the CTE's needs and responsibilities for test management and abide by the CTE's requirements for database management.

The Project Team when making the decision to write Job Summaries as a method to schedule non-Shipyard work or only develop Schedule Activities must consider the advantages and disadvantages.

- The Job Summary provides the following advantages. The first is the reusability of the Job Summaries. Second is the ability to issue Work Documents which can be certified which has value for Ship's Force work.
- Development of the job summary has the following disadvantages. The first disadvantage is that the AIM software is complex and it is time consuming to create a Job Summary. A second disadvantage is the relatively high amount of training required to achieve proficiency in the software use. The integration effort has to allow time for this training in the Planning Phase. Finally, since the Shipyard uses the Job Summary for many functions other than scheduling (material ordering, work instructions and funds allocation) the Project Team must be careful to ensure that non-Shipyard Job Summaries are loaded properly as non-Shipyard work so that other functions of the database are not corrupted.
- In some cases an acceptable alternative to Job Summary writing is the use of a Schedule Activity. Schedule Activities are created directly in the PSS software. They can be constrained or cross-tied in the same fashion that CU Phases are and can be co-mingled with CU Phases. Schedule activities are created by a Shipyard scheduler rather than using Ship's Force for preparation of a Job Summary. There are some significant drawbacks to Schedule Activities that must be understood before they are used. First, since the Schedule Activity is created outside AIM software, the CTE does not know it is there. For items of importance to Test Event Readiness, the use of Schedule Activities is inappropriate. Second, it requires Shipyard schedulers rather than Ship's Force personnel to create the Schedule Activities. Finally, Ship's Force Work Centers cannot be associated to a schedule activity so any attempt at resource profiling or leveling is diminished in its effect if Schedule Activities are used too heavily.

The Resource Leveled Schedule will reflect Project Strategies when complete. The initial action to integrate the Project Strategies into the Resource Leveled Schedule occurs when specific cross-ties and sequences are identified by the specific strategy. These are incorporated into the Network before Workload Distribution takes place. An example of this action is reflecting the CU Phase for System Takedown as a predecessor to CU Phases which begin work in the system. The sequencing of the System Takedown CU Phase in the schedule should reflect the System Takedown Strategy developed which provides the specific sequence and plan for taking down all systems. Once in the Network, with a proper duration identified, the Distribution of the Workload will refine the Strategy and provide indication that the developed strategy will provide the desired result.

c. Development of a Resource Pool

In parallel with the Job Planning process an accurate representation of the available workforce pool must be developed. To be truly effective in resource leveling a Project, resources for all Shipyard productive work should be resource leveled as well. Development of the available resource pool must account for how manpower will be applied to the Project. Determination of the amount of the available resources must include considerations on how the workforce will be employed such as overtime, contracted work, borrowed labor, and expected performance factors. Accurately assessing the available resource pool is vital to successfully scheduling the Project work.

To be meaningful, a reasonable expectation that the resources identified in the available resource pool will actually be provided to the project at the scheduled time for the scheduled time duration must exist. This defines the level of commitment for the involved resources. Although certain specialized skills may require identification of specific individuals in key areas, it is not intended to require broad naming of specific people to obtain this commitment. Rather, it is a diligent review of resources available (including attention to special skill areas), compared to potential and identified work assignments for these resources (to ensure that a resource is not "committed" twice, or scheduled beyond the capability of the resource to fulfill the work assignment). Disparities between resources available and work identified may be mitigated by use of overtime, borrowing additional resources, contracting out or hiring additional resources, training additional resources, or other similar strategies. Initiation (and continued implementation) of a mitigation strategy is an acceptable "commitment" of the resource provided there is a reasonable expectation that the mitigation strategy will be successful if completed, and that the affected parties will carry the strategy through to completion. Significant or unusual mitigation strategies should be presented to and concurred in by shipyard and project management.

d. *Distributing the Workload*

Once a Network of technical relationships has been developed and validated, the workload must be distributed over time by applying available resources. The workload distribution process, which is referred to as resource leveling, is greatly aided by the use of computer algorithms. It is an iterative process that involves judicious application of parameters that determine the priority associated with accomplishing the individual CU Phases. These parameters, coupled with the available resource pool, determine how the workload is distributed. It is during this time that application of the detailed execution strategies developed by the Project Team is critical. These strategies provide an objective basis for determining the best range of Preclude Float Allocation (PFA, also known as Preclude Float Activity), Float Group, and Activity Priority Code (APC) values. Changes to the priority parameters, refinements to the resource pool and mitigation strategies must be iteratively applied and adjusted until a realistic, achievable Schedule is produced.

2. Scheduling Definitions

The following terms are used throughout the Scheduling Process and must be thoroughly understood by the Project Management Team.

Activity - A group of tasks (CU Phases) which consume or use resources (labor, equipment, facilities, or material) when being accomplished.

Activity Priority Code (APC) - A designation of the importance of an activity as determined by the Project Management Team. Scale is from 1 (very important) to 5 (relatively unimportant); the default value is 3. Used to prioritize Activities for movement in time during the Resource Scheduling Process.

Calendar - The shifts-per-day and days-per-week planned to be worked.

Constraint - A limitation placed on an Activity or Event by other Activities or Events.

Critical Path - The longest continuous path from the start of a Project to the end for the time available to accomplish the path. Alternatively, the path through the Project with the least float.

Cross-Ties - The process of establishing relationships (Predecessor/Successor) between different Job Summaries. The process identifies what CU Phases from one Job Summary control the start of work in another Job Summary.

Duration - The time estimated to be required to complete an Activity (measured in shifts).

Early Finish (EF) - The earliest possible finish time for an Activity.

Early Start (ES) - The earliest possible starting time for an Activity.

Event - A specified point in time which represents the beginning or end of one or more Activities or Events. An Event does not consume time or resources.

Finish-to-Finish Constraint - A relationship between two Activities in which the first Activity must finish before the next Activity can finish. May cause Network logic errors.

Finish-to-Start Constraint - A relationship between two Activities in which the first Activity must finish before the next Activity can start. <u>This is the default constraint for Availability Scheduling</u>.

Free Float - Amount of time a task can slip and not affect any successor.

Imposed Date - A date that places an Activity in a relative date position without a technical constraint.

Key Event - A Project Event which cannot slip without seriously impacting the overall Project Schedule and possibly delaying the completion date of the Project in question or other Projects.

Late Finish (LF) - The latest possible time that an Activity may finish.

Late Start (LS) - The latest possible time that an Activity may start.

Milestone - An Event that represents a specific project goal that supports the Key Events.

Negative Float - Completion of the Activity requires more time than available - this situation requires resolution.

Network - A diagram that depicts a Project by showing the Activities and Events and the relationships between them.

Overtime Float - Amount of time in non-work period available to a Project. Includes weekends, holidays, and off-shift time.

Performance Evaluation Review Technique/Critical Path method (PERT/CPM) - A technique for representing a Project Network, in which Activities and their relationships are depicted by nodes and areas, and Critical Paths are identified and tracked. It allows planning to any level of detail (normally at the CU Phase level but sometimes lower) and indicates the intended order of accomplishment. It also indicates the degree of job dependency and Schedule flexibility.

Preclude Float Allocation (PFA) - A "flag" on an Activity that prevents its movement during the Resource Leveling Process. It is applied by the Project Management Team.

Predecessor (PE) - An Activity or Event that immediately precedes one or more Activities or Events under consideration.

Project Sequencing and Scheduling System (PSS) - The scheduling module of the AIM software program. Within PSS is the scheduling software (PDMSS) used for the actual scheduling process.

Program Depot Maintenance Scheduling System (PDMSS) - The computer system used by schedulers to create, validate, and maintain Resource Leveling Availability Schedules. During Project execution, it is used to update the Project Schedule to reflect the current status, to provide tools for technical sequence verification, and to provide to the Project Management Team the flexibility to change the CU Phase Schedule within positive float.

Resource Leveling - The process which moves the work (CU Phases) within positive float to compensate for limited resources.

Schedule - A portrayal of the date commitment of all Activities and Events in a Project. It may be a Network, bar chart, or in report format.

Schedule Activity - An Activity created in the Schedule that has no association with a CU Phase in AIM. It is generally used to tie Network logic together or granulate work into finer segments for tracking purposes.

Schedule Event - An Event in the Project Network that is not created in the AIM system, and is generally used to build higher-tier Schedules.

Start-to-Finish Constraint - A relationship between two Activities in which the first Activity must start before the next Activity can finish. May cause Network logic errors.

Start-to-Start Constraint - A relationship between two Activities in which the first Activity must start before the next Activity can start. May cause Network logic errors.

Successor (SE) - An Activity or Event that immediately follows one or more Activities under consideration.

Total Float - The amount of time that an Activity can slip without impacting the Project Completion date or an Event (Total Float = LF - EF).

Work - The effort required to perform a task or job, distributed over time. Work is expressed in man-hours or mandays (8 man-hours = 1 manday) and is distributed over time using the provided duration.

Work Breakdown Structure (WBS) - The separation of work into smaller, identifiable units. Under AIM, these units are phases of work on Component Units (CU Phase).

3. Schedule Development Process

a. *Define the Authorized Work Package*

Successful development of a Project Schedule begins with the definition of the Authorized Work. This is accomplished by use of the approved Availability Work Package (AWP) which defines specific work to be performed. Upon receipt of an approved AWP (and funding from the customer), planning can begin which will allow Schedule development.

b. *Establish the Project in AIM*

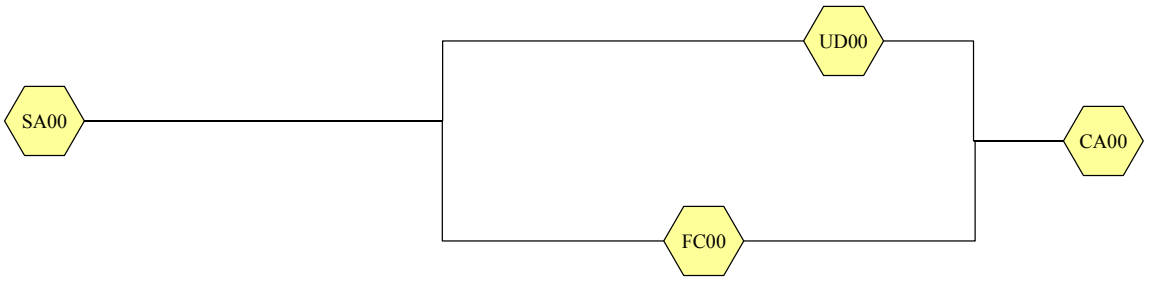
The initial step in planning for the Project is to establish the Project (Availability) in the Advanced Industrial Management (AIM) program. This step is typically performed by the Executing Activity Business Office with the assistance from Executing Activity AIM Program Office. Once the Project is established in AIM, the Job Summary development process begins. This process results in the creation of CU Phases which are the elements used to build the Project Schedule.

c. *Identify Key Events and Milestones*

Key Events are major schedule events such as Start Availability, Undocking, Commence Steaming, Start Sea Trials, etc., which if missed will seriously impact the overall schedule and possibly delay the project or other projects. In establishing the Key Events for the project, the following must be considered:

- The Key Events listing from the Baseline PMP should be the starting point for defining the Key Events for the project. Additional Key Events may be added as required.
- Each Key Event should be fully defined. A clear and concise description for each Key Event is important so that everyone on the project fully understands what work is within the scope (or NOT in the scope) of each event. Each Key Event should have a Prerequisite List or Checklist that specifies the required completeness of System and Space work, and the required level of administrative reviews.

Key Events and their dates are passed to the scheduling system via the import function in PSS. After the Key Events are imported into PSS, the scheduler must tie the Key Events together with schedule constraints. This creates a Key Event network which shows the logical as well as technical ties between the Key Events.



System requirements for each Key Event must be documented. Technical requirements for each Key Event for each system must be listed, as well as strategic considerations (e.g., contingencies, temporary systems, etc.)

USS NEVERFISH (SSN 000) DMP
System Requirements for Undocking (UD00)

System	Description	Technical Requirements	Strategic Considerations
562	Drain System	System capable of pumping all bilges and sumps at design flow rates. All hull and backup valves tested and installed or blanks installed.	TD-105 – Valve repair cannot complete prior to UD00 due to material unavailability. Temporary drain system must be installed in bilge area by valve station.

Milestones are Events that support Key Events. Milestones are used to monitor Schedule and cost progress so that actions can be taken, if required before you reach a Key Event. There are two types of Milestones, System and Management. As much as possible, the number of Management Milestones should be minimized since Management Events tend to be more general in nature (e.g., “Complete all X31 Work”).

d. *Develop Job Summaries*

Job Summaries - A Job Summary is a logical and manageable grouping of work within a SWLIN. An example of a logical and manageable Job Summary boundary is "Open, Inspect, and Restore Sanitary Tank #2." This work is usually covered under SWLIN 176A02, which also lists the work for all other built-in tanks. Using this example, work for each built-in tank could be broken down into a separate Job Summary so that it will be easier to manage and control. An alternative would be to group tanks when this is desired by the specific Project Strategy.

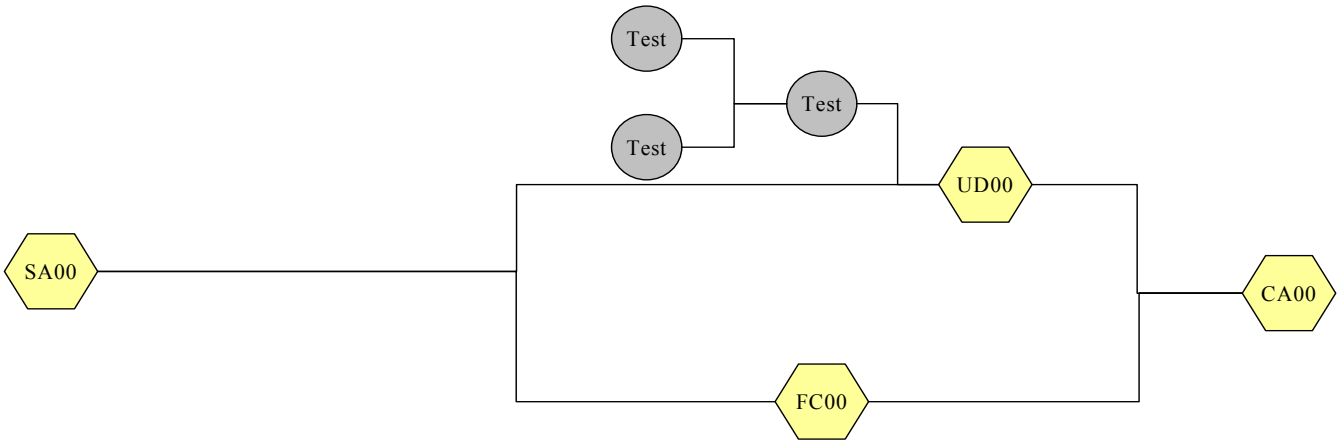
Component Unit Phase (CU Phase) - A CU Phase is a subset of the Job Summary which is the basic building block in building a Project Network. A CU Phase describes what work needs be done, estimates the cost for the work, identifies the Shop Trade Skill Designator (TSD) that will perform the work, and any special requirements for the work. CU Phases are sometimes compared to Job Order Keyops.

Work-to-Test - The Work-to-Test strategy is the process by which it is determined what work has to be done prior to accomplishment of the required test. This is also referred to as the Right-to-Left Approach in building the Project Network.

Building the Project Network - Building a work-to-test Project Schedule requires establishing the network with a Left-to-Right and a Right-to-Left Approach. The Left-to-Right Approach develops the work sequence of the Schedule and the Right-to-Left approach develops the all important test sequences and test plan. The merger of both approaches creates the work-to-test Schedule.

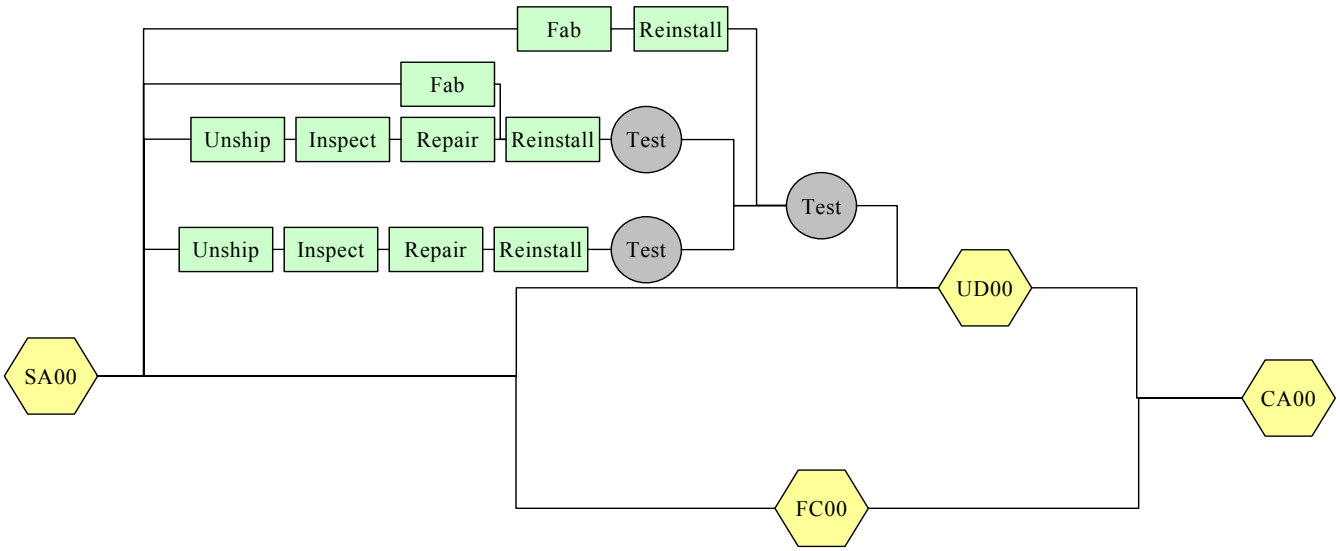
The Right-to-Left Approach

Define the Test Sequence for each Key Event - Using the system requirements tables, and after reviewing the Availability Work Package and test phases, develop a test sequence for each Key Event. The test sequence depicts the relationships between tests and between tests and Key Events. The test sequence must reflect technical requirements as well as the Project's strategic considerations as listed in the system requirement tables. A well-defined system requirements table is critical in developing an accurate test sequence. It is also very important that changes are documented in the tables and affected test sequences revised.



The Left-to Right Approach

Sequence the Work - The CU Phases (activities) must be sequenced to reflect how the Project intends to do the work, both technically and strategically. After initial development of the summary logic, cross-tie analysis should be conducted to identify any technical or strategic constraints between Job Summaries.



Identify Work-to-Test Relationships - As the CU Phases are sequenced, special attention must be taken in establishing the tie between the work that will be performed and the testing that will prove the work. Both the Nuclear and HM&E CTE play a vital role in establishing this work-to-test relationship.

Implement Project Strategies - The Resource Leveled Schedule will reflect Project Strategies when complete. The initial action to integrate the Project Strategies into the Resource Leveled Schedule occurs when specific cross-ties and sequences are identified by the specific strategy. These are incorporated into the Network before Workload Distribution takes place. An example of this action is reflecting the CU Phase for System Takedown as a predecessor to CU Phases which begin work in the system. The sequencing of the System Takedown CU Phase in the schedule should reflect the System Takedown Strategy developed which provides the specific sequence and plan for taking down all systems. Once in the Network, with a proper duration identified, the Distribution of the Workload will refine the Strategy and provide indication that the developed strategy will provide the desired result.

Section 4.5.4 of the Baseline Project Management Plan (BPMP) identifies specific strategies to be developed with prescribed time periods for completion. While not all of the developed strategies will be reflected in the Resource Leveled Schedule (an example being the plan to develop the strategies), the following guidelines reflect how, when, and who has the responsibility for ensuring that the strategy has been implemented once developed:

STRATEGY	IMPLEMENTATION RESPONSIBILITY	WHEN IMPLEMENTED	HOW IMPLEMENTED
Fast Start Strategy	PEPM	A-3	Review RLS to verify F.S. attributes met
Key Event/Milestone Strategy	PEPM	A-15 to A-6	Defines Schedule Events/Milestones
System Status & Plant Condition Plan	Cognizant APS/PEPM	A-6 to A-4	Ensure RLS sequences work to support Plnt Cond.
Special Attention Job Plan	Cognizant APS/PEPM	A-6 to A-4	Include special sequences and ties
Plan/Space Inspection & Closeout Plan	Cognizant APS/PEPM	A-6 to A-4	Include event and detailed schedule
System Transfer/ Takedown Plan	Cognizant APS/PEPM	A-6 to A-4	Include CU Phases and sequence in schedule
Test Integration Plan	Cognizant CTE	A-6 to A-4	Reflect Test Plan in schedule
Special Resource Requirements Plan	Cognizant APS/PEPM	A-5 to A-3	Reflect contracted dates in schedule
Outside Activity Work Integration Plan	PEPM	A-6 to A-4	CU Phases included in schedule
Ship's Force Task Integration Plan	PEPM	A-6 to A-4	CU Phases included in RLS
Open and Inspect Plan	Cognizant APS/PEPM	A-5 to A-3	RLS sequences Work per Strategy
Special Evolution Schedule Strategy	Cognizant APS/PEPM	A-2	Detailed Schedule provided
Crane Utilization Strategy	Cognizant APS/PEPM	A-3	Review RLS for compatibility with Strategy

e. *Validate the Project Network*

Validate the Network by reviewing the activity duration and calendar relationships to ensure they conform with the Project's Execution Strategy. In a Critical Path Method (CPM) Network, there should be only one start and one finish, with no isolated (non-constrained) activities or events. Analysis of the Project Network to calculate schedule dates and total float can now be performed to indicate whether or not the approved work can be accomplished within the defined date parameters of the Key Event structure. The following should be verified:

• *Activity Duration* - the amount of time, in shifts, estimated to complete an activity is realistic and credible

• *Calendar* - shifts and days per week planned to work (e.g., calendar 15 means one shift per day, 5 days per week, etc.)

Resource Leveling Considerations - There are certain elements relating to Resource Leveling that should be given attention in order for the algorithm to properly function. The leveling software requires that the Schedule Network be established so that the values it calculates are valid to generate a predictable output. An appropriate Work Breakdown Structure (WBS) is a key element in the leveling process. Preclude Float Allocation (PFA) indicators act to preclude certain activities from being moved during the distribution process. The PFA flag is not intended to be used indiscriminately, but is intended to be used discretely in unique situations such as controlled Nuclear work or Shipyard work dependent on Ship's Force evolutions. Activity Priority Codes (APC) are used to emphasize certain types of work that may have high calculated float or to indicate a preference as to which work is more desirable to work when float is about equal. Activity Priority Codes should be assigned as part of the Job Summary review process. It should also be assigned as part of the Execution Strategy.

Activity Priority Codes should not be assigned after the work distribution process, nor should APC assignment be performed in bulk by Job Summary or SWLIN. It is desirable to be consistent with the assignment of the APC in a path. During the leveling software setup, Float Group (FG) assignments should be adjusted to support desired results. Resources required per period must match how the work is going to be accomplished or there will be no validity in the matching of workload and workforce. Quantities per period are a direct reflection of duration and man-hour estimate; therefore, valid durations for the work being done are a must for proper calculation of resource requirements. Imposed dating such as the use of Planned Starts, Planned Finishes, or Forced Dates can inject negative total float values in the project network. Since total path float is one of the primary means of assigning priority to workforce assignment, the number of imposed dates affecting float calculations must be monitored. There should be no negative float in the Project Network as it indicates an unexecutable plan and paints a false picture with respect to workload calculations. Accurate earned value (progress) reporting influences all resource consumption and remaining duration calculations, and is therefore extremely important during Project execution.

f. *Develop Available Resource Pool*

With the Project planning well underway at about A-10 months, the Resource Department shall identify a preliminary resource pool which will be used as a basis of comparing the "Production work" to the available "Production workforce." This resource pool represents that capacity of the Shipyard's Production Department workforce (at the shop level) that is to be committed to the project team. The capacity of the resource pool is cumulatively reported in total mandays which are then distributed over time.

A good starting point for an initial resource pool is the Workload and Resource Report (WARR). Within the WARR is a Project specific "forecast" developed by Workload Forecasting Branch of the Business Office. It is important to realize that 10 months prior to the start of the Availability, the forecast values may be based on the customer's notional budget (in mandays) rather than specific Project estimates. Additionally, the distribution of that budget over time (men-per-day per month) may be based on the coordination of the best plan for the Shipyard rather than the best plan for the specific Availability being planned. For that reason, before utilizing the forecast as a resource pool, the Business Office, the Production Department, and the Project Team must review the forecasts to:

- Ensure the forecasted quantity (both at the Department and Shop levels) is comparable to expenditures on past Projects with similar work customer budgets and currently known estimates
- Compare forecasted values (at the Production Department and Shop levels) with the Project's expected work estimates (i.e., Quantity at Completion (QAC)). Typically the forecast will tend to be higher than estimates because the forecast contains allowances for performance, growth and new work *(NOTE: Resource Leveling works best when the capacity of the resource pool approximates the quantity of work in the Schedule to be leveled. In order to equate the capacity of the resource pool to the scheduled work, the Shipyard may have to use functionality within the Forecasting System to proportionately depreciate the quantity in the forecasted capacity.)*
- Ensure it adequately supports the Project Team's fast start strategy (e.g., start major sail work at A+2, all components requiring in-shop repair unshipped 45 days after the start of the Availability, etc.)
- Ensure the forecasted quantity accomplishes 80%-85% of the Production work by undocking
- Ensure the forecast accommodates the accelerated increase in manning at the start of the avail such that, 6 weeks after the start the Production Department's workforce level should be at or above the straight line average level from start availability to undocking

Once identified, the Production Department's initial resource pool can be electronically transferred into the Project Sequencing and Scheduling (PSS) System either by the use of the Resource Control Module (RSC) of Performance Measurement and Control (PMC), or any other typical spreadsheet software (e.g., Microsoft Excel).

> *NOTE: Implementation and use of the Resource Control Module (RSC) was an ongoing NAVSEA initiative at the time of issue of this document. Issues being addressed include loading and use of the RSC software, source of the data, and data detail (e.g., data loaded down to Shop Trade Skill Designator (TSD) level). Upon completion of the initiative, and resolution of the outstanding issues, this Appendix will be revised to include additional detailed guidelines reflecting the initiative results.*

g. *Schedule the Project*

After the Project Network has been validated to ensure that the appropriate elements and strategies are in place, the resource pool data can be downloaded for use in the Resource Leveling process. The PSS analysis can now be performed to calculate schedule dates for the Network. The software does two passes through the Network, a forward pass from start to finish to calculate the early start and early finish dates, then a backward pass from the end to the start which calculates the late start and late finish dates. During this analysis process, available total float through the Network is also calculated and will be used during the workload distribution process.

From this point, the workload distribution process can begin by setting up the resource leveling software to meet certain parameters such as; float group percentages and establishing the date parameters, from and to dates, that the software should consider. Specific software set-up requirements include:

- The resource pool has been identified
- All work is in the PSS project
- All Key Event dates have been reviewed
- All constraints and cross-ties have been entered
- All Man Hour Estimates have been reviewed
- All Durations have been reviewed
- All Calendars have been reviewed (no Hourly calendars may be used) are consistent with project strategies
- All Preclude Float Allocation (PFA) have been flagged
- All Activity Priority Codes (APC) have been set

Activity Priority Codes (APC) establish the precedence that is used to align the Network to the available workforce. These priorities give Project Managers the ability to project their strategies and detailed understanding of the work into the leveling process to preclude indiscriminate Network shuffling by the computer. The APCs should be assigned accordingly during the Network development and validation process and are used in conjunction with identified float groups for ranking purposes during the workload distribution process. Use and guidelines for assigning APCs are available in Enclosure (1) of this Appendix.

There are four (4) user defined float groups. Float groups place candidates (CU Phases) within a given range of float into a single category for ranking. For example, candidates with float less than 10 could all be placed in Float Group 1. This will place all candidates with total path float less than 10 above lower ranked work. There is no precise formula for determining float groups. Making float groups with narrow bands of float emphasizes the Activity Priority Code during the ranking process. Conversely, float groups with broad bands of float place the emphasis on total path float. The percentage limits assigned to each float group permits the software user to limit the amount of path float that may be consumed by the distribution process. For example, a percentage limit of 80 will reserve 20% of the available path float.

The date parameters to be identified establish the range of time (of the project) that will be addressed during the distribution process. This step requires some thought in that a start (from) date earlier than the current data date (time-now) effectively makes the process begin on the current date. However, it is permissible to begin the process at some date in advance of the current date. For example, if today's date is at A-1 of the Availability and the Project Team is only interested in scheduling work from "Dock Ship" (DD00). By entering the date for DD00, work preceding this date will be left untouched. Only work from DD00 will be distributed and scheduled. The finish (to) date determines when the process will stop the distribution of work, generally "Complete Availability" (CA00).

Distributing the project workload to match the available workforce is an iterative process that can be done multiple times until the desired results are achieved. After each scenario is finished, the results should be reviewed by the project personnel to determine if the plan is achievable and whether or not the required resources are available to support the plan. Once the desired workload/workforce profile is established, the analyzed schedule dates can be passed to the AIM database as the "Project Schedule".

h. *Evaluate the Schedule*

Resource leveling requires that the data provided be within measurable bounds to ensure an accurate match between workload and workforce is accomplished without causing instability in the Schedule. Developing and providing metrics for Resource Scheduling will require an understanding that most of the metric values will not have a unique number but will constitute an operating envelope that will ensure conformity to the proposed process. The metrics contained in Enclosure (2) are guidelines to assist in providing a qualitative measurement of the ability of PSS and RSC to match workload and workforce using the automated tool set.

An assessment should be conducted which compares the durations assigned by SHAPEC/EPD/NEPD, the durations that were assigned by the project during the process of building the network and the actual durations incurred during execution of the same work on previous projects. Significant differences between any of these durations should be clearly analyzed and understood by the project.

When the process of resource leveling has been completed, but before the resource leveled schedule is considered complete, a cross-check on use of overtime must be performed. Intended use of overtime must be consistent with the executing overtime goals and reflected in the Project Overtime Management Plan.

i. *Develop Mitigation Strategies*

Upon evaluation of the Schedule, it may be necessary to adjust the Schedule or resources to obtain a match between workload and the available workforce. The adjustments made reflect Project Mitigation Strategies. Such strategies may move certain (non-Critical Path) work to a time period where sufficient resources are available, or may require the work to be accomplished in a different fashion using different resources. Alternatively, additional resources may be obtained through use of Overtime, or borrowing from another source. This also reflects a Mitigation Strategy.

4. Maintaining the Schedule

a. *Products/Reports*

Key Event Schedule - The Key Event Schedule contains all the key events established for an Availability with an approved schedule date for each key event. A key event is defined as an event which cannot slip without seriously impacting the overall schedule and possibly delaying the completion date on this or other Projects. The Key Event Schedule is used by senior Shipyard management as a method of monitoring and reporting progress of a ship Availability to NAVSEA, Type Commander (TYCOM) and others as necessary. The Key Event schedule is the highest level in the hierarchy of Shipyard schedules. The Key Event schedule:

- Is mandatory, the Key Event Schedule will be issued as indicated in the Project Planning Timetable (PPTT)
- Shall be approved by the Project Superintendent and concurred on by the Operations Officer and Nuclear Production Manager as applicable. Subsequent changes require the same level of approval as the original schedule

Milestone Schedule - The Milestone Schedule contains all the milestones established for an Availability with an approved schedule date for each milestone. Milestones are defined as the Project Production and Testing goals supporting key events. They are used as a means to maintain momentum on a Project by continually focusing middle level management attention on completion of relatively near term events. The number of milestones should be the minimum number sufficient to provide benchmarks by which Shipyard managers can assess overall ship status. The Milestone Schedule:

- May be combined with the Key Event Schedule. It should be issued as required by the scope of work package, or as deemed necessary by the Project Management Team. This schedule will be issued as indicated in the PPTT.
- Shall be supportive of and compatible with the Key Event Schedule.
- Shall be approved by the Project Superintendent. Subsequent changes require the same level of approval as the original schedule.
- Shall have the notional critical path(s) identified as appropriate.

Executive Level Schedule - This "schedule" is produced for senior Shipyard managers and Shipyard customers including the Ships' Commanding Officer in particular. The "schedule" shows work at a high level summary of detail to reflect Project progress with regard to cost, schedule, and quality. Additionally, it communicates progress of work in the Critical Path for the next Key Event. Information concerning cost, quality, and work completion is provided from PMC and other sources (described in the section and Appendix on Metrics) by the Project Management Team. Scheduling however, provides a high level "bubble chart" showing the critical jobs and how they relate during execution. An example of this product (the scheduling portion of the Executive Level Schedule) is shown in Enclosure (3) of this Appendix.

Component Unit Phase Schedule - The Component Unit Phase Schedule is the overall schedule of Production work, testing, Ship's Force work and contractor work. Each component unit phase should relate to a specific function (e.g., remove, repair, reinstall, test, etc.) that can be scheduled over a reasonable period of time, support only one test and/or event, be managed by a single supervisor, be assigned a budget and can be closed out to charges upon completion. General production service and non-production task groups shall be time phased, event phased, or product orientated, and scheduled for practical manageability. The Component Unit Phase Schedule:

- Is mandatory, with the schedule developed not later than A-2 months, or as indicated in the PPTT.
- Shall be supportive of and compatible with upper level schedules.
- Development shall be the responsibility of the Project Engineering and Planning Manager with support from the project management team.
- Shall be approved by the Project Superintendent. Subsequent revisions require the same level of approval.
- Will account for the availability of resources and the scheduled workload and available workforce will be in general agreement. This schedule will reflect the result of the application of workload distribution process
- Identify the Project Controlling Path(s).

> *NOTE: A task Schedule is developed when project management determines a job requires finer control or monitoring than the Component Unit Phase Schedule provides. Task Schedules are not mandatory and are developed when determined necessary by any member of the project management team. Task Schedules shall be supportive of and compatible with upper level schedules. Approval of a Task Schedule shall be by the cognizant project manager.*

Workload Profiling Graphs - These graphs are developed during the Workload Distribution process to show comparison of scheduled work against available resources. These graphs are produced by the PSS Prioritization software.

Project Management Schedules

Daily Production Schedule

NOTE: The Daily Production Schedule is acknowledged to exist, but has not been defined as of the time of issue of this document. Action to define the attributes and requirements of the Daily Production Schedule, as well as guidance for developing and use will be added when available.

Short Range Schedule - This schedule is a working document for the project and shall show all work scheduled to be accomplished at the Component Unit Phase level during the period covered. These schedules, for both Nuclear and Non-nuclear work:

- Are mandatory
- Shall be in daily or larger time increments and cover a three to five week period
- Are not required to be approved as they are an extraction from the Component Unit Phase Schedule
- Reside in AIM, PSS scheduling databases, and are updated weekly
- May be issued separately for individual reactor plant work and for the rest of the propulsion plant, but they must be accurately coordinated by the cognizant Project Manager

Weekly Schedule Performance Report - This report contains information on Project progress and status. It is developed from the PSS and PMC databases, and is part of the Project Metrics package discussed further in APPENDIX F.

NOTE: Support Work Schedules shall be issued as considered necessary by project managers to show work such as prefabrication, check out of support systems and facilities, training of personnel, mock-up training, and preparatory work. Whenever necessary, these schedules may contain CU Phase task information. These schedules may be issued separately or be part of the Daily Production Schedule. Support Work Schedules are not mandatory. They shall be developed at the discretion of project management, but shall be approved, as a minimum, by the cognizant project manager, and concurred on by any other Shipyard manager responsible for executing the work.

b. *Float Analysis*

The Float Utilization Report is a key element in assessing the results of the distributed workload. Allocated float is determined by calculating path float on all activities at their earliest possible start. This includes any activity with a user imposed planned start. The philosophy here is that it does not matter what pushes an activity from its earliest start, the fact is float has been consumed (allocated). The Float Utilization Report is a valuable tool for evaluating risk and understanding what happened as a result of the scheduling

process. Of primary concern will be those activities that began with large quantities of float and where it was nearly or entirely eroded. If significant numbers of activities fall into this category, a significant amount of risk is being introduced. This report should be reviewed to determine strategies to be used when modifying the float groups and percentage limits before the distribution process is run again.

c. *Maintenance*

One of the most important issues in maintaining a Project Schedule is the accurate reporting of status and progress of the work being accomplished. On a daily basis, the AIM database interfaces with other databases, such as, SUPDESK, Cost/OSE, and PSS. During the import process from AIM to PSS, certain data elements are received that can have an effect on the Project Network. Based on identifiable parameters, actual start and/or finish dates can be established within the Network that will have an effect on the Schedule dates. Expenditures at the CU Phase task level and percent of progress at the overall CU Phase level have a direct impact on the calculation of remaining duration and quantities of resources required to complete that work.

As time moves forward and work that is scheduled to start does not get started on time, there is a tendency for a bow wave of work to start growing during the current work week. When scheduled work does not get started on time and begins to move to the right, the available float in that path begins to diminish. It will be necessary for the Project team to re-evaluate that work to determine whether or not it has been scheduled for an appropriate time frame. If available float and resources exist in the network, non-critical work should be moved down-stream if necessary.

During the execution of a project, many changes are made to the scheduled Network. Changes in the scope of work and the addition of new work to the Network will have an affect on resource requirements and the amount of work scheduled in the current time frame. If the new work is emergent critical work, it should be left in the current work window. If not, selective dating can be used to place the new work in an appropriate time frame for accomplishment. Daily statusing of work in progress has a direct affect on the calculation of remaining time and resources required. As the Project moves forward, it will be necessary for the project team to reevaluate the workload/workforce profile in order to ensure that the required resources are available to execute the scheduled work. In some cases, the project may elect to redistribute the remaining workload to eliminate any difference between the work and available resources.

Use and Guidelines for Activity Priority Codes

Activity Priority Codes (APC) establish the precedence that is used to align the network to the available workforce. These priorities give project managers the ability to project their strategies and detailed understanding of the work into the leveling process to preclude indiscriminate network shuffling by the computer. By judiciously assigning APCs, the project provides the intelligence that steers the process of matching work to the workforce.

Activity Priority Codes for CU Phase Activities

SUGGESTED DISTRIBUTION	PRIORITY CODE	EXAMPLES OF APPLYING PRIORITIES TO WORK	GUIDELINES FOR DEVELOPING PRIORITIES
2-3%	PFA*	Plant Conditions, Work not separated (Blast/Paint)	Plant Conditions Establishment Required to start work, e.g., locked step (Blast/Paint)
5-10%	1	Inst. Services, Time Constrained Rprs, (G.P., SG, other) Establish Hull Cuts/unshipping paths	Necessary Support Services and all access cuts, Major Prefab
10-15%	2	Prefab/staging and high risk Job Summaries Inspections, some first time alts/work, ripout/unshipping	Special emphasis work and its support work. High risk work/inspections. Opening work sites/starting work.
20-30%	3	Complex/setup work, calibrate, align/adjust, complex tests Medium risk Job Summaries, painting, clean/flush/blast	Work, testing for medium risk jobs.
30-40%	4	Some alts/repairs/PMS, restoration, reinstallation, other tests. Removal of services.	Restoration/reinstallation/maintenance and other tests (non-complex)
30-40%	5	Some alts/repairs not affecting system status/plant conditions, low risk Job Summaries, Refurb shop equip.	Low Risk work

Capture input information during:

1. Developing project strategy (PPM)
2. Job Summary development/review (PPM)
3. Schedule Maintenance (PSS)

* Preclude Float Allocation (PFA) – This work will not move as the result of any resource scheduling process.

Enclosure (1)

Resource Scheduling Metrics

Value Measured	Rationale	Metric	Source	Action
1. Aggregate Workload	Workload and Workforce matching cannot occur without the authorized work package recognized in the systems	1. 90% of known work is in the system	1. Man-hour Summary Report from PSS compared to Business Office Estimate for Authorized Work Package 2. "INI" in AIM from PSS Report or AIM	Complete work definition and planning process Complete Schedule development
2. Aggregate Resource Availability (Workforce)	Workforce must be available to accomplish the scheduled workload and there must be a high correlation between the workload and workforce	1. Workforce correlation to workload within 95%	1. WARR/RSC and Business Office estimate for Authorized work 2. WARR/RSC and Man-hour Summary Report from PSS	Apply workforce to ensure the capacity of the available workforce is equal to the anticipated workload
3. Schedule Network Condition	The Resource Scheduling Algorithm requires that the schedule network be in a condition that the values it calculates are valid to generate a predictable output. Calculated Total Path Float (TF) and start dates are two of the primary determinants in establishing priority of workforce assignment in the resource scheduling algorithm and the project schedule network must be constructed and maintained to ensure calculated information is accurate.			
1. Isolated Start Activities	Isolated starts will show work accomplishment without logical predecessor requirements	<20 Starts 1. Schedule adherence identifies what is being worked compared with what work is scheduled	PSS Network Condition Report	Construct the schedule network so there is one star
2. Isolated Finish Activities	Isolated finishes are not tied to their correct successors and they generate inaccurate total path float	<10 Finishes	PSS Network Condition Report	Construct the schedule network so there is one finish

Resource Scheduling Metrics (Cont'd)

Value Measured	Rationale	Metric	Source	Action
3. Isolated Activities	Isolated activities show in the current work window with no logical dependencies	<1%	PSS Network Condition Report	Construct the schedule network so there is one start and one finish and no isolated work
4. Activities With Negative Float	CPM analysis predicts that paths with negative float cannot support Key Event Completion and the float numbers are frequently inaccurate	<1%	PSS Network Condition Report	1. Adjust durations or calendars based on increased resources 2. Ensure progressing is accurate 3. Ensure imposed dates are not causing negative 4. Reschedule the project by moving Key Event dates
5. Out-of-Sequence Activities	These are logic errors and will not generate accurate total path float	<.5%	PSS Network Condition Report	Correct the logic error or remove actual starts
6. Activity to Constraint Ratio	Number of network dependencies compared to the work activities and too few indicates incomplete logic construction	1. For a large Availability with complex testing and work interdependencies >1.98 2. For small Availabilities with no complex test or plant condition requirements >1.95 3. For inactivation and recycling work >1.85	PSS Network Condition Report	Complete logic construction

Resource Scheduling Metrics (Cont'd)

Value Measured	Rationale	Metric	Source	Action
4. Activity Priority Code (APC) Distribution	The APC is the element that the project can use to influence the relative priority of workforce assignment to the work essentially ensuring that the highest priority work is assigned workforce and scheduled first.			
1. Preclude Float Allocation (PFA)	Highest priority work that cannot be affected by resource scheduling	2-3%	PSS Report	Adjust PFA within limits
2. APC 1	Work will move but with the least effect Over populating this value will negate the effect	5-10%	PSS Report	Adjust APC within limits
3. APC 2		10-15%	PSS Report	Adjust APC within limits
4. APC 3		20-30%	PSS Report	Adjust APC within limits
5. APC 4		30-40%	PSS Report	Adjust APC within limits
6. APC 5		30%-40%	PSS Report	Adjust APC within limits
5. Duration Validity	Resources required per period must match how the work is going to be accomplished or there will be no validity in the matching of workload and workforce			
1. Resource Quantity per period (RQPP) too high	Resource RQPP that are high normally indicates an unrealistically short duration In some instances the high RQPP is justified such as undocking but normally the RQPP is much lower	Evaluate jobs with RQPP >4 and test for appropriate duration prior to resource scheduling	PSS Network Condition Report	Increase duration to ensure RQPP equivalent to how the work will be performed
2. Resource Quantity per period too low	Resource RQPP that are low indicates the job duration is stretched over an indeterminate point of time	Evaluated jobs with RQPP <.1 and test for appropriate duration prior to resource scheduling	PSS Network Condition Report	Reduce duration to ensure RQPP equivalent to how the work will be performed

Resource Scheduling Metrics (Cont'd)

Value Measured	Rationale	Metric	Source	Action
6. Work Breakdown Structure (WBS)	Appropriate WBS is very difficult to measure but guidelines are available and the duration measurements closely relate. WBS is important so RQPP is not calculated inaccurately when the work is too course and shows many skills required for long periods of time with low RQPP values when in fact the resources are used at defined periods in the cycle of the work with much higher RQPP values	Use approved guidelines and note Duration Validity and the number of Start to Start and Finish to Finish constraints which indicates there is poor logic construction showing work relationships Start to Start and Finish to Finish Constraints <10%	1. WBS Guidelines 2. PSS Network Condition Report	Review work for possible granulation or summation and understand where inaccuracies maybe injected because of WBS issues.
6. Workload and Workforce Match (bow wave)	The scheduled workload and the capacity of the workforce must agree within limits are a mismatch accumulates and the schedule shows bow wave worked that cannot be accomplished by the available workforce. This condition makes the schedule invalid and negates any predictive ability to use the tool for predictive measurement or workforce forecasting.			
1. Complex availabilities greater than 20K MDs	A 30% mismatch allows for unscheduled and alternate work and to minimize the burden of matching workload and workforce	The workload and the capacity of the workforce must match within 130% for the next 2 weeks and after the two week window it should match within 5-10%	1. PSS Resource Histograms & Tabular Reports 2. RSC Line Graphs and Tabular Reports	Use Resource Scheduling Functionality
2. SRAs and Short Intense Availabilities	The match must be within the capacity of the workforce to execute the Availability in the time period allotted	Workload and workforce must agree within the ability to use mitigation to accomplish the work, i.e., overtime	1. RSC Line Graphs and Tabular Reports	Use Resource Scheduling Functionality or adjust workload using planned dates

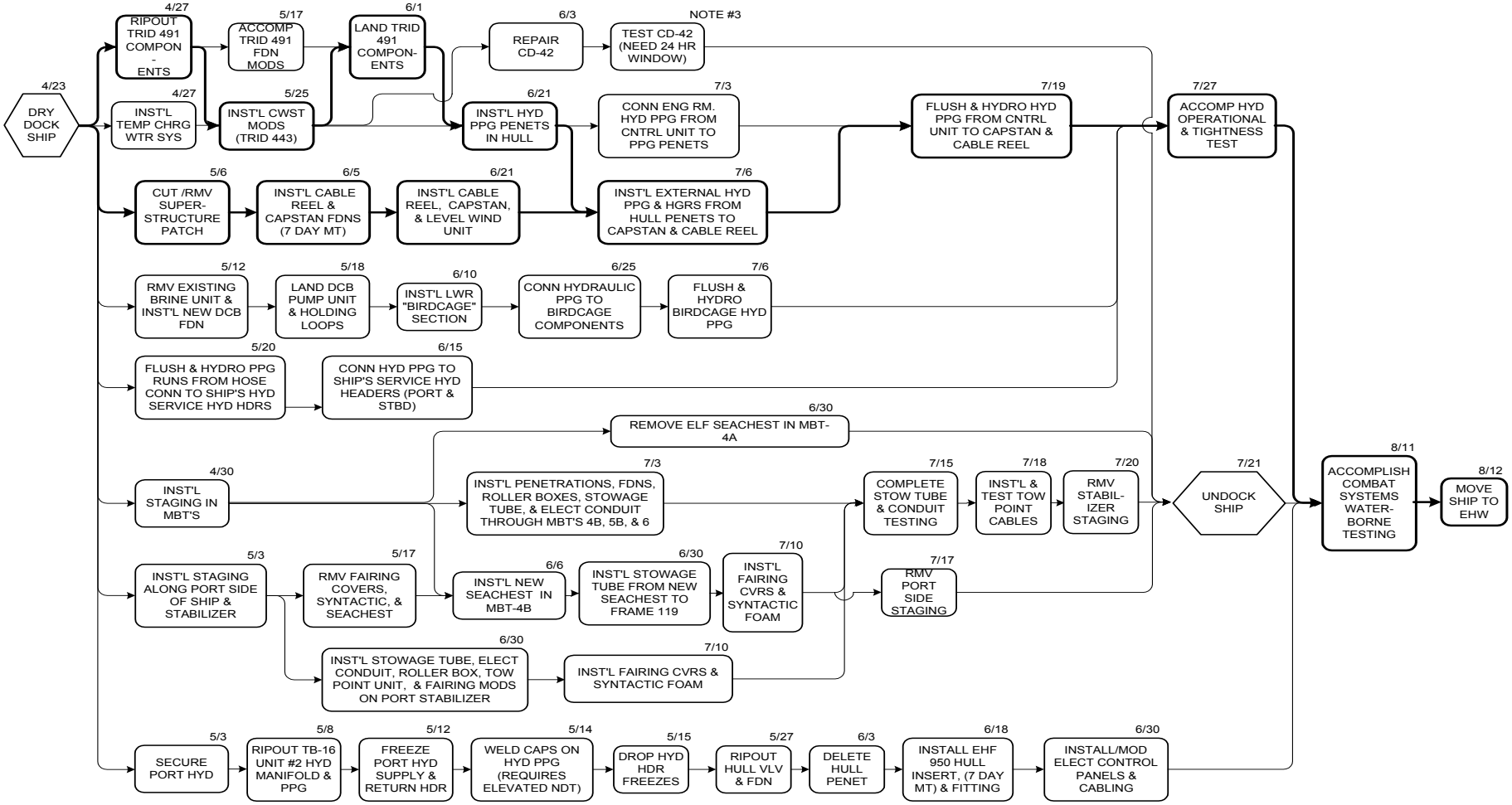
Resource Scheduling Metrics (Cont'd)

Value Measured	Rationale	Metric	Source	Action
7. Imposed Dates	Imposed dates can inject negative total float and cause date calculations to inject negative in the network. Since total path float is one of the primary means of assigning priority to workforce assignment the number of imposed date effecting total path float calculations must be monitored			
1. Planned Start (PS) Dates	PS dates can push work forward and cause negative total path float	<10% of the activities	PSS Network Condition Report	Remove PS before Resource Scheduling
2. Planned Finish (PF) Dates	PF dates lock the late finish date and cause negative total path float that is most likely not real PFs should be used sparingly and only for very special emphasis work that is high risk	<1%	PSS Network Condition Report	Remove PF dates before Resource Scheduling
3. Forced Dates (FD)	Forced Dates lock all analyzation and subdivide the network analyzation FD negate the effect of resource scheduling	FD should only be used on Key Events	PSS Network Condition Report	Remove FDs from all but Key Events
4. Constraint Delay (DE)	Similar to a PS in that they inject negative total path float	<.5%	PSS Network Condition Report	Remove inappropriate Constraint Delays
5. Activity Delay	Similar to a PS in that they inject negative total path float	Shouldn't be used	Similar to a PS in that they inject negative total path float	Remove inappropriate Activity Delays

Resource Scheduling Metrics (Cont'd)

Value Measured	Rationale	Metric	Source	Action
8. Schedule Variance	Schedule Variance is a measure of how well the project is executing against a plan Negative SV generally indicates a lack of resources or improper progressing and is a valuable tool in assessing overall ability to meet project cost objectives	SV>1.15 Note: current SV calculations are not compared to a planned baseline and only represent the SV on work that has been reported as in progress.	PMC	Action is required to bring SV into acceptable limits by progressing accurately, ensuring more manning is available, or rescheduling and providing a new baseline for comparison.
9. Progressing	Accurate earned value determines all resource consumption and remaining duration calculations and is the cornerstone of accurate workload and workforce forecasting	1. Progress against expends 2. Under reported Progress against expends	PMC PSS Network Condition Report	Report progress accurately Report progress accurately
10. Schedule Adherence (SA) **(NEW METRIC)**	A measurement is required to ensure work scheduled in the current work window is actual work that can be accomplished by the assigned workforce This will prevent uncompleted work from piling up in the current work window creating bow waves and work back logs Schedule adherence identifies what is being worked compared with what work is scheduled	SA>85% SA = (qty charged in execution week)/qty or work scheduled in execution week) *100	PMC	PMC PSS

SAMPLE EXECUTIVE SCHEDULE



NOT FROM PROJECT NETWORK
FILE: 731_TLA.VSD

NOTES:
1. DATES SHOWN ARE COMPLETION DATES
2. HEAVY LINE RPRESENTS CRITICAL PATH
3. COMPL BTWN 6/21 & 7/19 AS WORK ALLOWS

REFERENCE
1. CSS-17 ERP KEY EVENT SCHEDULE, DATED: 20-JAN-99.

APPENDIX D

Work Definition and Integration Guidelines

Work Definition and Integration Timeline

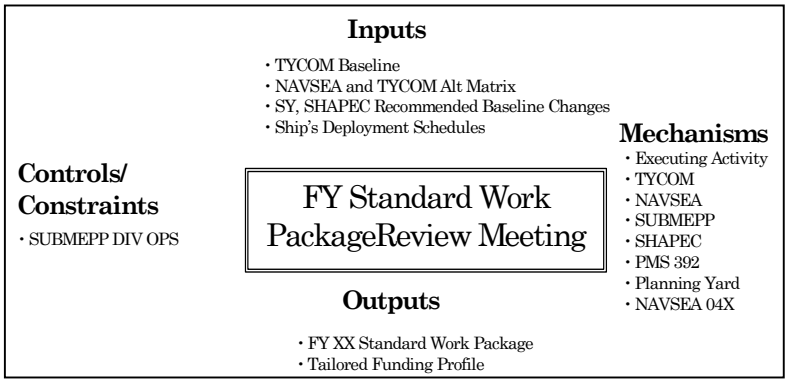
Issue AWP Initial Issue	Establish Work Definition Timeline	Work Discovery Period #1	Initial Planning Meeting	Issue 2 AWP
A-21	~A-18 - A-15	Pre-deployment	Deployment - 1 (Approx A-12)	IPM + 1 (Approx A-10)
				Start during Stand Down
JS01	Work Discovery Period #2	Screening Meetings	JS02	Work Discovery Period #3
A-9	During deployment (if possible)	During deployment (as required)	A-5	Post deployment
Underway Work Discovery Period	Final Planning Meeting	Issue 3 AWP	JS03	JS00 (approve all job summaries)
Post stand down (if not complete)	Deployment + 2 (~A-4)	FPM + 1	FPM + 5 weeks (A-4 - A-3)	~A-4 - A-2.5
ICP	RLS	FRE		
A-2	A-2	~A-2 - A-1		

☙ Fiscal Year Standard Work Package Review Meeting ❧

Background:

The Fiscal Year (FY) Standard Work Package Review Meeting is established to provide a forum for customers (TYCOMs and NAVSEA) and providers (Executing Activities, SHAPEC, SUBMEPP, Planning Yard) to discuss expectations, lessons learned, requirements, etc., and to establish a baseline of standard maintenance items, a cut-off date for specifications and advance planning key event milestones for the 'family' of major Depot Availabilities (DMP/ERO/EOH) scheduled two fiscal years into the future. Standard maintenance items are those Planned Maintenance Requirements (PMR) contained in the Class Maintenance Plan (CMP) and TYCOM Baseline Availability Work Package (BAWP) that are common to all major Depot Availabilities and are benchmarked for standard estimates that include 'normal and usual' repairs.

Process Action Description:



The technical community will identify changes forth coming in technical requirements/specs and advise of their impact/assessment. The cut-off date for the high level specification documents cited by the AWP is the beginning of the FY (01 Oct) two FYs prior to the FY of the Availability. Only technical changes deemed mandatory will be applied subsequent to the cut-off. TYCOM and NAVSEA will identify alterations (A&Is and D/F/K-Alts) in a matrix by hull. SHAPEC will provide adjustments to the standard (benchmarked) estimate based on an annual DL analysis and TGI quality review. TYCOMs will provide ship UNCLAS schedules for the next two FYs (prior to start of Availability (SOA)). An outcome goal of this meeting is to establish mutually agreeable advance planning milestone events tailored to each Availability that meets SHAPEC, Executing Activity, and Fleet needs. SEA 04X will present Corporate NAVSHIPYD goals, incentives and workload forecasts for execution FY and FY+1. Additional data should identify the "availabilities of concern" whose poor/marginal planning/execution performance will affect another(s).

NAVSHIPYDs (Executing Activities) will present local initiatives on planning, execution and management of a standard Availability. And, additionally provide an assessment of the impact on the corporate advance planning process and identify availability to support shipcheck.

SHAPEC and the Executing Activity will identify their advance planning funding needs. These funding requirements will be used to develop a tailored funding profile for each Availability in the fiscal year. Customers and providers agree on areas of 'consistency' that would be in the interest of all concerned (e.g. co-planning of availabilities, bulk ordering/buying of material/LLTM). The outcome goal is to have SHAPEC co-planning each standard item only once for a FY for all availabilities having that standard item.

Life Cycle Maintenance of Initial Approved Work Packages

Background: Accountability and Traceability of Initial Approved Work Package Changes:

All variations from the customer-approved baseline are recorded in Part 5 of the Initial Approved Work Package "Record of Change". Through the entire life of an Initial Approved Work Package there is complete traceability through all line item version changes, with change authorizations (accountability), back to the retained customer approved baseline version of the requirement. Each work package contains, stored, the full set of applicable customer approved baseline requirements from which it was built.

Work package preparation and maintenance process for deletion of items from an Initial Approved Work Packages:

Work items can be deleted from an Initial Approved Work Package for various reasons, such as:

- Component maintenance can be "off cycle" due to CASREPs or maintenance that was accomplished before it's scheduled due date. Normally "off cycle" work is deferred from an Initial Approved Work Package when it is not due before the start of the following Depot Availability. These items are identified by SUBMEPP programs that compare the maintenance due date of each component with the start date of the Depot Availability following the one for which the Initial Approved Work Package was prepared. These items are screened by the customer for deferral. The follow up for these items is inclusion of the requirement in the Initial Approved Work Package for the next Depot Availability. This is the source for the majority of deferred Initial Approved Work Package items and can cause both availabilities to vary from the baseline requirement.
- Approved alterations can cause maintenance items to be deleted from an Initial Approved Work Package. An alt may remove or replace equipment which was planned to receive maintenance. The only follow up in this case is removal of the component from the ship's configuration database by the planning yard based on processing 2CK forms submitted to report alt completion. This is happening infrequently now, with smaller alt packages being authorized.

- Planned Maintenance can be deleted from or added to an Initial Approved Work Package by back fitting the results of engineering studies, RCM studies, or op-cycle extension studies. Maintenance items typically go from periodically accomplished maintenance to I or O level maintenance, fix when fail, maintenance based on PMP monitoring or other condition based maintenance (PAT or Ship's Force report material problems). Maintenance standards are retained for these items for use when needed. CASREP data, 3M data, I level completion data and Depot Availability growth and new work data is available for review to validate the deferral or deletion of a planned depot item. Deferrals due to back fitting changes from these types of studies are infrequent.
- Maintenance can be deferred from a Depot Availability Revised Work Package when the customer has insufficient funds to accomplish work requirements. Items deferred for insufficient funds are typically items within I level capability. These deferred items become part of the I level workload, usually outside of the Depot Availability. For SRAs at IMAs, and DMPs at Pearl, the work might be done by the FMA during the same Availability. Very few Availabilities have work deferred due to lack of funds.

Strategy for Accomplishment:

- Execute meeting at A-26 months and maximize the consistent and standard definition of work defined in the Fiscal Year Standard Work Package.

Process Improvement Recommendations:

- Definition and agreement on a standard set of work requirements (Reviewed Annually).
- Reconciliation meeting which defines standard work for entire FY (Standard for all FY Work Packages).

Associated Risks:

- Disagreement on baseline condition (FY Standard Work Package) would result in multiple versions of the Initial Approved Work Package (Issue 1) resulting in a lack of standardization which will limit re-use of working documents.
- Individual Work Definition for each Availability, no common information sharing.

Risk Mitigation:

- Have all people prepared, have the meeting on time, and drive standardization.

Issue Initial Approved Work Package (Issue 1)

Background:

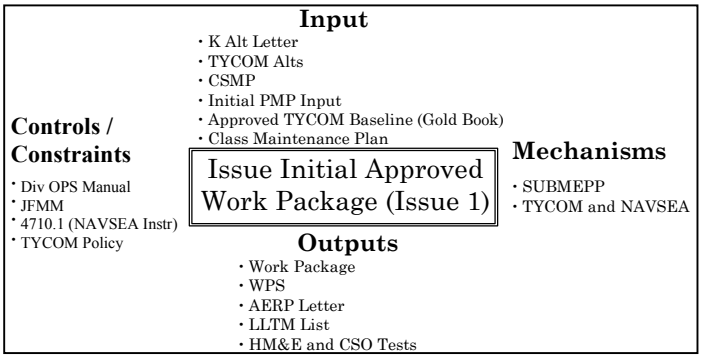
The work package and work package supplement identify the planned maintenance and modernization work requirements that allow SHAPEC and the Executing Activity to start the advance planning process. The more controlled and timely these products are influences the entire planning cycle for each Availability. Accurate and clear work definition and enhanced interaction between all participants will provide reliable schedules and realistic milestones in the advanced planning area.

Each of the participants:

- SUBMEPP as tasked by the submarine type commanders to prepare, issue and maintain the Initial Approved Work Package (Issue 1) and associated Work Package Supplement.
- Executing Activity and SHAPEC for delivering and executing the work requirements.
- NAVSEA and TYCOM for timely funding and executive guidance.
- Forces Afloat for early establishment of and accurate reflection of Ship's Force items, will need to be truly active and committed for process improvement. Including processing work control paper, training and PMS.

Process Action Description:

At approximately A-23 a ship specific "draft" Initial Approved Work Package is derived directly from the applicable FY Standard Work Package. SUBMEPP engineers and technicians technically review the draft initial work package and work package supplement.



Their review tailors the maintenance and modernization work requirements to a specific hull and Availability. The Class Maintenance Plan, Class Baseline Availability Work Package, NAVSEA/TYCOM Modernization Plans, URO MRC, CSMP, Performance Monitoring Program among other reference material are considered in their technical review. This tailored Initial Approved Work Package is issued as a hull specific Initial Approved Work Package (Issue 1) from which the SHAPEC and Executing Activities Availability advance planning can start. The Initial Approved Work Package (Issue 1) is issued to NAVSEA, TYCOM, SHAPEC, the Ship, Squadron, Planning Yard and the Executing Activity at A-21.

Strategy for Accomplishment:

- Defined Availability process for a specific hull.
- Issuing of ship's specific approved work package at A-21.

The Initial Approved Work Package (Issue 1) must be issued by A-21 to support downstream planning initiatives by SHAPEC to have all Job Summaries and CU phases approved between A-4 and A-2.5. The Initial Approved Work Package (Issue 1) contains a majority of the baseline (standard) maintenance requirements that allows the Executing Activity the ability to commence the advance planning process earlier than has previously been accomplished. Within this seventeen month advance planning window, the Initial Approved Work Package is incrementally refined to include input from Ship's Force, the Executing Activity, the Work Discovery Periods and Initial Planning Meeting (IPM). At A-10, following the IPM, SUBMEPP will issue the Revised Work Package (Issue 2) which includes all known maintenance and modernization requirements. SUBMEPP will issue a work package supplement or Issue 3 as required for items authorized during the Final Planning Meeting (FPM). Therefore, by A-4, all Job Summaries are issued and no later than A-2.5 all Job Summaries and CU phases have been approved. Work authorized after the FPM is "new work" and will be planned by the executing activity instead of SHAPEC.

Process Improvement Recommendations:

- Issue Initial Approved Work Package (Issue 1) at A-21 instead of A-9.
- Eliminate issuing Proposed Work Package.
- Provide larger planning window with the required funding.
- Refined and consolidated work package process.

The process change to issue the Initial Approved Work Package at A-21 allows SHAPEC and the Executing Activity to start the advance planning process early. This gives them seventeen months vice eight months to advance plan, prepare, and issue Job Summaries (JSs) and Task Group Instructions (TGIs). By providing a larger advance planning window, a more rigorous process for delivering an Initial Approved Work Package (Issue 1) and a more flexible environment for resource allocation at SHAPEC and the Executing Activity the "Redefined" process will facilitate the opportunity to combine planning efforts for multiple availabilities.

Associated Risks:

- Not issuing at A-21 inhibits the ability to co-plan work and adequately resource level and will not support Job Summaries no later than A-4-3.
- ShipAlts identified without complete technical documentation causes Job Summaries not to be issued.
- Accurate and timely definition of TYCOM and NAVSEA ShipAlts.
- Not funding the advance planning kills the expected improvements.

The ship's operating schedule needs to support the advance planning milestones in order to identify the known work as early as possible to allow for the maximum time for the advance planning process. Adherence to the re-defined work definition milestones and visibility of the milestones to the TYCOMs and operating ships will allow for the plan to reflect the ship's deployment schedule. Additionally, the executing activity assignment must be made and the funding in place to support establishment of the timeline. The modernization package also needs to be defined early, remain stable, and advance planning funded to allow the greatest success for the advance planning process.

Risk Mitigation:

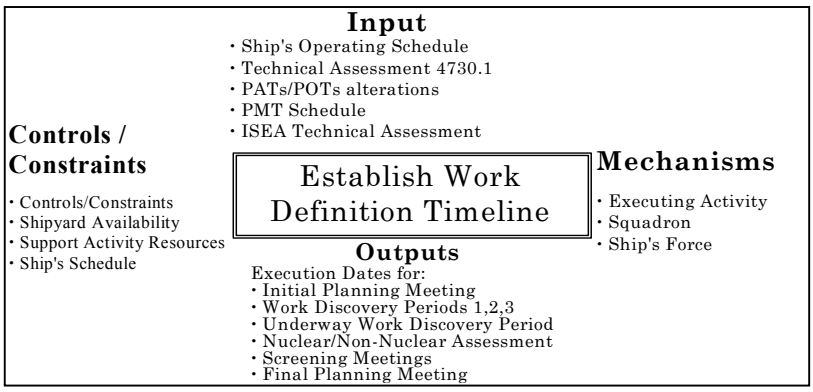
- SUBMEPP will issue the Initial Approved Work Package with priority to date, and will not hold up the process due to lack of specificity of alts and CSMP items.
- TYCOM programmed alts and NAVSEA have alts identified by A-24.
- TYCOM, NAVSEA have planning funds in place.

Establish Work Definition Timeline

Background:

At the A-18 but NLT the A-15 period the executing Shipyard initiates discussion with the Ship's Commanding Officer and the parent Squadron to establish the Work Definition Timeline. The defining of the Work Definition Timeline and the establishment of the Work Discovery Periods is the key element in the establishment and accomplishment of subsequent downstream planning events.

Process Action Description:



Subsequent to the Initial Approved Issue of the AWP in the A-18 to A-15 timeframe the Executing Shipyard must meet with the Squadron and the Ship's Commanding Officer to discuss and establish the Work Definition Timeline. Based on the ship's schedule and agreement with the parent squadron the actual dates for the following are established: Initial Planning Meeting (IPM), Work Discovery Period 1, 2, and 3, Underway Work Discovery Period, Nuclear and Non-Nuclear Technical Assessments, Screening Meetings/Communications, as well as the estimated date for the Final Planning Meeting (FPM).

Strategy for Accomplishment:

This period should be scheduled as soon as practical after AWP issue (but NLT A-15 to allow the establishment of the major events influenced by Ship's Availability. Once these events have been established then the follow on planning events JS01, JS02, JS03 and JS00 can be determined.

Associated Risks:

Any failure to establish these dates as scheduled will impact downstream planning events.

Risk Mitigation:

The Executing Shipyard should contact the parent squadron as early as possible to establish the necessary communication and reinforce the critically of establishing the required availability of the ship and Ship's Commanding Officer for the purpose of establishing the Work Definition Timeline.

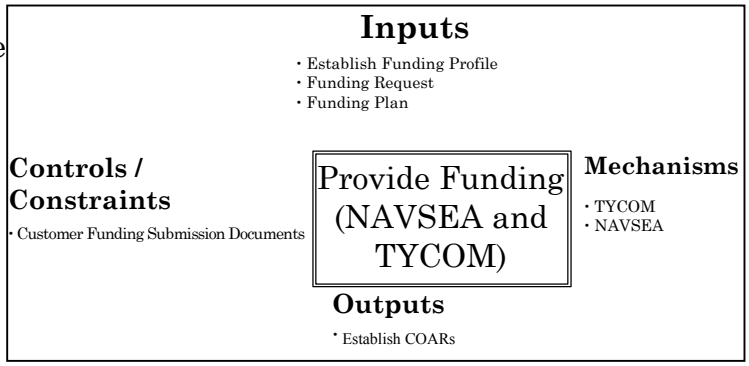
Provide Funding (NAVSEA and TYCOM)

Background:

The availability of funding to support the Availability Planning Process and the timeliness of when it is received to support the milestones is a key element in the accomplishment of the "Redefined" Process. Without proper funds being available at the required A-Dates the process cannot go forward. The commitment of NAVSEA and TYCOM to have the funds available is a major factor for SUBMEPP, Executing Activity, SHAPEC, and Forces Afloat to make the process work. This step also contains a fundamental assumption that during the FY Year Standard WP Review Meeting; NAVSEA, SUBPAC and SUBLANT agree on Standard Work Package requirements.

Process Action Description:

Based on the agreed upon content of the Fiscal Year Standard Work Package, as identified as an output of the FY Standard Work Package Review Meeting. NAVSEA and TYCOM must meet the need of providing funds to SHAPEC and the Executing Activity by the A-21 milestone.



Without funding in place to support Executing Activity Establishing the Project and Start Planning All Activities, all remaining process steps and the ability to co-plan work and resource level upcoming availabilities will be in extreme jeopardy.

Strategy for Accomplishment:

- NAVSEA and TYCOM provide funding at required level by A-21.
- Initial customer funding requirements based on FY Standard Work Package and identified at A-26 to NAVSEA and TYCOM establishing new funding mindset

Process Improvement Recommendations:

- Customers both NAVSEA and TYCOM provide funding to coincide with issue of Initial Approved Work Package (Issue 1) for advance planning, material ordering, and prefabrication.
- Funding to be based on percentage of notional mandays planned for execution per NAVSEA benchmarks and identified as a result of the FY Standard Work Package Review Meeting.

Associated Risks:

- Lack of up-front funding will delay advance planning process.
- Delay in funding makes work more expensive (OT), and lessens the opportunity to reduce planning costs through co-planning.

Risk Mitigation:

- Provide funding for identified funding needs at the Standard Work Package Review Meeting.
- Budget for advance planning funding in the budget process.

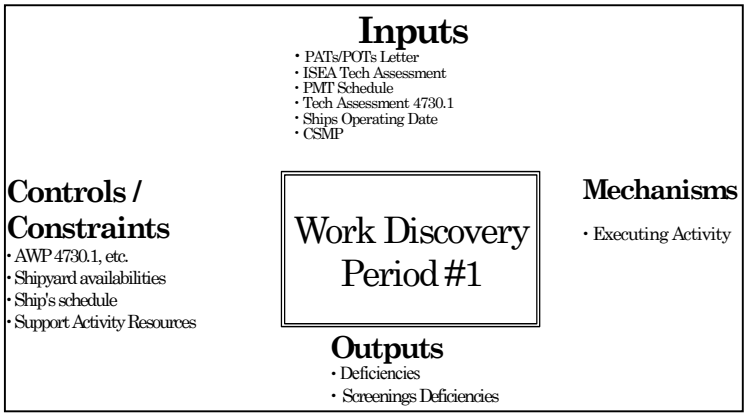
Work Discovery Period #1

Background:

At the A-15 but NLT A-12 period Work Discovery Period #1 occurs where the Nuclear Technical Assessment is performed and provides a time for Nuclear POTs testing to define maintenance requirements and identify ship system deficiencies. This Work Discovery Period is also a convenient time to perform some select Non-Nuclear PATs and pier-side technical assessment items.

Process Action Description:

The ship is available commencing in the A-15 to A-12 Pre-deployment timeframe for in port dockside testing. The ship will need to be engaged early to allow them adequate time to prepare for and perform the required tests.



Strategy for Accomplishment:

Work Discovery Periods #1 and #2 are intended to accomplish the maximum number of the tests and inspections possible to identify work items prior to JS02. This period should coincide with the maintenance period scheduled just prior to deployment. Ship's Force will be preparing for deployment and will be extremely busy thus increasing the importance of early communication with the Commanding Officer. It is intended to have Work Discovery Period #1 prior to deployment to allow ample time to collect and analyze the data in order to identify the additional work that will be added to the Initial Approved Work Package at the Initial Planning Meeting (IPM). Current CSMP List should be obtained and evaluated for additional work items. All work discovery items should be loaded and tracked in the DMTS and assigned/authorized for correction at the Deficiency Screening Meetings.

Associated Risks:

Any non-discovery work requirements identified after deployment could jeopardize downstream planning events.

Risk Mitigation:

Ship's Force/Executing Activity provide updates to keep all parties informed of maintenance changes as well as operating schedules to ensure the performance of Work Discovery Period #1 pre-deployment.

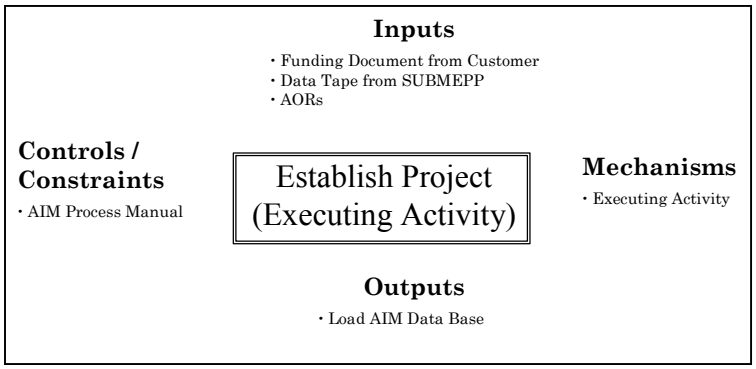
Establish Project (Executing Activity)

Background:

Establishing the project is a new action as a result of the tool set being used in AIM. It is necessary to have the project entered and established in order to commence with the official planning process at both SHAPEC and the Executing Activity. This process enters the project into the AIM database to allow SHAPEC to commence job summary development.

Process Action Description:

The Executing Activities, Business and Strategic Planning Office (BSPO), will enter the new project (ship) into the Advanced Industrial Management (AIM) database and establish project in AIM in accordance with the AIM process manual. The BPSO then assigns the initial Project Team via the "List of Key Personnel" screen.



The PEPM will then assign these personnel to Areas Of Responsibility (AORS) via the List AORS. When funding is received, the BSPO will request the Comptroller to establish the required Customer Order Acceptance Records (COAR) for the Availability. The COARs and an electronic Availability Work Package file from SUBMEPP are then loaded into AIM for that specific project.

Strategy for Accomplishment:

- Earlier loading of AIM database with an approved work package.
- Early funding for Availability advance planning.

The establishment of the project in AIM must be done to support SHAPEC Job Summary Development. The target date to have this event completed is A-20 months to support the fast start strategy. This event needs to happen soon after the Initial Approved Work Package to reap the benefits of providing the baseline approved work at A-21.

Associated Risks:

- Delays in Start of Planning Activities.

Delays in customers providing advance planning funding at A-21 months will preclude establishment of COARS necessary to allow SHAPEC to commence Job Summary development, and execution shipyard from downloading AWP into AIM.

Risk Mitigation:

- Early assignment of BSPO and PEPM.

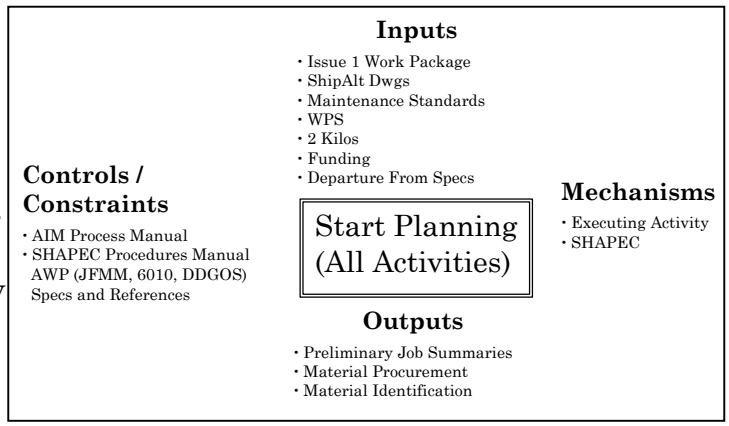
Start Planning (All Activities)

Background:

A key element of the refined work definition process is the ability to "Fast Start" Strategy a major portion of the authorized work for any type of Availability. This work has been established and agreed to via FY Standard Work Package and Initial Approved Work Package (Issue 1). Without the fundamental agreement being established, the "Fast Start" Strategy planning cannot take place.

Process Action Description:

- SUBMEPP will issue a ship's comparison report as requested by SHAPEC.
- SHAPEC/Executing Activity will accomplish the following:
  a) Review AWP comparison report for like work and identify destination ship rollover history
  b) Submit required necessary shipchecks to identify existing ship's conditions, interference items, flow paths, etc.
  c) Review lessons learned program for pertinent inclusion into existing software.



Strategy for Accomplishment:

- Identifying approved work earlier and providing funding to support earlier planning.

Process Improvement Recommendations:

- SUBMEPP to issue initial "Customer Approved" copy of AWP at A-21 for DMP, ERO and EOH availabilities.
- Customer to provide funding in conjunction with the initial issue of AWP at A-21.
- SHAPEC to start the planning process at A-20 to support the "Fast Start" Strategy.
- SHAPEC and executing shipyards continue working with SUBMEPP and customers to further define the 688 Class Baseline AWP.
- NAVSEA to align both SUBPAC and SUBLANT AWPs with reference to standardization of specifics contained within AWPs.

Associated Risks:

- There will be a substantial amount of "rework" in Job Summary and TGI preparations due to such an early planning schedule.
- Job Summaries won't get approved by A-4-3 if technical documentation is not available.

Risk Mitigation:

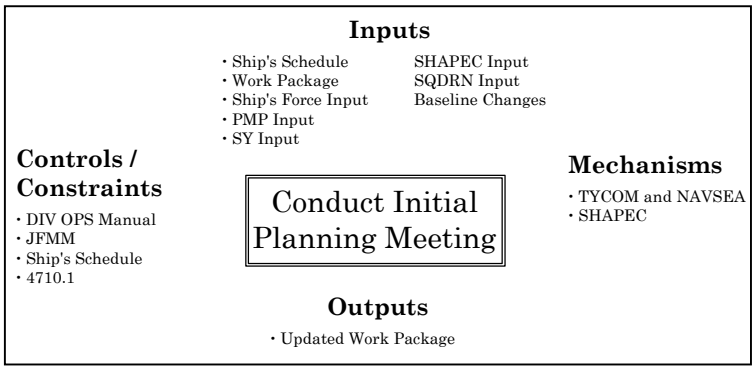
- Early delivery of technical documentation (alteration).

Conduct Initial Planning Meeting

Background:

Past Availability Planning has been hampered by ineffective incorporation of Forces Afloat input of the ship's Material Condition. Shortfalls have included incomplete Alteration Status, incomplete results of Performance Monitoring Team performance data and poor planning of the Pre-Availability Upkeep in which the PATs, POTs, and Shipyard Engineering Technical Assessments are accomplished. The Work Definition Process identifies that SUBMEPP, the Executing Activity, SHAPEC, and TYCOM conduct an Initial Planning Meeting (IPM) with Forces Afloat to update the Initial Approved Work Package (Issue 1). This meeting establishes an open dialog between Forces Afloat, NAVSEA, Performance Monitoring Team, the Executing Activity, SUBMEPP, SHAPEC and the TYCOM early in the planning stages of the Availability, provides greater lead time for identification of non-standard work requirements and provides Forces Afloat a strong foundation in the Availability planning process. The IPM's prime focus is to further define the work requirements in the Initial Approved Work Package (Issue 1) by folding-in new CSMP items that will not or can not be completed prior to the Availability start; maintenance resulting from Ship's Force input on the submarine's material condition, input from the Performance Monitoring Program, and additional maintenance identified from the Work Discovery Period #1. The alteration portion of the Initial Approved Work Package (Issue 1) is further refined as a result of the customers' consideration on ship's configuration and modernization status. Extensive review of TAMS reports for applicable ShipAlts and A&Is by Ship's Force, squadron and executing shipyard should be conducted prior to IPM and firm commitments made and an activity assigned to execute.

Process Action Description:



The TYCOMs will review the ship's schedule and determine the appropriate timeframe for conducting the Initial Planning Meeting. The TYCOM coordinates the scheduling of this meeting with the Executing Activity, the ship, the cognizant Immediate Supervisor In Command (ISIC) and Submarine Squadron Support Unit (SSSU). This meeting should be conducted approximately 2 - 4 weeks prior to the ship's last deployment prior to the Availability. SUBMEPP will prepare a message that identifies the information/data that each activity is to provide at the meeting.

Specifically:

- ISIC and Ship's Force validate TAMS.
- Forces Afloat (ISIC, Ship's Force and the IMA) provide a list of outstanding Alts/A&Is that are expected to be accomplished by the IMA or Ship's Force prior to the Availability.
- Ship's Force submits a list of outstanding Departures from Specification (DFS) and, with the ISIC and IMA, determines those DFS that the SY should plan for the Availability.
- PMT identify components that indicate that Maintenance should be planned for the Availability and provide a review of condition based maintenance data when requested.
- PMT provides data and information on components that should receive additional analysis during the Shipyard's Technical Assessment.
- ISIC and Ship's Force validate the CSMP for those items that are candidates for inclusion into the Availability work package.
- Shipyard provides Ship's Force with an overview of the Work Discovery Periods.

All parties should come to agreement on a method to screen work into the AWP during the work definition period. An attempt should be made to schedule formal Work Screening Meetings during the deployment period.

Strategy for Accomplishment:

- Establish Initial Planning Meeting to engage Ship's Force.
- Ensure that all parties are committed for success and participate.
- Earlier identification to Ship's Force of what is taking place during the Availability.
- Timelier forum for Forces Afloat to identify concerns and needs.

This Initial Planning Meeting is intended to be conducted early in the planning process to allow SHAPEC and the Executing Activity to incorporate Forces Afloat input and Ship Alterations and A&Is identified by TYCOM and NAVSEA early in the planning process.

Process Improvement Recommendations:

- Forum to provide optimum input from Forces Afloat and earlier planning of Ship Alterations, A&Is and CSMP items.
- Single meeting focused on non-standard related work requirements.

Associated Risks:

- Delay in identification of non-discovery work requirements.
- Inefficient execution could degrade the effectiveness of the Work Discovery Periods.
- Accurate translation of CSMP items.
- TAMS is accurate in both status and programming.

Risk Mitigation:

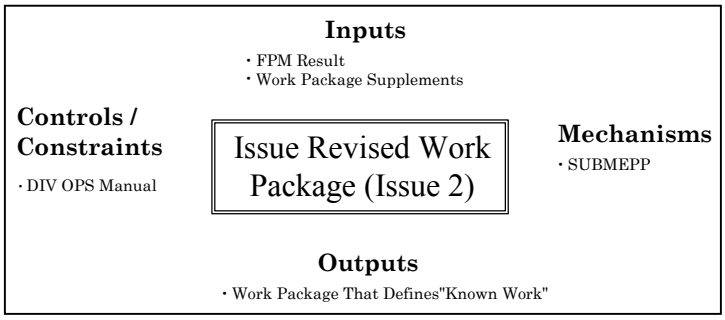
- Squadron, IMA, executing Activity, NAVSEA, TYCOM and PMT must be proactive in support of this planning meeting.

Issue Revised Work Package (Issue 2)

Background:

The TYCOM tasks SUBMEPP to prepare, issue, and maintain the Revised Work Package (Issue 2) and Work Package Supplement. This work package and work package supplement identifies the known work as of the end of the IPM and serves as the final package for which SHAPEC and the Executing Activity approves and issues Jobs Summaries for the Availability.

Process [DJ1]Action Description:[DJ2]



All changes to the Initial Approved Work Package (Issue 1) agreed to by the customers at the IPM are incorporated into the Revised Work Package (Issue 2). SUBMEPP determines appropriate section numbers (line items) and SWLINs for the additional work. This information is processed and the Revised Work Package (Issue 2) is issued in hard copy form as well as a data set for loading into the project database on the executing activity's AIM server. SUBMEPP also produces a work package supplement aligned with the Revised Work Package (Issue 2).

Strategy for Accomplishment:

- Issue Revised Work Package (Issue 2) by IPM+1 (NLT A-10).
- Incorporate all work requirements identified at IPM.

The Revised Work Package (Issue 2) must be issued by A-10 to support downstream planning initiatives by SHAPEC to have all Job Summaries and CU phases approved by A-2.5. In order to support this goal, the IPM must be completed no later than A-12 to allow one month (vice the current 2 months) for SUBMEPP to complete work on the Revised Work Package. In order to support the efforts for "Fast Start" Strategy planning for changes from IPM, SUBMEPP may assign SWLIN and line item numbers for the changes and provide this information to SHAPEC and the Executing Activity shortly after IPM. The Revised Work Package (Issue 2) and AIM data set would follow within one month after IPM.

Process Improvement Recommendations:

- Issuance of Revised Work Package (Issue 2) at A-10.
- Increased window to have Issue 2 Job Summaries and CU phases approved.

Associated Risks:

- Revised Work Package (Issue 2) delay will jeopardize Revised Job Summaries (Issue 2) at A-5.

Risk Mitigation:

- All information required for IPM must be ready for IPM and the meeting must be executed as scheduled.

Complete Issue of Job Summaries (Issue 1)

***See Section 4.3** of Baseline Project Management Plan.*

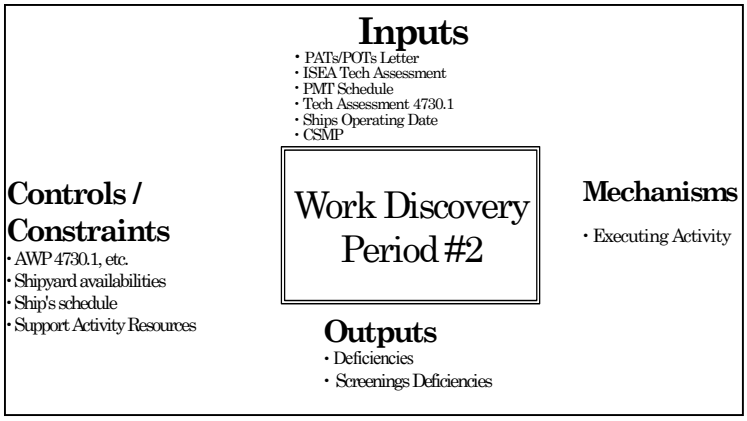
Work Discovery Period #2

Background:

Work Discovery Period #2 is ideally performed during the deployment period. Underway testing would allow for sound testing, sound mount inspections under operating conditions, and non-nuclear technical assessments.

Process Action Description:

This Work Discovery Period #2 is intended to take advantage of the first 10-day upkeep period in the theater of operation. (Based on the ship's assigned area this opportunity may not be available.)



Strategy for Accomplishment:

Work Discovery Periods #1 and #2 are intended to accomplish the maximum number of the tests and inspections possible to identify work items prior to JS02. The goal of this period is to spend approximately three to five days at sea (either transit to or from the upkeep site). Low risk non-intrusive PATs testing and pier side technical assessments can be performed during this period. This is also an opportune time to remind Ship's Force of the PATs tests that they are required to perform and to stress the importance of performing these tests. It is intended to have Work Discovery Period #2 during deployment if possible to collect and analyze operational data in order to identify additional work items prior to the Deficiency Screening Conference. Current CSMP List should be obtained and evaluated for additional work items. All work discovery items should be loaded and tracked in the DMTS and assigned/authorized for correction at Deficiency Screening Meetings.

Associated Risks:

Inability to accomplish approximately 80% of tests, inspections and deficiency identification during work discovery periods #1 and #2 for inclusion in JSO2 will delay completion of JSO3

Risk Mitigation:

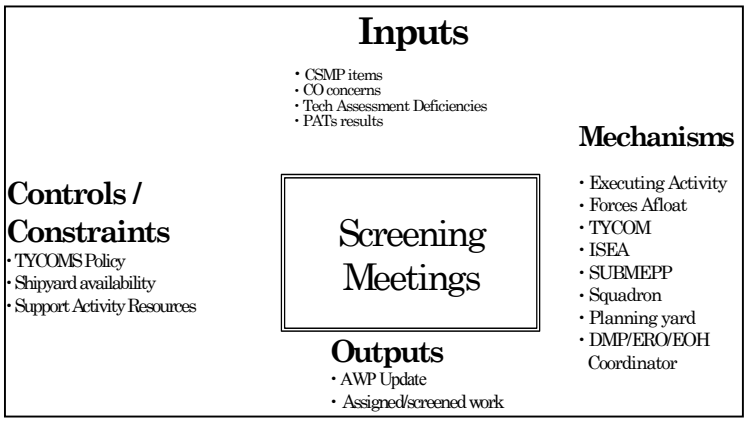
Ship's Force/Squadron/Executing Activity provide updates to keep all parties informed of schedule changes to minimize impact on ability to obtain operational data.

Screening Meetings

Background:

A formal Work Screening Meeting should be scheduled for the second 10-day upkeep period during the ship's deployment (if theatre of operation allows). This screening will allow a review of the deficiencies identified during Work Discovery Periods #1 and #2. All deficiencies must be measured against the final certification required to deliver the ship at the end of the Availability.

Process Action Description:



This meeting is intended to authorize any deficiencies collected to date on accomplished PATs, CSMP items, and technical assessments. This meeting will result in the screening of deficiencies, Commanding Officer items of concern and ultimately the authorization of work into the AWP. A line of communication should be established between the TYCOM representative, SUBMEPP and the executing activity BSPO/Project team. Recommendations for additions/deletions of items in or to the AWP should be presented and authorized s soon as practicable.

Strategy for Accomplishment:

- Schedule for second 10-day upkeep period during deployment.
- Fly DMP/ERO/EOH Coordinator to home port to participate.
- Promote open and early communication between Executing Activity and the ship.

It is intended that Screening Meetings be conducted to coincide with the accomplishment of Work Discovery Period #2.

Associated Risks:

- Non-discovery work not identified early impacts downstream planning events.
- Parties involved should not wait for a formal meeting to screen AWP comments.

Risk Mitigation:

This meeting is not the only opportunity to screen/authorize work into the AWP. A line of communication must be established between the TYCOM Rep, SUBMEPP, and Executing Activity BSPO/Project Team. This communication must be extended to and maintained with the Ship's Force and Executing Activity. Use of e-mail is encouraged.

Issue Job Summaries (Issue 2)

See Section 4.3 of the Baseline Project Management Plan.

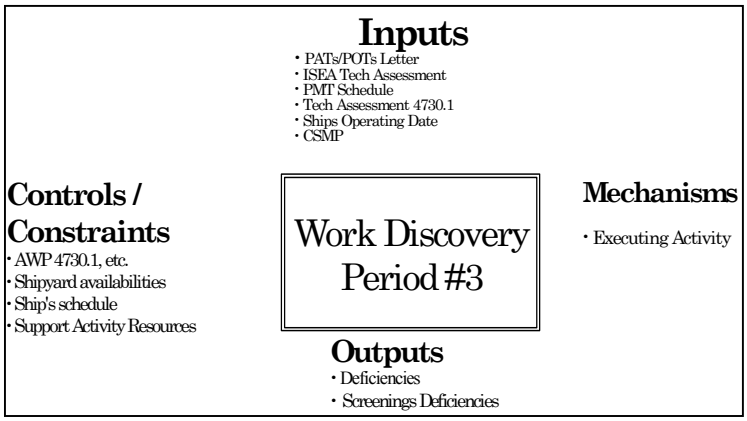
Work Discovery Period #3

Background:

Work Discovery Period #3 commences immediately upon the ship's return to port from deployment. This time allows for the performance of the remaining non-nuclear PATs, pier side testing, and technical assessments to be initiated. It is during this period that weapons PATs and the nuclear technical assessment (if not complete) will be performed. .

Process Action Description:

Traditionally for the first 30 days post-deployment ship's force personnel will not be available due to a mandatory stand down. Duty section personnel are however available. These limited resources require a thorough and careful scheduling of remaining requirements to assure maximum use of assets and to prevent stressing the crew.



Strategy for Accomplishment:

This period commences immediately upon return of the ship from deployment. For the first 30 days ship's force personnel will be in a mandatory stand down so resources will be very limited, restricted to duty section personnel. This period should be utilized only for the execution of previous planned evolutions that are currently incomplete for various reasons and all tasks must be preplanned and scheduled to minimize crew impact. Current CSMP List should be obtained and evaluated for additional work items. All work discovery items should be loaded and tracked in the DMTS and assigned/authorized for correction at the FPM.

Associated Risks:

Any work requirements identified and not performed could jeopardize downstream planning events and force an unplanned underway period for data collection purposes.

Risk Mitigation:

The executing activity must keep Ship's Force and Squadron informed of all previously scheduled assessments/tests not performed that has potential to influence Work Discovery Period #3, Post-deployment.

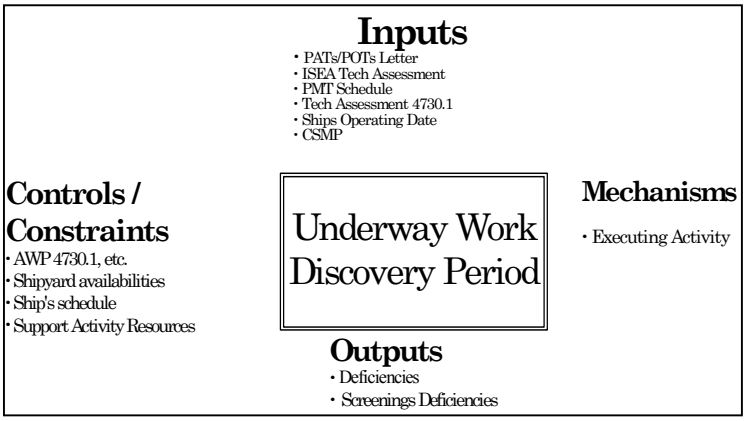
Underway Work Discovery Period

Background:

This Work Discovery Period is to be utilized as the last Fail Safe for the performance of the required technical assessments/tests that have not been performed as a result of conflicting operational schedules, deployments, mechanical failures, etc. If the weapons PATs have been performed there may not be a need to accomplish this underway period.

Process Action Description:

The at sea weapons PATs must be performed during this period, if not previously accomplished. Three to five days will be required at sea. The ship must be informed early if these previously scheduled tests were not performed as scheduled thus requiring this at sea period.



Strategy for Accomplishment:

This underway period should be scheduled as soon as possible after the stand down period. Depending on ship's deployment schedule and home port assignment, consideration should be given to "ride" the ship back to home port to accomplish some of the required tests. This underway period would be required only if weapons PATs has not been previously performed and is required to support the upcoming Final Planning Meeting (FPM) and downstream planning events. All work discovery items should be loaded and tracked in the DMTS and assigned/authorized for correction at the FPM.

Associated Risks:

Any identified required assessments/tests not performed will jeopardize downstream planning events.

Risk Mitigation:

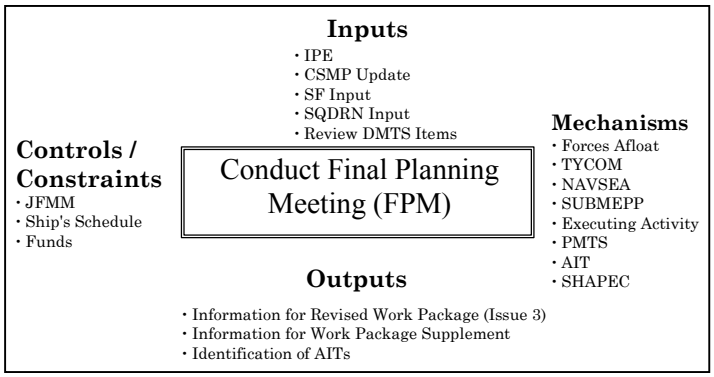
Ship's Force and Squadron must be identified early of all required testing not completed for the purposes of scheduling this underway inspection period.

Conduct Final Planning Meeting (FPM)

Background:

The TYCOM convenes a meeting in order to authorize deficiencies from the Work Discovery Periods and new CSMP items into the Availability. This meeting should identify about five percent of the AWP. It is not the intent of this meeting to authorize the performance of Ship Alterations and A&Is. These should be screened into the package much earlier to allow for maximum planning time and minimize "churn" on the project team as they prepare to transition from planning the Availability to execution of the Availability.

Process Action Description:



The FPM involves representatives from Forces Afloat (SF, PMT, SSSU, IMA, DD, and SQN), TYCOM, NAVSEA, SUBMEPP, SHAPEC, and the Executing Activity. The meeting is held typically at the ship's homeport, and nominally between A-4 and A-2.5 depending on the ship's last deployment. The FPM's prime focus is to authorize deficiencies from the Work Discovery Periods and new CSMP items into the Availability; maintenance resulting from Ship's Force input on the submarine's material condition, input from the Performance Monitoring Program, and additional maintenance identified from the Work Discovery Periods. The FPM also serves as an opportunity for Ship's Force to meet again with the execution project team key personnel as well as to outline Alteration Installation Team involvement during the Availability.

Strategy for Accomplishment:

- Conduct FPM between A-4 and A-3 at the ship's home port.

Process Improvement Recommendations:

- Shifts most of the emphasis for modernization work to the IPM, earlier in the planning timeline.

Associated Risks:

- Ship Alterations and A&Is are authorized at the meeting creating a burden on the executing activity late in the planning timeline.

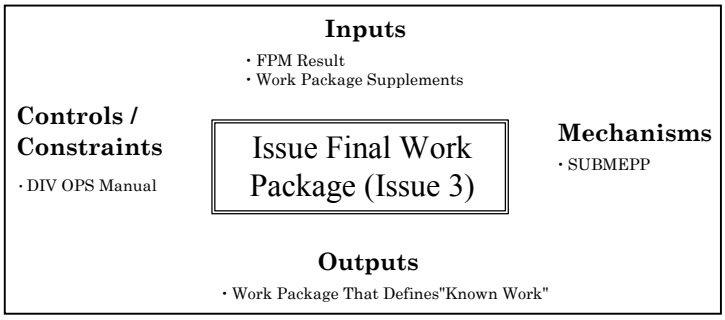
Risk Mitigation:

- Establish an open line of communication between TYCOM and NAVSEA to obtain authorization for S/A performance early in planning.
- Utilize an aggressive, proactive review of TAMS and make recommendations to TYCOM and NAVSEA.

Issue Revised Work Package (Issue 3 Final)

Background:

The TYCOM tasks SUBMEPP to prepare, issue, and maintain a Revised Work Package (Issue 3) if required by extensive work discovery items and Work Package Supplement. This Work Package Supplement identifies the work discovery items authorized at the Final Planning Meeting (FPM) and serves as the final package for which SHAPEC and the Executing Activity approves and issues Jobs Summaries for the Availability.



Process Action Description:

All changes to the Revised Approved Work Package (Issue 2) agreed to by the customers at the FPM are incorporated into the Final Work Package (Issue 3). SUBMEPP determines appropriate section numbers (line items) and SWLINs for the additional work. This information is processed and the Final Work Package (Issue 3) or Work Package Supplement is issued in hard copy form as well as a data set for loading into the project database on the executing activity's AIM server.

Strategy for Accomplishment:

- Issue Final Work Package (Issue 3) by FPM+1 (NLT A-4 - A-3).
- Incorporate all work discovery items identified at FPM.

The Final Work Package (Issue 3) must be issued by A-4 - A-3 to support downstream planning initiatives by SHAPEC to have all Job Summaries and CU phases approved by A-2.5. In order to support this goal, the FPM must be completed no later than A-4 to allow one month for SUBMEPP to complete work on the Revised Work Package. In order to support the efforts for "Fast Start" Strategy planning for changes from FPM, SUBMEPP will assign SWLIN and line item numbers for the changes and provide this information (mark up) to SHAPEC and the Executing Activity within three working days after the FPM. BSPO will input into AIM database within 3 working days of receipt of markup. Work Package (Issue 3) and AIM electronic AWP would follow within four weeks after FPM.

Process Improvement Recommendations:

- Issuance of Work Package (Issue 3) at A-4 - A-3.

Associated Risks:

- Work Package (Issue 3) delay will jeopardize Revised Job Summaries (Issue 3) at A-3.

Risk Mitigation:

- All information required for FPM must be ready for FPM and the meeting must be executed as scheduled.

All Job Summaries Issued (JS03)

See Section 4.3 of the Baseline Project Management Plan

Approve All Job Summaries (JS00)

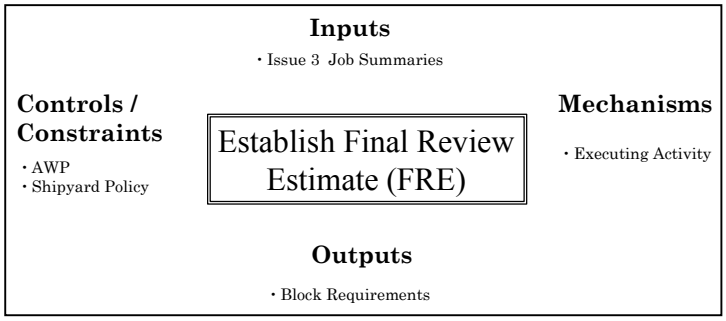
See Section 4.3 of the Baseline Project Management Plan

Establish Final Review Estimates (FRE)

Background:

The requirement to submit the Final Review Estimate (FRE) is contained in SWLIN 001Y01 of the Revised Work Packages. The FRE provides the customers (TYCOM and NAVSEA) with a manday and material cost estimate for work identified up to and including the FPM.

Process Action Description:



The basic process for development of the FRE is as follows:

(a) Job Summaries and CU phases for Initial Approved Work Package (Issue 1) are approved.
(b) Job Summaries and CU phases for Revised Work Package (Issue 2) are approved.
(c) Job Summaries and CU phases for Revised Work Package (Issue 3) are approved.
(d) Projects Internal Control Price (ICP) has been developed based on the approved Job Summaries.
(e) The Executing Activity's BSPO will combine the project's ICP with a Executing Activity's reserve for each SWLIN. The Executing Activity's reserve is calculated based upon the Executing Activity's business strategy, considering past performance, current and projected Executing Activity's workload, competition and return cost of previous projects or similar work.
(f) The Executing Activity's BSPO will include an estimate (NTE 10%) for new work reservations (labor & material) in the FRE.

Strategy for Accomplishment:

- Establish FRE at A-1.

The FPM is scheduled for A-4. Based on changes/additions to the work package at the FPM and subsequent approval of all Job Summaries (JS00) and CU phases at A-4 to A-2.5, the issuance of the FRE at A-1 is supportable. The FRE should include a cost estimate for SHAPEC accomplished work.

Process Improvement Recommendations:

- None

Associated Risks:

- If all Job Summaries are not approved at A-2.5, the ICP could be jeopardized and subsequent issue of the FRE in accordance with 4.0 planning.

Risk Mitigation:

- Revise work package requirements for estimates.

Issue 1, Issue 2, and Issue 3 Work TGIs Approved

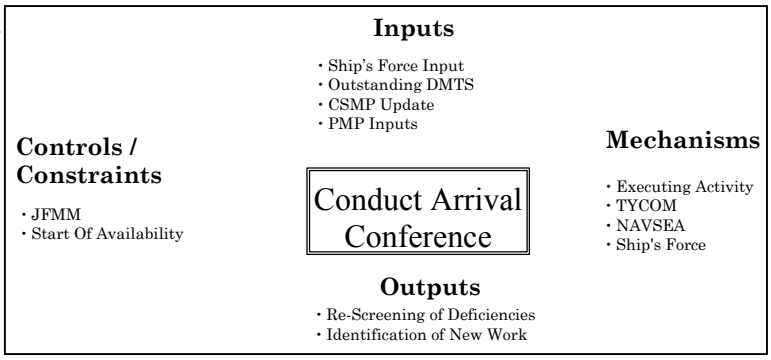
See Section 4.3 of the Baseline Project Management Plan.

Conduct Arrival Conference

Background:

CINCLANTFLT/CINCPACFLTINST 4790.3, JOINT FLEET MAINTENANCE MANUAL VOLUME II, INTEGRATED FLEET MAINTENANCE PARA 3.6.2.1 defines the scheduling and conducting of the arrival conference. This definition is generic in nature and applies to a typical CNO Availability.

Process Action Description:



The Arrival Conference is held shortly after the ship's arrival at the Executing Activity or at the start of the Availability. The Executing Activity schedules and chairs the conference Attendees: Ship's CO, XO, Key Ship's Force personnel, TYCOM Representative, Squadron Representative, Shipyard personnel (Project Supt, APS, PEPM, BSPO Rep, Engineering/Production Reps, etc.) SUBMEPP, and other activities as applicable (e.g., NUWC, NAVSES, PMT, FTSPAC/LANT, etc.).

Agenda:

(a) A review of DMTS deficiencies previously assigned to forces afloat or other outside activities, that have not been corrected, for purposes of determining the capability of forces afloat/outside activity for correction or re-assignment to the Executing Activity. All parties involved must make a firm commitment to execute deficiencies as assigned. All executing activity assigned deficiencies will be entered by SUBMEPP into the revised work package.

(b) Resolving any outstanding issues from the Initial Planning Meeting, FPM, and/or any new problems.

(c) A discussion of scheduling and production planning requiring close coordination between Ship's Force and the Shipyard.

(e) Dissemination of general administrative information of interest to Ship's Force.

(f) Submittal of additional new work items for consideration. This should be kept to a minimum utilizing a very proactive approach to adjudicate TAMS and CSMP items earlier in the planning timeline thus allowing the ship and the project team to focus on execution of the Availability.

Strategy for Accomplishment:

- Arrival Conference provides additional definition of discovery work required during the upcoming Availability.
- Re-screen remaining outstanding deficiencies

The goal is to have all "I" level deficiencies identified during the Work Discovery Periods corrected prior to the start of the Availability. The IMA must agree to complete the work assigned to them in order to support the Availability Key Event schedule. This will avoid a last minute planning effort to create the necessary software and procure required material. In order to achieve this goal, the ship must be available for an A-3 upkeep period. This upkeep period must be dedicated to correct DMTS deficiencies assigned to Forces Afloat.

Process Improvement Recommendations:

- None

Associated Risks:

- New work identified at A-0.

Risk Mitigation:

- None

APPENDIX E

Sample Inside Machine
Shop Plan

(Plan to be provided later)

APPENDIX F

Performance Metrics

Overview for

USS Submarine (SSN XXX) ERO/DMP/EOH

Project Supt: _____

Deputy project Supt: _____

Availability Dates: _____ to _____

GUIDANCE FOR DEVELOPMENT OF APPENDIX F METRICS

1. Schedule

Key Events and Milestones:

This table lists the Key Events and Milestones that are up coming. As a minimum it will list the next Key Event due and in addition, any Key Events due in the next 30 days. It will also list the Milestones with negative float that are predecessors to the listed Key Events or the next 10 Milestones, whichever is greater.

The Baseline Resource Leveled Schedule issued and approved by A-2 will be the source of the "Original Scheduled Date" for all execution Key Events and Milestones. If, during the course of execution, the ship is officially rescheduled, the "Revised Scheduled Dates" column will also be populated. Each week, the "PSS Schedule Projection" column will be populated with the Early Start Dates for each Milestone and the Project Superintendent's estimate for each Key Event. Any Key Event with a projected late completion will be addressed in the "Project Superintendent's Comments" section. The "Actual Completion Date" will be completed and listed on the report for one reporting period.

Straight Line UD00 Graph:

This graph is generated using the criteria defined in the Fast Start Strategy. This graph will be included in the report starting at availability start and will be included until the project crosses the Straight Line. Trip Points are as discussed in the Fast Start Strategy.

100-700 Series and 800 Series Graphs:

These graphs are generated using PMC SWLIN level data depicting percent completion over time in the SWLINs starting with 1 through 7 (Non-nuclear Wrench Turning Work) and in SWLINs starting with 82, 83, 84 and 85 (Nuclear Wrench Turning Work). The current availability will be compared to the Corporate Best and the shipyard's best performance on the same type availability. Additionally, the "baseline" or "original plan" will be included on the graphs to demonstrate the worthiness of the plan and to detect the magnitude of losses in schedule as the availability progresses.

The 100-700 Series SWLIN graphs should be used to "predict" undocking. Historically, between 88% and 91% of the 100-700 work must be complete to undock. The actual undock dates should be shown on the graph for the two comparative availabilities as well as the planned undock date for the availability in question.

The 800 Series SWLIN graphs should be used to track progress to Cold Operations Testing (SC00). Historically, between 90% and 92% of the 800 work must be completed to achieve SC00. The actual SC00 dates should be shown on the graph for the two comparative availabilities as well as the planned undock date for the availability in question.

Testing Graphs:

As a minimum, three graphs shall be provided – one each for HM&E, Combat Systems and Nuclear Testing that graphically depicts the cumulative tests scheduled over time and the actual cumulative tests completed over time. Additionally, a table will be provided that includes the following information:

- The total number of tests required to be performed to date for each key event.
- The total number of tests originally scheduled to be completed to date.
- The number of tests actually completed for each key event to date.
- The number of tests remaining for each key event.
- The number of weeks to each key event is based on the current scheduled date of the event.
- The number of tests per week is determined by dividing the number of remaining tests by the number of weeks to the event.

TRIP POINT

The required rate of testing to support an event or the combined rate for the Availability must not exceed 20 tests required/week.

2. COST

PMC Data:

Three "Screen Captures" from PMC will be required – Total Project, Total Production and Total Support. An electronic recreation of this data can be used instead of the screen captures if preferred.

New Work:

New work is work assigned to the project after the Initial Planning Meeting (Issue 2 of the Work Package).

This graph will compare actual assigned new work over time to the available new work reserve.

TRIP POINT

The BSPO will monitor the use of new work funds and provide new work charts to TYCOM on a weekly basis. TYCOM will take necessary action to provide funds with new work authorization once reserves are spent.

Cost Performance:

These graphs are provided to illustrate both the rate of expenditure of funds and predict the final financial outcome of the availability. A separate graph shall be provided for each customer. The availability Actual Quantity of Work Performed (AQWP) and Predicted End Quantity (PEQ) will be compared to the Final Review Estimate (FRE), Predicted End Cost (PEC), or Fixed Price (if applicable). Additionally, a table will be provided to separately report AQWP, FRE and PEQ for both labor and material.

Cost Trends:

Cost per percent complete trend graphs will be provided for the 100-700 Series and 800 Series SWLINs. The data for these graphs will be compiled in the same manner as discussed in Section 1. Mandays per percent complete over time will be compared with the corporate best and shipyard best performance for the same type of availability. It is important that the total package mandays be shown for each comparative availability so that a proper comparison can be made. Also, a trip point will be set based on the FRE or Fixed Price (if applicable) of the availability in question.

3. Quality

One graph is to be provided for quality which measures Weighted Deficiencies per 1000 MDs over time. A benchmark availability will be provided which must be the same benchmark data used in the Quality Performance System (QPS). This indicator is NOT to be compared across different shipyards as a corporate surveillance program has not been established and differences can cause extreme differences in the data collected.

4. Engineering Support

Two separate graphs depicting non-nuclear trouble desk activity will be provided – one for Deficiency Logs (DLs) and one for Deficiency Reports (DRs). Each week at a scheduled time, the following activity measures of the trouble desk should be determined:

- Number of DRs and DLs Logged for the week,
- Number of DRs and DLs Issued for the week, and
- Current DR and DL Backlog.

Any issues relating to DRs or DLs requiring offyard action that are late should be addressed in the Project Superintendent Comments.

TRIP POINT

The backlog of unanswered DLs for Non-Nuclear work should not exceed 75. The backlog of unanswered DRs for Non-Nuclear work should not exceed 50.

5. Overtime

The actual overtime percentage trend should be plotted against the original phased overtime plan.

6. Manning

SPF Standard Report WF-250 will be provided.

7. Material

The actual number of CCRP assets that have been returned to the system will be plotted against the scheduled returns.

8. Exposure

The Exposure Index trend over time will be graphically reported. The Exposure Index is calculated by dividing the Actual Cumulative Exposure by the Estimated Cumulative Exposure. It is important that no units of exposure are reported in this section, as it would require a classification change to the document.

APPENDIX F

PROJECT PERFORMANCE REVIEW

USS SUBMARINE (SSN XXX) DMP/ERO/EOH

Data Date:

Project Supt:

Deputy PS:

Availability Dates: XX/XX/XX–XX/XX/XX

1. KEY PROJECT PARAMETERS

QAC:	MDs	Internal Schedule Duration:	Months
ICP:	MDs	CNO Schedule Duration:	Months
FRE:	MDs		

New Work Reserve: MDs

New Work Issued: MDs Percent New Work Issued: (%)

Funds in hand $133,643,810

2. TOTAL AVAILABILITY ASSESSMENT: **R/Y/G**

Schedule Performance	Cost Performance	Quality Performance
Green	**Red**	**Yellow**
24 Days ahead of CNO Scheduled End Date	**$3,969,765 over Fixed Price**	**11 Weighted Deficiencies / 1000 MDs**
Degrading/Steady/ Improving	**Steady**	**Steady**

Cost Performance Index: 1.10 CPI delta from last week: -0.01

Predicted End Cost: 173,828 MDs Variance to ICP: -10,431 MDs

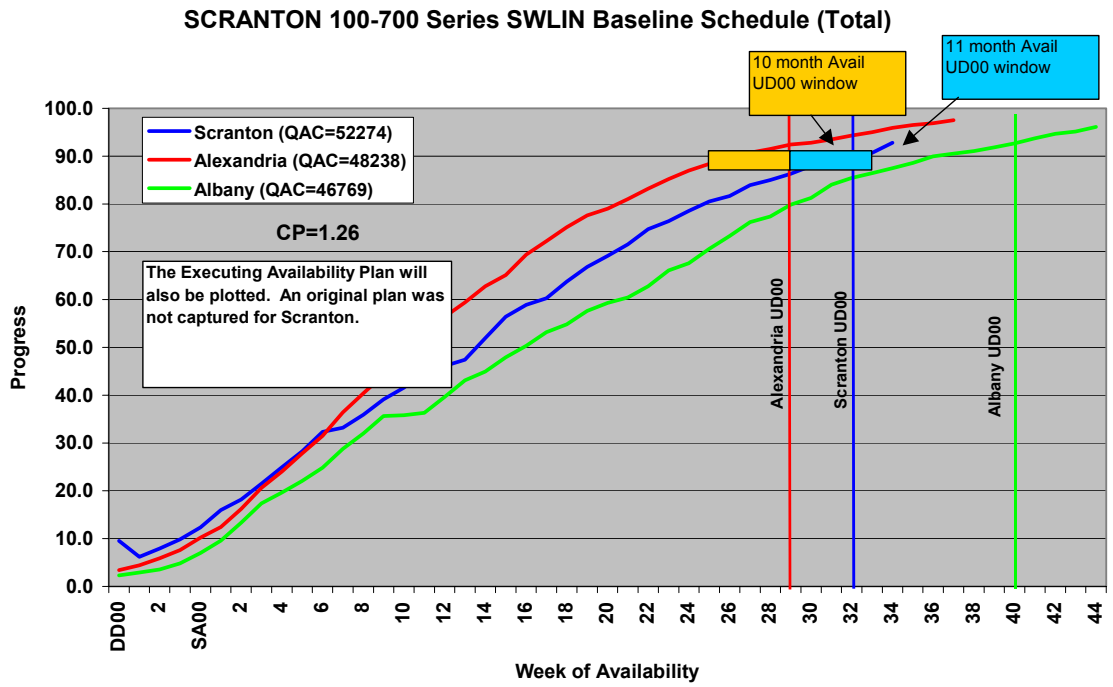
Variance to FRE: -2,730 MDs

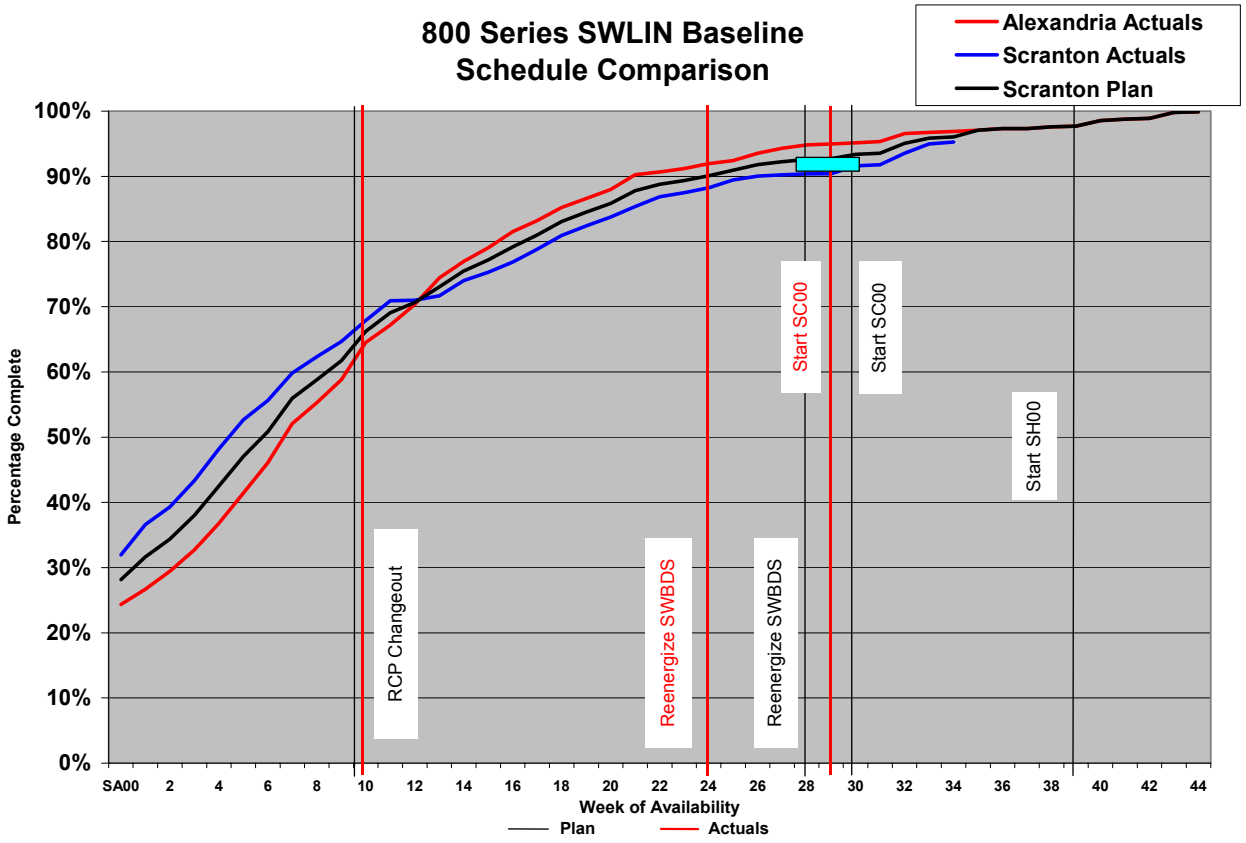
SAMPLE

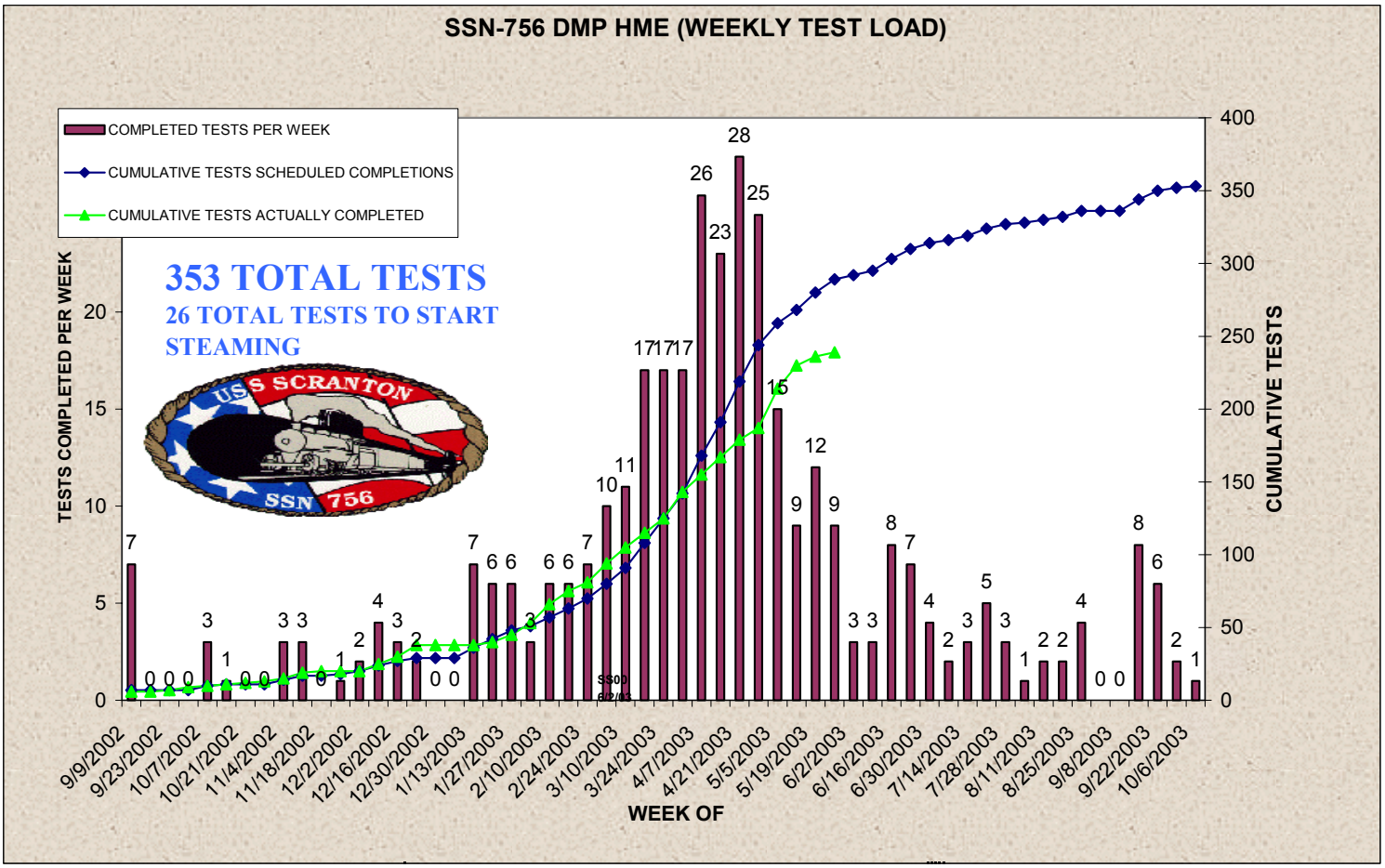
1. SCHEDULE

	Original Scheduled Date	Revised Scheduled Date	PSS Schedule Projection	Actual Completion Date
Key Events	The following are required for report: - The next two Key Events (at a minimum) - All past due milestones (based on Original Scheduled Date) - All Milestones completed since last report - All Milestones scheduled to complete in the next thirty days			
UD00-Undocking				
SS00-Start Steaming				
Milestones				
SC06-Port Loop Blowdown				
SC05-De-Energize Switchboards				
UD04-Comp R/O Patch #5				
UD21-Ripout Shaft Components				
SC07-Ripout Patch #20				
MP01-Comp Ripout of all Masts & Scopes				

The Straight Line UD00 Graph (Figure 4.5.4.3.2) of the BPMP will be provided until the executing project crosses the Straight Line.


SCRANTON 100-700 Series SWLIN Baseline Schedule (Total)
10 month Avail UD00 window
11 month Avail UD00 window
Scranton (QAC=52274)
Alexandria (QAC=48238)
Albany (QAC=46769)
CP=1.26
The Executing Availability Plan will also be plotted. An original plan was not captured for Scranton.
Alexandria UD00
Scranton UD00
Albany UD00
Progress
Week of Availability


800 Series SWLIN Baseline Schedule Comparison
Alexandria Actuals
Scranton Actuals
Scranton Plan
RCP Changeout
Reenergize SWBDS
Reenergize SWBDS
Start SC00
Start SC00
Start SH00
Percentage Complete
Week of Availability
Plan
Actuals



Separate graphs will be provided for HM&E, Combat Systems and Nuclear Testing.

HP&A

Key Event	Total Tests Req'd	Tests Scheduled to Complete	Total Tests Completed	Remaining	Weeks to Event	Tests Req'd Per Week
SC00						
CW00						
UD00						
HB00						
SS00						
CH00						
CT00						
SP00						
CP00						
DT00						
FC00						
ST00						
CA00						
Total						

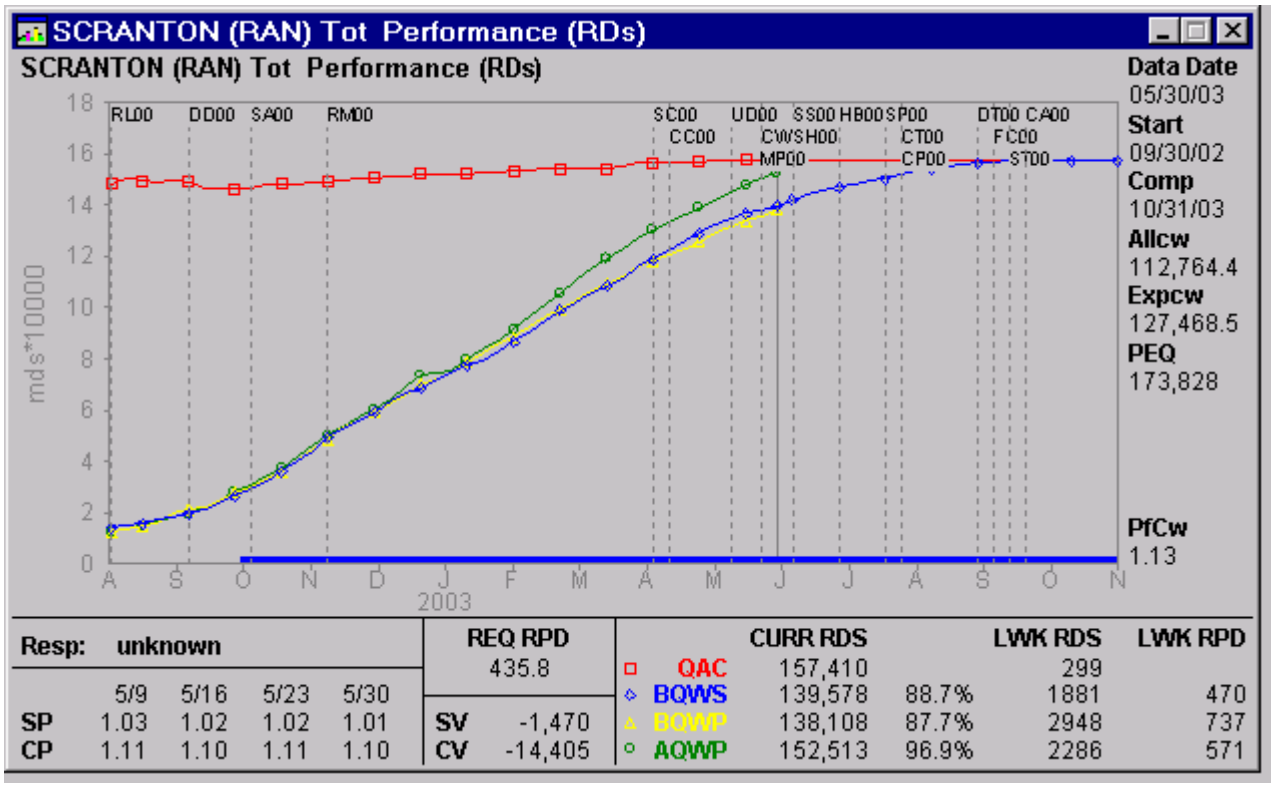
CSO

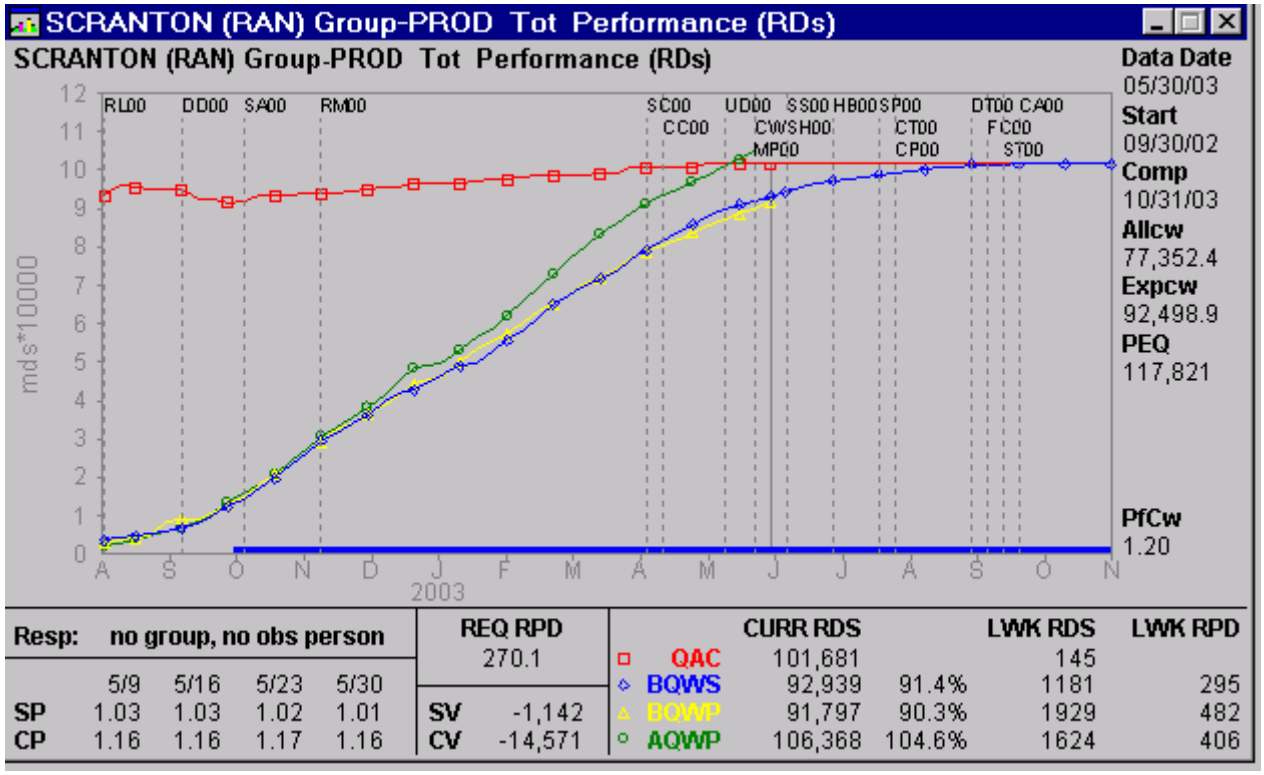
Key Event	Total Tests Req'd	Tests Scheduled to Complete	Total Tests Completed	Remaining	Weeks to Event	Tests Req'd Per Week
CW00						
MP00						
UD00						
CT00						
DT00						
CA00						
Total						

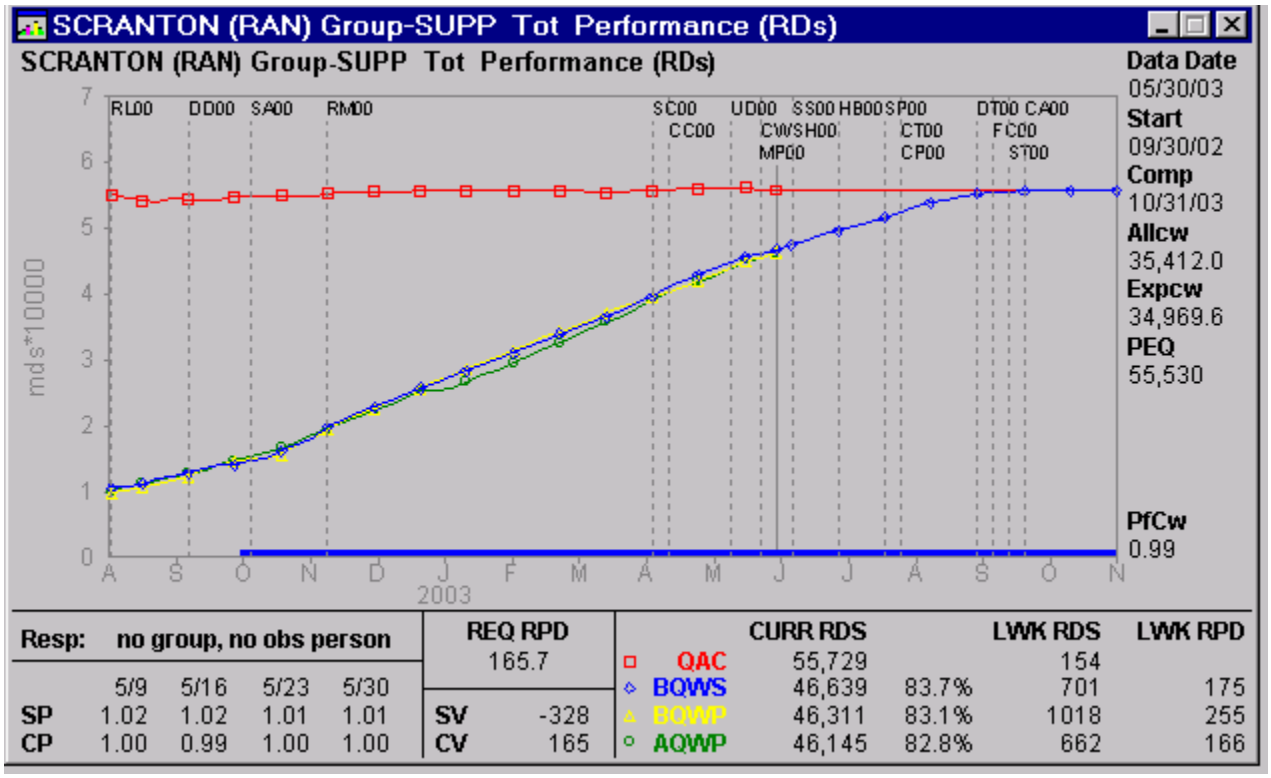
NUCLEAR

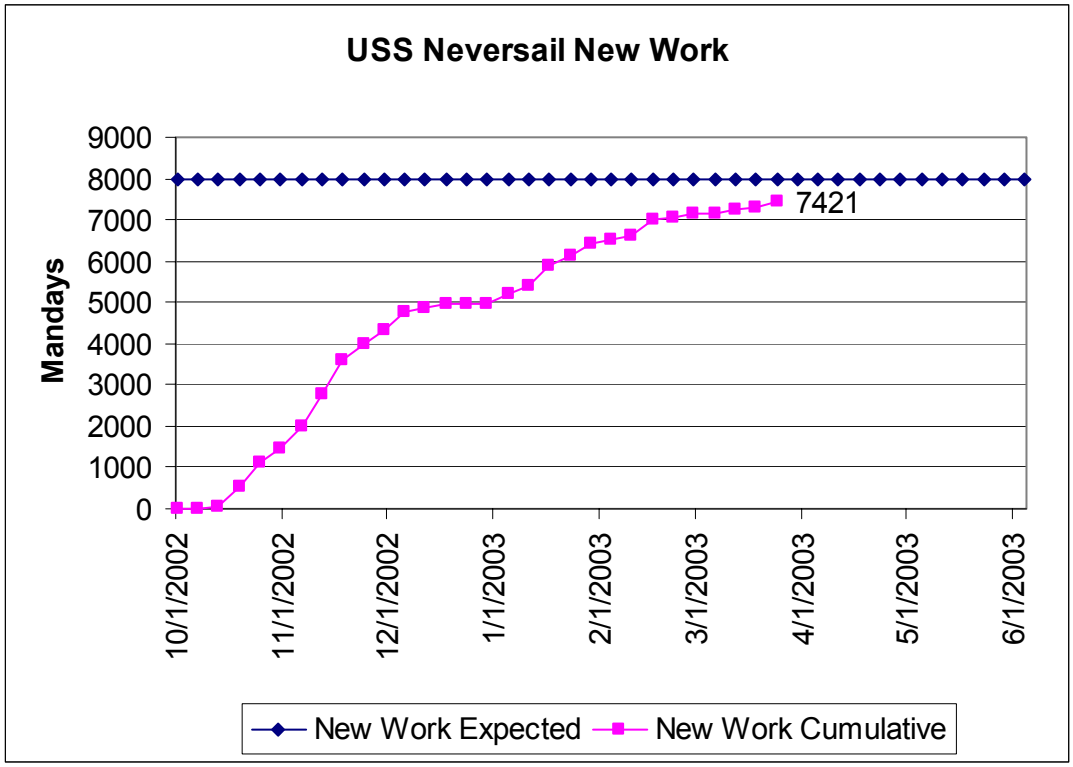
Key Event	Total Tests Req'd	Tests Scheduled to Complete	Total Tests Completed	Remaining	Weeks to Event	Tests Req'd Per Week
SC00						
SP00						
Total						

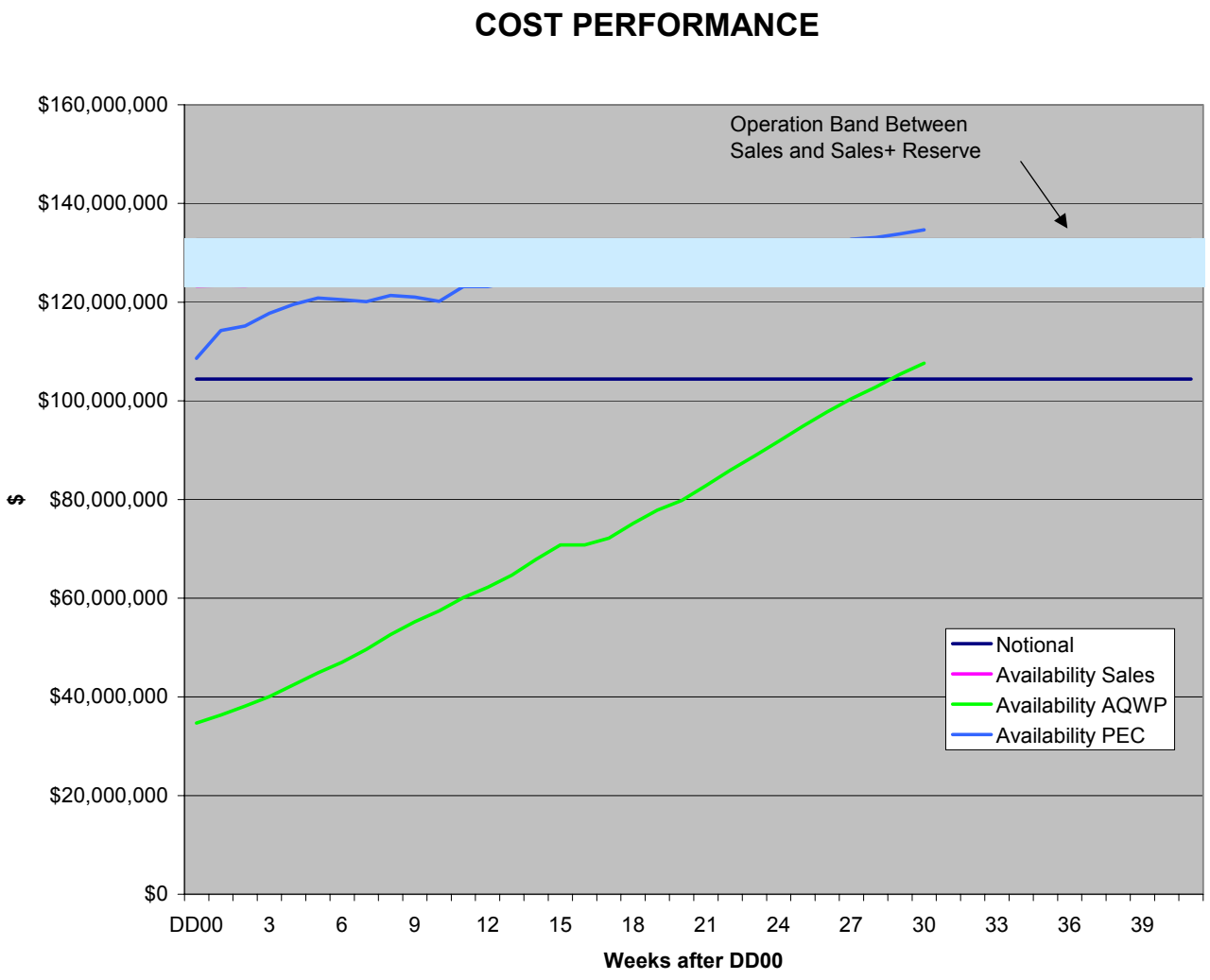
2. COST


SCRANTON (RAN) Tot Performance (RDs)
SCRANTON (RAN) Tot Performance (RDs)
Data Date
05/30/03
Start
09/30/02
Comp
10/31/03
Allcw
112,764.4
Expcw
127,468.5
PEQ
173,828
PfCw
1.13
mds*10000
RL00 DD00 SA00 RM00 SC00 CC00 UD00 CWSH00 MP00 SS00 HB00 SP00 CT00 CP00 DT00 CA00 FC00 ST00
A S O N D J F M A M J J A S O N
2003
Resp: unknown
REQ RPD 435.8
5/9 5/16 5/23 5/30
SP 1.03 1.02 1.02 1.01
CP 1.11 1.10 1.11 1.10
SV -1,470
CV -14,405
CURR RDS LWK RDS LWK RPD
QAC 157,410 299
BQWS 139,578 88.7% 1881 470
BQWP 138,108 87.7% 2948 737
AQWP 152,513 96.9% 2286 571


SCRANTON (RAN) Group-PROD Tot Performance (RDs)
SCRANTON (RAN) Group-PROD Tot Performance (RDs)
Data Date
05/30/03
Start
09/30/02
Comp
10/31/03
Allcw
77,352.4
Expcw
92,498.9
PEQ
117,821
PfCw
1.20
mds*10000
RL00 DD00 SA00 RM00 SC00 CC00 UD00 CWSH00 MP00 SS00 HB00 SP00 CT00 CP00 DT00 CA00 FC00 ST00
A S O N D J F M A M J J A S O N
2003
Resp: no group, no obs person
REQ RPD 270.1
5/9 5/16 5/23 5/30
SP 1.03 1.03 1.02 1.01
CP 1.16 1.16 1.17 1.16
SV -1,142
CV -14,571
CURR RDS LWK RDS LWK RPD
QAC 101,681 145
BQWS 92,939 91.4% 1181 295
BQWP 91,797 90.3% 1929 482
AQWP 106,368 104.6% 1624 406

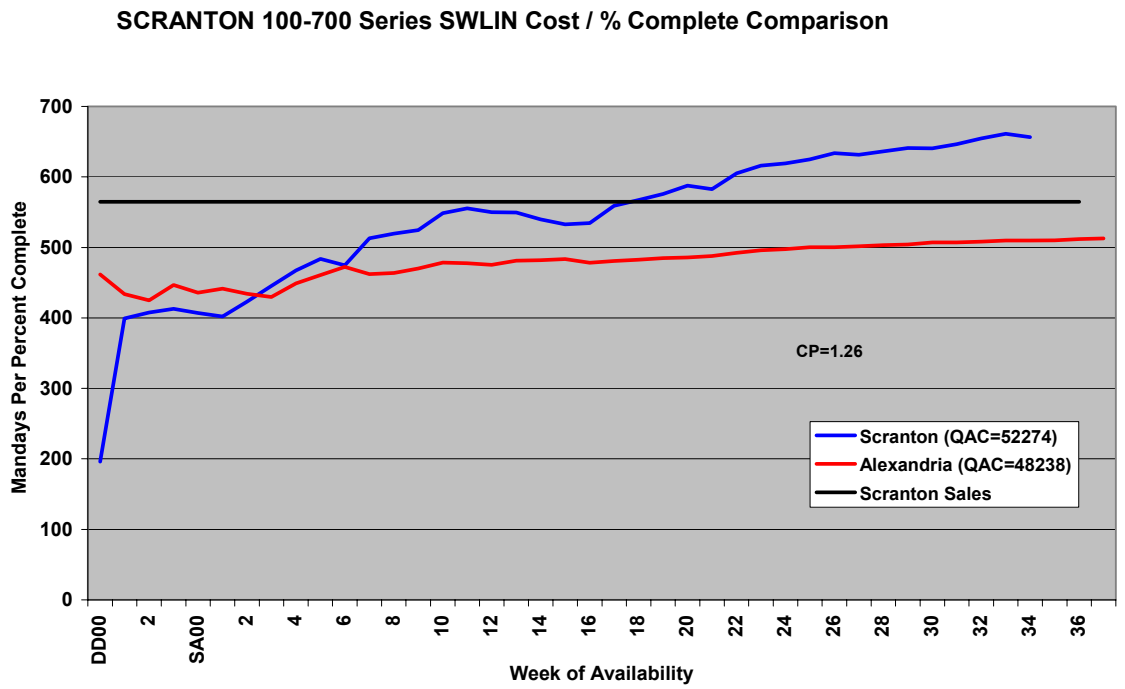

SCRANTON (RAN) Group-SUPP Tot Performance (RDs)
SCRANTON (RAN) Group-SUPP Tot Performance (RDs)
Data Date
05/30/03
Start
09/30/02
Comp
10/31/03
Allcw
35,412.0
Expcw
34,969.6
PEQ
55,530
PfCw
0.99
mds*10000
RL00 DD00 SA00 RM00 SC00 CC00 UD00 CWSH00 MP00 SS00 HB00 SP00 CT00 CP00 DT00 CA00 FC00 ST00
A S O N D J F M A M J J A S O N
2003
Resp: no group, no obs person
REQ RPD 165.7
5/9 5/16 5/23 5/30
SP 1.02 1.02 1.01 1.01
CP 1.00 0.99 1.00 1.00
SV -328
CV 165
CURR RDS LWK RDS LWK RPD
QAC 55,729 154
BQWS 46,639 83.7% 701 175
BQWP 46,311 83.1% 1018 255
AQWP 46,145 82.8% 662 166

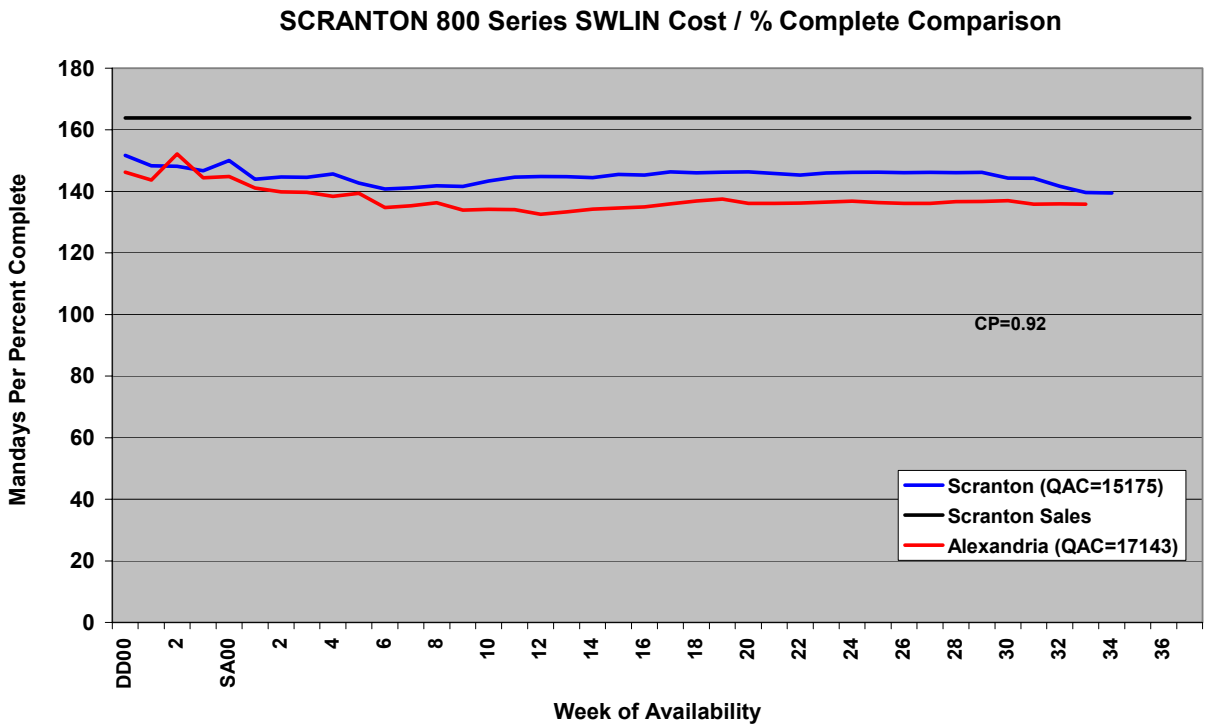

USS Neversail New Work
Mandays
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
7421
10/1/2002
11/1/2002
12/1/2002
1/1/2003
2/1/2003
3/1/2003
4/1/2003
5/1/2003
6/1/2003
New Work Expected
New Work Cumulative



The above graph is provided for format – recommend providing individual customer graphs.

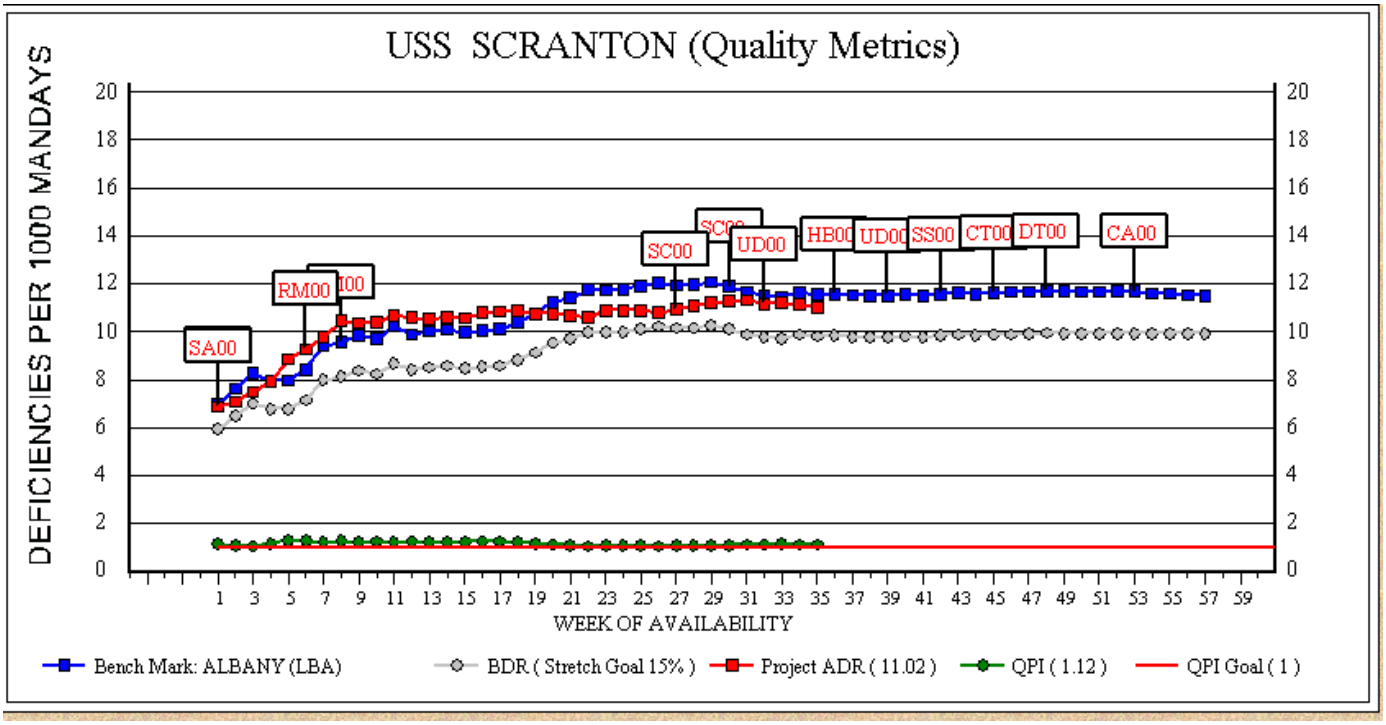
	ACWP	FRE	PEC
TYCOM – Labor			
TYCOM – Material			
NAVSEA – Labor			
NAVSEA - Material			


SCRANTON 100-700 Series SWLIN Cost / % Complete Comparison
Mandays Per Percent Complete
700
600
500
400
300
200
100
0
CP=1.26
Scranton (QAC=52274)
Alexandria (QAC=48238)
Scranton Sales
DD00
2
SA00
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
Week of Availability

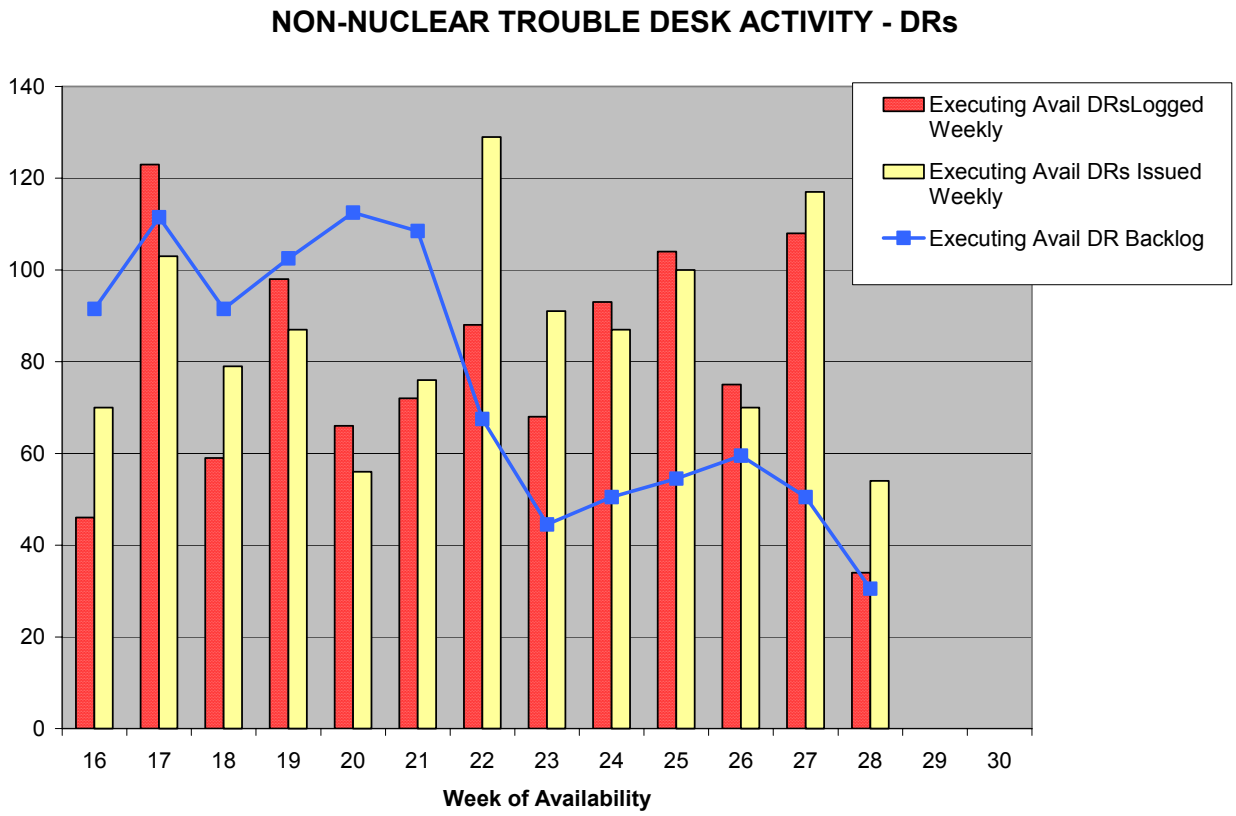

SCRANTON 800 Series SWLIN Cost / % Complete Comparison
Mandays Per Percent Complete
180
160
140
120
100
80
60
40
20
0
CP=0.92
Scranton (QAC=15175)
Scranton Sales
Alexandria (QAC=17143)
DD00
2
SA00
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
Week of Availability

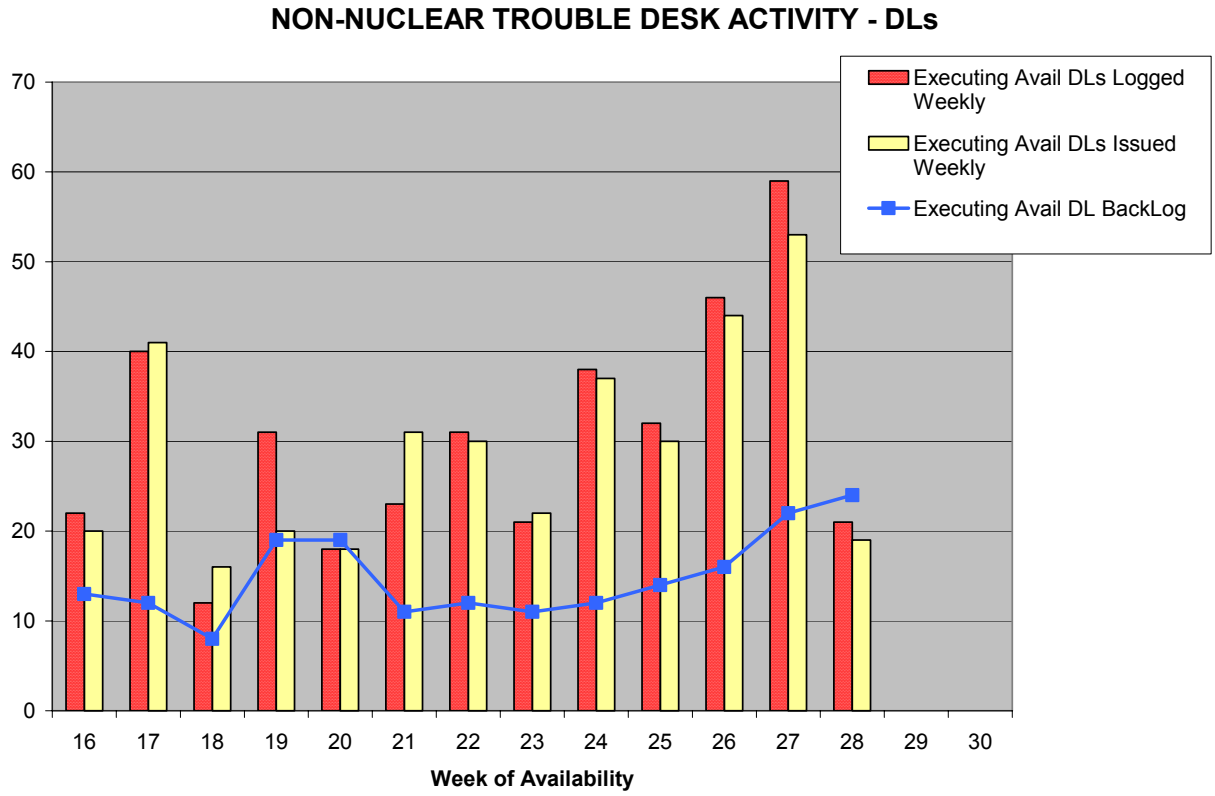
3. QUALITY

After looking at all of our quality metrics, recommend providing this to 130s as our recommendation.

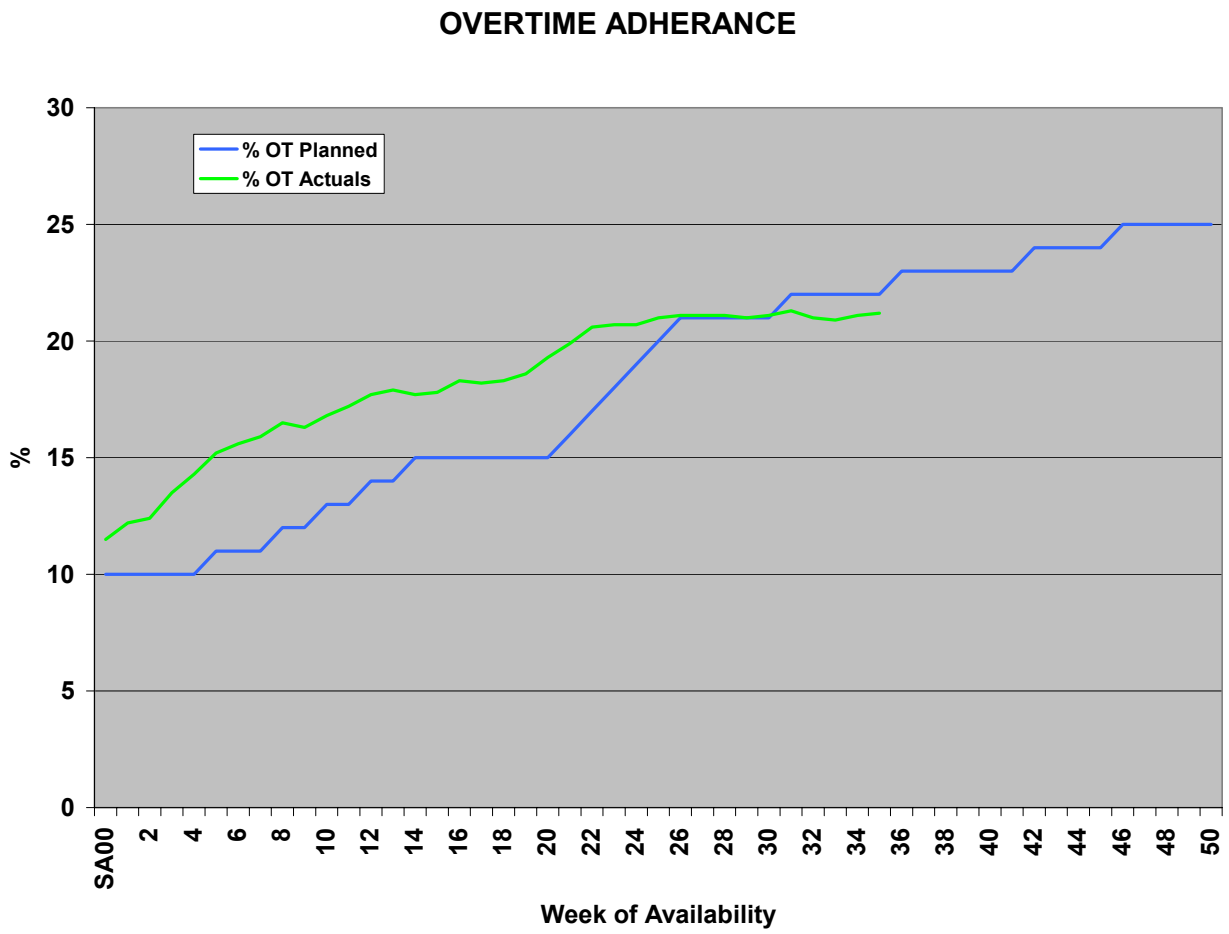


4. ENGINEERING SUPPORT





5. OVERTIME


OVERTIME ADHERANCE
% OT Planned
% OT Actuals
%
30
25
20
15
10
5
0
SA00
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
Week of Availability

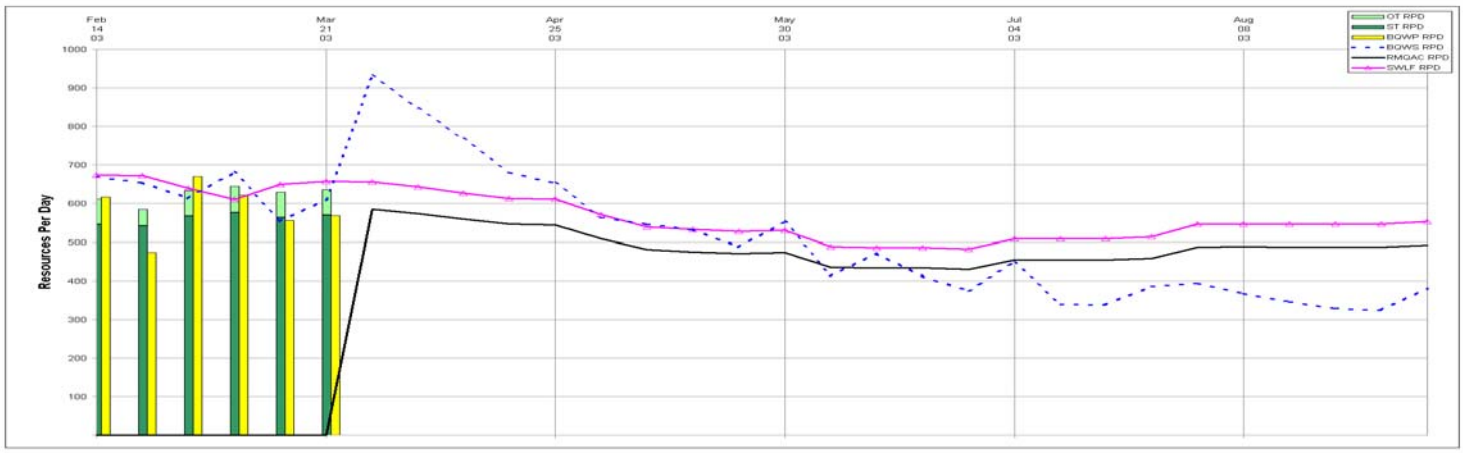
6. MANNING

Standard SPF Report WF-250 will be provided.

	CUR	LWK	VAR
FCST:	185158		
UDFCST:	182316		
ORIG:			
CFCST:	185493		
RM CFCST:	110952		
RM WORK:	99336	101700	-2364
ADJ:	173514	173035	479

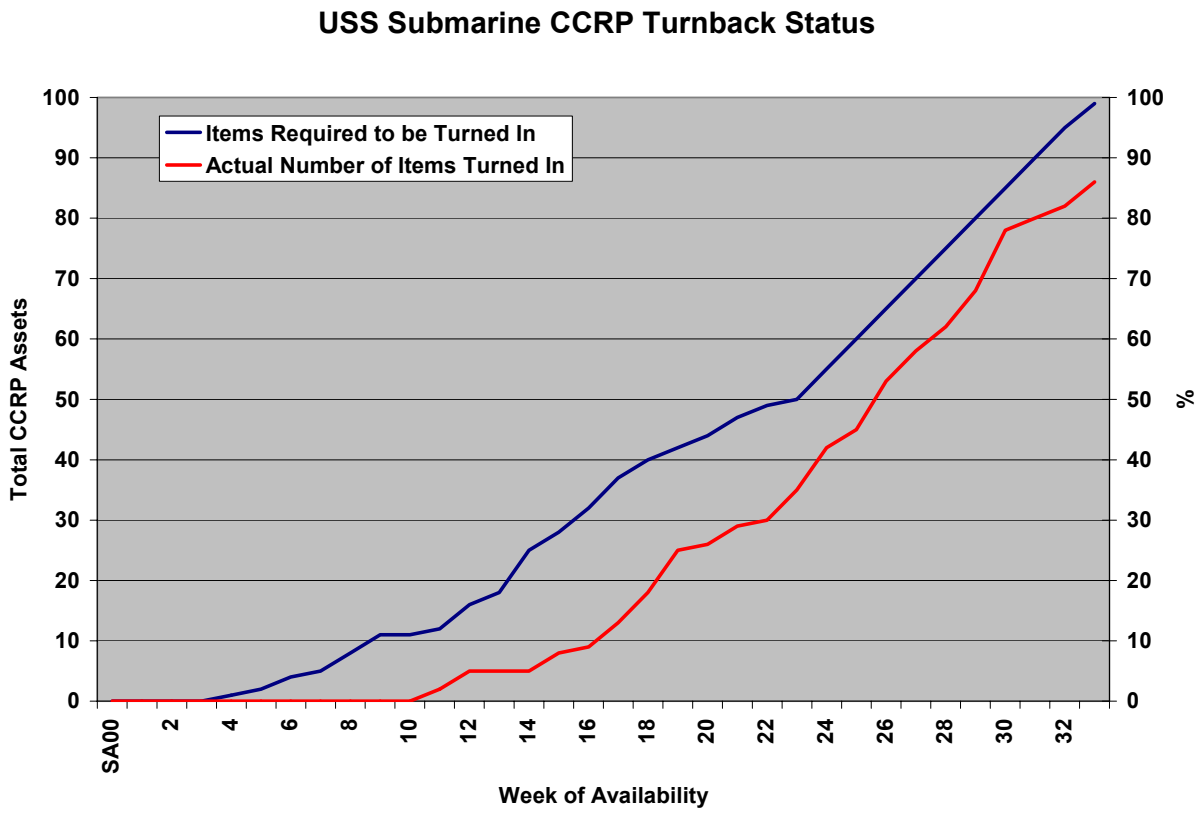
	CUR	LWK	VAR
ALLS:	173514	173035	479
EXCW:	43779	41938	1841
ALCW:	44708	42935	1774
PECW:	.98	.98	.00
PEOW:	1.04	1.04	.01
OT:	8386	8053	333
CUM OT%:	12.68	12.72	-.04

	CUR	LWK	VAR
QAC:	173514	173035	479
BQWS:	75123	72075	3048
BQWP:	74177	71335	2842
AQWP:	74542	71364	3178
SP:	1.01	1.01	1.07
CP:	1.00	1.00	1.12
%COM:	42.75	41.23	1.52



	Feb 14 03	Feb 21 03	Feb 28 03	Mar 07 03	Mar 14 03	Mar 21 03	Mar 28 03	Apr 04 03	Apr 11 03	Apr 18 03	Apr 25 03	May 02 03	May 09 03	May 16 03	May 23 03	May 30 03	Jun 06 03	Jun 13 03	Jun 20 03	Jun 27 03	Jul 04 03	Jul 11 03	Jul 18 03	Jul 25 03	Aug 01 03	Aug 08 03	Aug 15 03	Aug 22 03	Aug 29 03	Sep 05 03
SWLF	673	672	639	610	649	657	655	643	627	613	611	571	539	532	528	530	489	487	487	482	509	509	509	514	547	547	547	547	547	553
RM QAC							585	573	559	547	545	509	481	475	471	473	436	434	434	430	454	454	454	458	488	488	488	488	488	493
PROJ REQ	689	702	710	711	711	732	723																							
SHOP COM	665	676	678	673	672	645	655																							
BQWS	670	654	613	681	554	610	931	847	769	681	653	565	546	533	487	553	413	472	412	375	449	340	338	386	395	369	347	329	324	381
BQWP	617	473	670	621	555	568																								
AQWP	611	585	635	644	629	636																								
OT	66	43	68	67	66	67																								

7. MATERIAL


USS Submarine CCRP Turnback Status
Items Required to be Turned In
Actual Number of Items Turned In
Total CCRP Assets
%
Week of Availability
0
10
20
30
40
50
60
70
80
90
100
SA00
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32

APPENDIX G

Work Packaging
and Control Corporate Process

For SSN 688 Class Major Availabilities

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Part I

Introduction to Work Packaging and Control (WPC)

1. Purpose

The purpose of this process guide is to standardize WPC methods across Naval Shipyards in producing complete task packages to allow production personnel to efficiently execute first time quality work under the "fast start strategy" on SSN 688 class major availabilities (DMPs, EROs and EOHs). The "fast start" strategy includes a standardized methodical approach for each major Availability during the planning period in order to rapidly open job sites and increase production progress to greater than "straight line" undocking requirements within six (6) weeks of Availability start. Key elements of the fast start strategy which directly affect (or are achieved by) the WPC process are listed below and illustrated in Figure 1.

WPC Related Key Elements of the Fast Start Strategy

- A Resource Level Schedule (RLS) at A-2 months
- Prefab TGIs released to support completion of prefab at Availability start (A-0)
- Temporary service fab/stage TGIs released to support readiness at A-0
- 100% of all work TGIs, for known work, received at A-0
- Material required in the first 60 days after A-0 received and staged at A-0
- 100% TGIs required in the first 60 days assembled at A-0
- Approximately 60% of all TGIs assembled at A-0
- Work Authorization Forms (WAF)/System Transfer and associated tagouts required between A-0 and A+2 months, prepared, coverage checked, prioritized and ready at A-0
- System Transfers complete at approximately A+45 days
- System Status and Plant Conditions plan finalized by A-6

This guide will provide the methods required to implement the processes developed for Work Packaging and Control under the "fast start" strategy utilizing current AIM concepts and software. This guide is intended to be utilized in conjunction with the AIM Work Packaging and Control Desk Guide. Automated Data Processing (ADP) guidance, solutions and additional process description are provided in the AIM WPC Desk Guide as well as other AIM module desk guides.

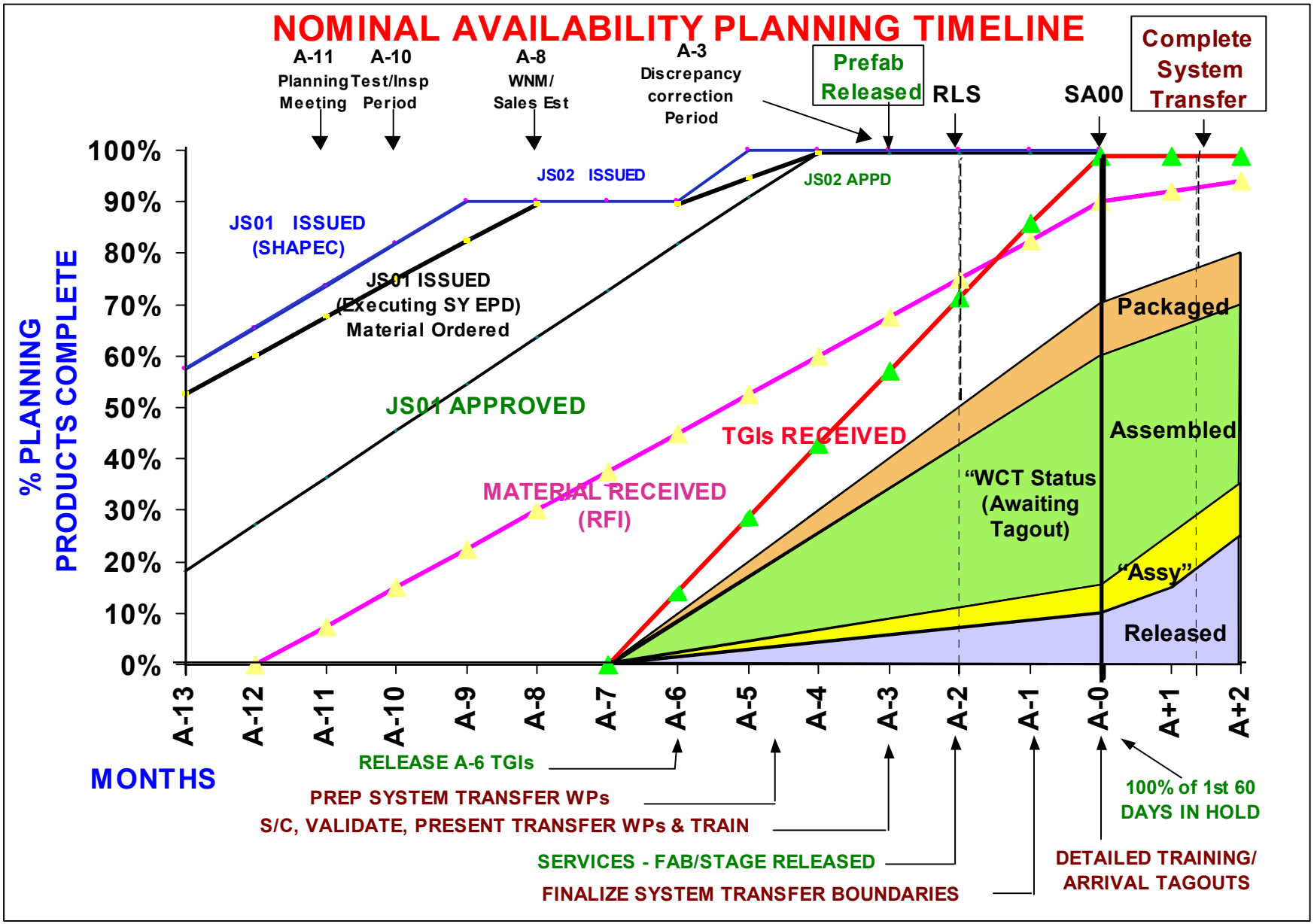


Figure 1. Nominal Availability Planning Timeline

2. Work Packaging Overview

The goal of WPC is to efficiently define, assemble, and release Task Packages to production which include the necessary technical information, instructions, funding, material, and work authorization for safe and efficient execution of work planned for an Availability. In addition, WPC must provide an equally efficient means to overcome non-labor resource problems, resolve technical and administrative deficiencies and schedule conflicts. WPC is also responsible for maintaining the necessary control and accountability required to identify and monitor outstanding work to support event certification. Based on these responsibilities, ***WPC is critical to the efficient execution of an Availability*** and must receive constant input from various areas of expertise including scheduling, engineering, planning, quality assurance, supply and production. In order to effectively integrate these diverse functions, four (4) primary sub-processes exist: (1) Task Packaging, (2) Work Control, (3) Material Management and (4) Problem Resolution. Figure 2 provides a high level overview of the WPC Process.

3. Work Packaging Process

As illustrated in Figure 2, WPC is a multi-faceted organization that is made up of four (4) primary sub-groups or processes. Normally, a Nuclear and Non-nuclear WPC leader/manager is assigned to the project team to oversee these sub-groups. Guidance is provided from the Project Team on execution issues, Project Engineering and Planning Manager (PEPM) on technical and material issues, the Chief Test Engineer (CTE) on work authorization issues and the Project Scheduler on sequence and schedule issues. The WPC leader shall have knowledge of the normal progression of work, the work authorization process and a working knowledge of all aspects of the WPC process. The following is a description of the four (4) primary sub-groups of WPC.

3.1 Task Packaging

The primary function of Task Packaging is to identify and group work which can be efficiently released and executed together based on the Task Packaging Strategy (TPS), assemble all necessary supporting information and work authorization, and to package and release in an organized fashion to execution personnel. Task Packaging is accomplished through three (3) main sub-processes:

- Task Package Development
- Task Package Assembly
- Task Package Release

A Task Package typically consists of one or more Technical Work Documents (TWDs), required references, Work Authorization Forms (WAF), Material Kit location and other applicable documents (RECs, QA Forms, etc.) grouped in a logical manner by system, zone, phase, trade skill, plant conditions, etc. The scope of the work for the Task Package including the technical instructions is contained in the TWD (TGI, Short Form TGI, DR).

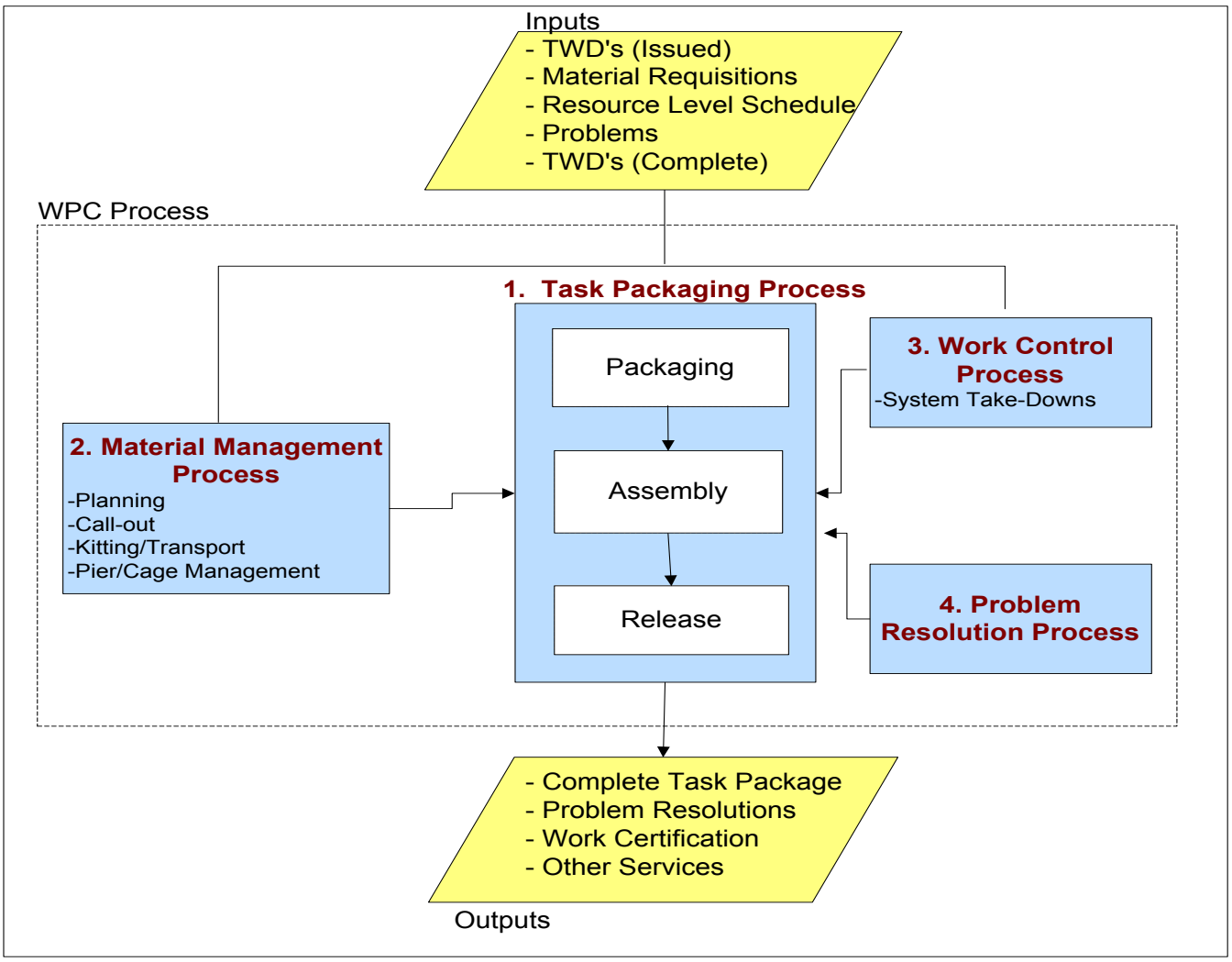


Figure 2. Work Packaging and Control High Level Process Diagram

Completed TWDs and any associated DLs are returned to Work Packaging from Execution supervisors. Work Packaging is responsible for ensuring that the required level of review is accomplished by the appropriate personnel and the TWD is complete and certified. The level of review for the TWD certification and the performing organization of that review is determined by the type of work and applicable NAVSEA and Shipyard requirements. Work Packaging also maintains completion/certification status in Document Tracking and is the primary source of work document status in preparation for Key Event and Test readiness. Work Packagers must be trained and qualified to receive the necessary access roles in AIM as outlined in the AIM WPC desk guide in order to accomplish the electronic portion of packaging. Packagers should also have a general knowledge of work progression on the waterfront and work authorization requirements. Packagers must work closely with other groups within WPC as well as Zone Managers, Production Supervisors, Test and Scheduling personnel to ensure packages are thorough, complete, and daily schedule demands are met.

3.2 Material Management

Material management is a key aspect of WPC in providing "one-stop shopping" for the mechanic in obtaining all required material to accomplish assigned work on time and in an efficient manner. Effective material management is accomplished through four (4) main sub-processes:

- *Material Planning* is the process of filtering material requisitions as they are originated and comparing them to required delivery dates to meet the schedule, prioritizing long lead time or critical material for delivery to meet the schedule and resolving JML technical problems.
- *Material call-out* is accomplished by WPC and is the process of statusing material, specifying what material to kit and scheduling delivery through the Zone Manager.
- *Material Kitting and Transport* receives kit requests from WPC, assembles subject material and ships to the designated locations.
- *Pier/Cage Management* process receives material kits for final delivery to the mechanic, adds required consumable/expendable trade specific items and coordinates the movement of material on/off the pier.

3.3 Work Control

Tagout/Work Control personnel are responsible for the work authorization portion of the packaging process. Normally, ships force personnel are also assigned to this sub-group (as part of the Management Information Center, MIC) to assist in preparation and authorization of Tagouts and Work Authorization Forms (WAF). Work packagers must consult with work control personnel on a regular basis to ensure work intended to be packaged together can be authorized together based on system configuration, temporary service isolations, testing considerations, and System Status and Plant Conditions Plan. Work Control personnel must ensure that System Transfer tagout boundaries are initially established broad enough to encompass as much of the overall planned work as feasible (based on available Job Summary information) in order to minimize the number of Work Authorization Forms (WAF) required.

3.4 Problem Resolution

During execution, problems are directed to the Trouble Desk verbally or via the combination Deficiency Log (DL)/Deficiency Report (DR) form for screening, prioritization, and assignment to expedite the problem resolution process. DLs are used to document the resolution of problems which affect the technical content, certification or lessons learned within the scope of the TWD. DRs are used to identify deficiencies outside the scope of the TWD and will usually require customer authorization via the BSPO as new work. Some problems submitted on the DL/DR form involve general shop information and do not affect any of the above and are therefore not formally documented. This category does not require consideration during certification of the TWD. The Trouble Desk tracks problem resolutions in the Problem Log maintained on Local Area Network (LAN) shared drives so that project personnel can access the files to determine status of a problem at any time.

Trouble Desk is made up of multi-discipline engineers, technicians and planners (based on Availability work package scope) as assigned by the applicable Engineering and Planning Department. The function of the Trouble Desk is to resolve project generated deficiencies (technical, material, administrative) as well as to provide technical evaluations and reviews as required in a timely manner. Trouble Desk also develops New Work planning products as authorized during the Availability but with the option to "farm out" major jobs back to the cognizant Engineering Department technical codes for development depending on workload and expertise requirements. Trouble Desk personnel must be qualified to receive AIM access roles based on the AIM PPM and JPL Desk Guides.

4. WPC Startup

WPC will be manned and capable of startup in accordance with Project Management Plan (PMP) Strategies. Generally, the core WPC team from one Availability will be rolled to the next Availability with some overlap to package prefab and services while completing the previous Availability. The WPC startup plan falls under the cognizance of the PEPM and shall be developed as part of the PMP and defined with regard to the planning schedule in the Project Planning Time Table (PPTT) with specific attention given to the establishment of plant conditions, packaging and issuance of prefab work, System Transfer and temporary services. The WPC leader/manager should be assigned early enough in the planning stages to participate in the PMP development concerning the WPC startup plan and the Project Task Packaging Strategy.

4.1 Manning

The number of personnel required in WPC will vary throughout the different phases of the Availability. Consideration to budget must be given with respect to NAVSEA guidelines regarding direct service bench marks as outlined in NAVSEA letter serial 072-206 dated 1 Dec 1997 (or latest revision). The time at which WPC personnel are assigned to the project will also vary depending on the type of availability and type of work planned. Figure 3 illustrates the functional make-up of a typical WPC Team. Enclosure (1) provides a baseline WPC manning profile based on these functional areas, rolled up to the current applicable NAVSEA direct service bench marks.

Work Packaging and Control (WPC)			
PACKAGING (WPC Leader)	**MATERIAL (WPC Leader)**	**WORK CONTROL (CTE)**	**TROUBLE DESK (PEPM)**
- Packagers - Document Tracking - QA/Certification	**- Callout - Expediting - Kitting - Pier/Cage Attendent - Material Transport**	**- Ships Force Reps - STEs and STDs (C-2340 and 246)**	**- TD Manager - Engineers/Techs - Cognizant Engineers - Planner Support**

Figure 3. Functional Make-up of a Typical WPC Team

4.2 Initial Products

The major products required to enable WPC to commence (illustrated in Figure 1) include approved Job Summaries and CU phases, the Project Management Plan (PMP) with finalized Packaging Strategy, received TGIs and corresponding material. For example, initial TGIs required at WPC startup include prefabrication, assemble and stage phases for pre-arrival work and temporary service hookup followed by 100% of the first 60 days of TGIs based on the RLS. Other less visible aspects of WPC such as ordering reference packages (Card Decks, SSCBs, JIDs, SRDs, etc.) and arrangement for computers, card readers, printers, and copiers, etc. shall be tracked in the PPTT to ensure efficient and successful performance of the WPC process.

4.3 WPC Reference System

A reference system and area known as the Technical Information Center (TIC) shall be established by the WPC Manager with assistance from the PEPM. The TIC should have hard copies and/or electronic access/printing capability of drawings, Technical Manuals, Standards, etc. The Technical Information Center will be equipped with the required hardware, software and computer hook-ups needed to access the different drawing and Technical Manual databases. The TIC should initially be populated with those references identified through the Job Summary and TGI writing process. The TIC should include the following:

(1) Efficient access to as-built or other secondary reference drawings as well as printing capability. Specifically, JEDMICS and ATIS software with a large format printer with access to the JEDMICS drawing database at Portsmouth Naval Shipyard (PNSY). Direct access to this database is vital since aperture cards are no longer issued for SSN 688 class ships per NAVSEA memo 392A42/545 dated 8 Sept 98.

(2) Management and access to the Technical Variance Drawings (TVDs).

(3) DODISS access. This database has all the Military specifications, standards, drawings, handbooks, QPLs, as well as the Federal Specifications, Standards and Drawings.

(4) Naval Ships Technical Manuals (NSTM) access via CD.

(5) Hard copies (approximately six (6) copies to start with) of all ship alteration drawings for initial support of Task packaging and the references identified during the Job Summary and TGI development processes.

4.4 Ship's Force Integration

In order for WPC to operate efficiently, Ships Force participation is required as follows:

- Liaison for Ships Force training on WPC/Tagout processes.
- Routing Work Authorization Forms (WAF) and Tagouts to appropriate divisions for processing (Work Control).
- Packaging/statusing of Ships Force work that is integrated in the Resource Leveled Schedule.
- Providing interface in accomplishing OQE/Document control requirements.

In addition, participation/collocation in the WPC process provides Ships Force personnel required information on a regular basis such as:

- Informational as well as official copies of work and test documents.
- Access to the Technical Information Center (TIC) to support S/F work.
- Access to shipyard instructions/processes governing the Availability.
- Scheduling and critical path work information

Integration of Ships Force is facilitated through execution of the Management Information Center (MIC) process. The purpose of the MIC is to provide a continuous interface between Ships Force and the project through collocation of MIC personnel within the applicable functional areas of WPC. The Submarine Shipyard Availability Manual (SSAM), volume II, section 300 provides additional specific requirements, duties and responsibilities of the MIC.

5. Selected Definitions:

Packaging - the activities involved with determining how to group CU Phases within a Task Package utilizing the project specific Task Packaging Strategy and the Resource Leveled Schedule. This is primarily accomplished by electronically assigning approved CU Phases within the AIM database to a specific Task Package and can be accomplished prior to actual TGI receipt.

"Packaged" (PKG) Status - indicates the previously approved CU Phase has been electronically assigned to a Task Package consisting of one or more CU Phases.

Assembly - the activity that takes a Task Package created under the "packaging" concept defined above and verifies that the TGIs for the Component Unit (CU) Phases in the Task Package are received and all other prerequisites are on track for completion in support of Task Package release.

"Awaiting Material" (MAT) Status - indicates all conditions (i.e., technical instructions, work control, references, etc.) have been met to release the Task Package with the exception of all material being RFI. (NSSG action is required to add this status to database.)

"Awaiting Work Control/Tagout" (WCT) Status - indicates all conditions (i.e., technical instructions, material, references, etc.) have been met to release the Task Package with the exception of work control authorization. (NSSG action is required to add this status to database.)

> *Note - The two (2) additional statuses of MAT and WCT listed above have been requested in the WPC module to status TGIs with material and work control deficiencies respectfully. During the interim, "Hold" may be utilized to indicate TGIs awaiting work control conditions to be met.*

"Assembled" (ASY) Status - indicates all conditions have been met and the package can be released as the Resource Leveled Schedule (RLS) dictates.

Release - the activity that takes an assembled package, re-verifies the completion of all conditions for the execution of the package arranges actual material kit delivery and releases it to the executing Zone Manager based on the scheduled start date.

"Released" (REL) Status - indicates a CU Phase is part of a Task Package for which all conditions have been met and is released to execution to commence work.

> *Note - Phase will remain in "Released" status until the first labor charge is made at which time the status within the database will automatically be updated to "Working" status.*

Issued Job Summary - describes a Job Summary that is provided to the Project Team for review with all references identified, material identified and ordered (i.e., document numbers listed) with a complete description of work to be accomplished.

Approved Job Summary - describes Job Summaries which have been reviewed by the project, comments incorporated, material ordered and identified to the correct end-use CU Phase and final approved (bought into) by the project team including technical sequencing. All CU Phases within an approved Job Summary are in approved status which supports the "packaging" process described above.

Received TGI - describes a TGI which is complete (including all concurrence) from a preparation standpoint and has been electronically received by WPC or hard copy provided to WPC to support the assembly process described above.

Availability Start Date - CNO scheduled Availability start date.

Early Start Date - Point at which the operational schedule permits work (installation of services, processing tagouts/Work Authorization Forms (WAF), starting production work, etc.)

Technical Work Document (TWD) - a document prepared/approved by appropriate technical authority. TWDs include TGIs and Short Forms (and any associated DLs) and Deficiency Reports (DRs).

Task Group Instruction (TGI) - the work instruction issued to production personnel as part of the task package when more detailed instructions are required for complex repairs, data recording or for other work requiring expanded technical instructions.

Short Form TGI - the work instruction issued to production personnel as part of the task package when instructions contained within the CU Phase description are sufficient to describe the work (i.e. invoke Ship Alteration plans, lagging removal/reinstallation, etc.)

Work Authorization Form (WAF) - a form used to effect system tagout, obtain required concurrence and authorize work to commence as specified in the applicable TWD. (Equivalent to the Ship's Force Work Authorizations Form (WAF).)

TWD Record Sheet (Non-nuclear) (A-Sheet) - accompanies the Work Authorization Form (WAF) and is used to list all TWDs covered by that WP and its associated tag-out and the status thereof.

System Transfer Process - System Transfer consists of two (2) parts: System Turnover and System Turnback. System Turnover (sometimes referred to as System Take-down) is defined as the process of depressurizing, draining, de-energizing, tagging out and transferring operational and tag-out control of a non-nuclear system to the shipyard to facilitate authorized work and testing. System Turnback is the process of verifying work and testing is complete to the extent necessary to return system tagout and operational control back to ships force sufficiently in advance of Key Events. A System Transfer Work Authorization Form (WAF) is used to identify the boundaries and effect this process. There are approximately 60 standard System Transfers executed on a major SSN 688 class Availability.

Work Control Group (WCG) - That organization in the Shipyard that acts as the liaison concerning system status and tag-out between the Shipyard and Ship's Force to effect the proposal of system status/tag-outs.

Technical Information Center (TIC) - A reference system and area established by the WPC Manager that provides hard copies and/or electronic access/printing capability of drawings, Technical Manuals, Standards, etc. The TIC will be equipped with the required hardware, software and computer hook-ups needed to access the different drawing and Technical Manual databases.

Management Information Center (MIC) - the MIC is manned by Ships Force personnel assigned approximately two (2) weeks prior to ship arrival and serves as the central point of contact between the ship and shipyard for all work related issues. The MIC is intended to be an instrument to expedite information exchange, the status of maintenance and the processing of Work Authorization Forms (WAF) during the Availability.

Part II

Work Packaging and Control Process Description

1. Task Packaging

1.1 Task Packaging Overview

The primary function of Task Packaging is to identify and group work which can be efficiently released and executed together based on the packaging strategy, assemble all necessary supporting information, documentation, material and work authorization, and to package and release such information in an organized fashion to execution personnel. A Task Package typically consists of one or more Technical Work Documents (TWDs), required references, Work Authorization Form (WAF) and other applicable documents (RECs, Mechanical Joint records, etc.) and Material Kit location grouped in a logical manner by system, zone, phase, trade skill, etc. Packagers should work closely with other groups within WPC (as well as Zone Managers, Resource Shop Supervisors, Test and Scheduling personnel, etc.) to ensure packages are thorough, complete, and daily schedule demands are met.

Task Packaging uses the concept of controlled release of work based on the Project Resource Leveled Schedule (RLS) produced at A-2 months (see Figure 1) and the project specific Task Packaging Strategy defined in the PMP. The actual package development/grouping of work is accomplished electronically within the AIM database using a logical strategy. The packaging process includes the assembly of all necessary information, including references, documentation, material, and authorization in an organized fashion. The Packaging process also includes the controlled release of the task packages per the production schedule and PMP. These individual steps are illustrated in Figure 4.

Task Packaging High Level Diagram

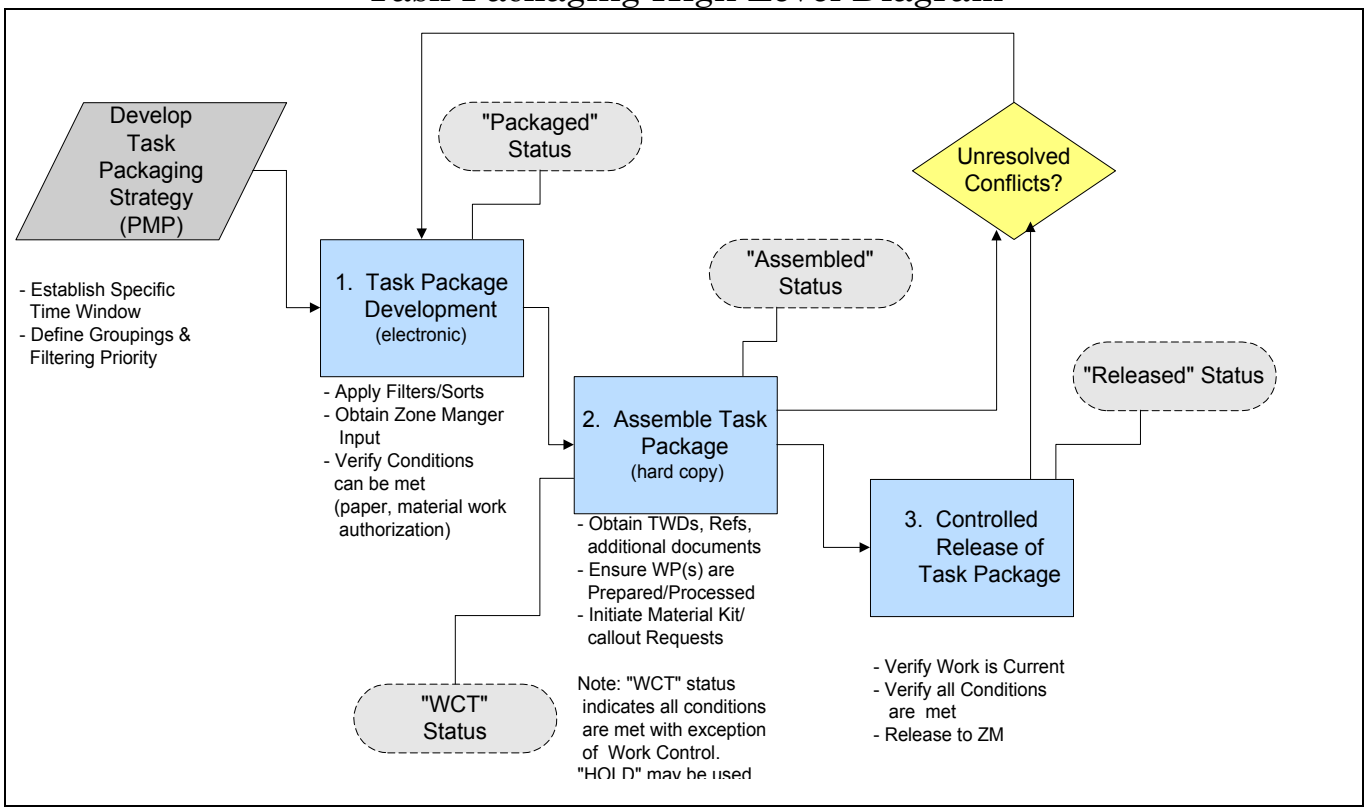


Figure 4. Task Package Development, Assembly and Release High Level Diagram

1.2 Task Packaging Description

1.2.1 Task Packaging Strategy

Task Packaging Strategy is schedule driven and is the "game plan" WPC follows for selecting, grouping and packaging work to allow efficient release and execution. The WPC manager/leader should develop and include in the PMP the project specific packaging strategy with input from the project team, as well as lessons learned from other availabilities. The Task Packaging Strategy should indicate the time frame and preferred priority for grouping work understanding that it is a general guideline for WPC and can be modified as necessary to meet the project schedule while staying within the guidelines of the PMP.

1.2.2 Task Package Development

Package development is primarily electronic during this step. CU Phases are selected from the database, efficiencies identified, and Task Package contents established. Identifying efficiencies is the key factor in Task Package development. Efficiencies refer to those CU Phases with similar attributes that, when combined in one package, provide a means of performing work more economically.

1.2.2.1 Packaging begins with review of the Task Packaging Strategy in order to determine specific direction for identifying sort/selection criteria, identification/handling of critical path work, and definition of the time frame to work within.

1.2.2.2 Secondly, obtain the specific Time Window and apply the primary and secondary sort criteria as established by the Task Package Strategy by using the Query & Package Screen in the WPC main menu in AIM. Perform additional what-if scenarios to determine if other efficiencies can be identified. Venture outside the Task Package Strategy in order to apply trade knowledge of the job and work progression requirements when applicable. Consider Work Authorization Form (WAF), System Take-Down and Test boundaries when determining package groupings. Resolve predecessor and successor conflicts with the CTE, Zone Manager and project scheduler to ensure problems with overlapping work will not occur. After completion of CU Phase grouping, the initial Task Package Report is developed.

1.2.2.3 The final step in the process is the determination of work authorization status and zone manager preference for accomplishing work. Work Control shall review proposed package contents to determine if conflicts exist among work authorization requirements (Work Authorization Forms (WAF), Tagouts, SPOD, NPOD, DPS, etc.) in accordance with current applicable shipyard instructions and initiate Work Authorization Forms (WAF) and tagouts based on Job Summary level information when possible. In addition, TWD issue from JPL and reference Availability shall be verified to support the established time frame and problems resolved through the PEPM. The cognizant Zone Manager shall review and approve package contents from an execution standpoint. CU Phases with problems resulting from the above reviews that cannot be resolved within the established time frame shall be repackaged and schedule conflicts resolved in order not to delay release of the remaining contents of the now *modified* Task Package. The individual TWDs which formulate the Task Package should now be placed in the "packaged" status in the AIM database by the packager. Figure 5 illustrates the “Packaging” process.

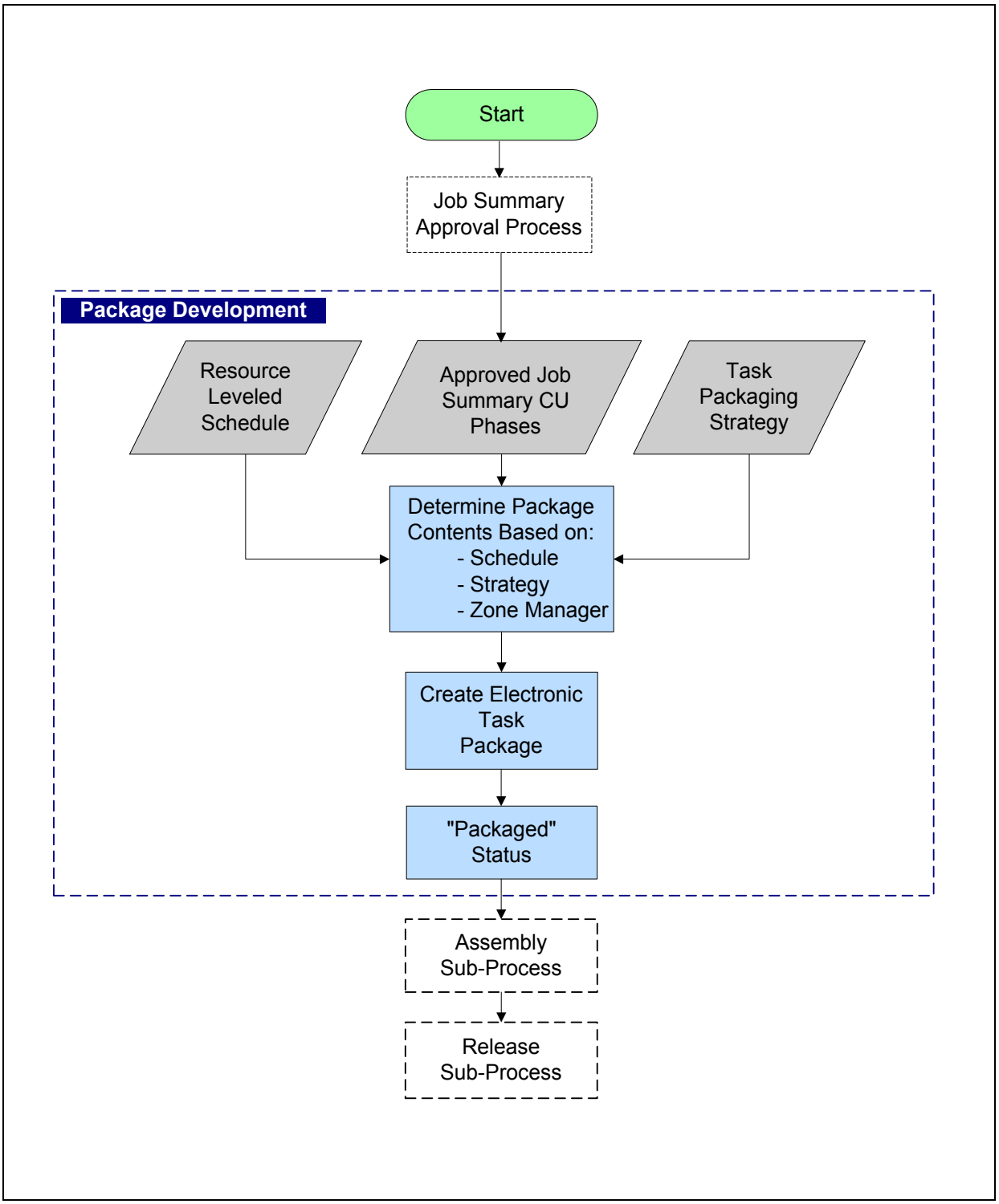


Figure 5. Package Development Sub-Process Flowchart

1.2.3 Task Package Assembly

Assembly of the Task Package produces a complete package of TWDs with supporting documentation and work authorization forms. A "Package Assembly and Release Checklist" is a tool that can be used by the packagers as a means to ensure all prerequisites during the assembly and release process are met. Assembly of the Task Package consists of five functions the package will go through in order to become assembled and ready for release. These functions are Document Control, reference acquisition, Material kitting, Work controls and other documentation. Each of these areas must be checked and performed as applicable to the Task Package prior to release as illustrated in Figure 6 and described as follows:

1.2.3.1 Document Control Functions

When a TGI is required, WPC cannot assemble and package until the TGI has been approved and is in "Received" status in the AIM database. For TGIs created outside TGI Builder, WPC updates the status of the TGI to "received" once written and approved. The work packager also creates the Official TGI and ensures that all the pages are present and it is the latest change.

1.2.3.1.1 - Work Packaging is also responsible for input and status update of project documents (i.e., Work Authorization Forms (WAF), RECs, DRs, etc.) as determined by project specific guidelines. There are numerous different documents that can be tracked for a Project in the AIM database; however, the primary documents requiring tracking to support Event Readiness are Discrepancy Reports (DRs), Work Authorization Forms (WAF) (WPs) and Re-entry Control Forms (RECs). Each project must determine which documents will be utilized and tracked within the database depending on the Availability type and project. Work Packaging is also the central processing point for all "Official Working Copy" TWDs and associated DLs from execution whether partially worked or completed.

1.2.3.1.2 - TGI changes (including Pen and Ink changes authorized by DL resolutions) will be incorporated into the "OFFICIAL" copy. If the change revises drawings, QA information, work authorization, or isolation, then WPC will route the TGI to incorporate all changes required by the revision. The previous revision of the TGI that contains signatures or data will be retained with the new revision. Signatures on work steps that haven't changed do not require re-accomplished in the revised TGI. Non-controlled copies of TGIs (which are any TGIs not stamped "OFFICIAL") can be provided at the Zone Manager or Shop request.

1.2.3.2 References

References required to accompany the TWD in order for production to execute the work within a CU Phase should be marked “Y” under “Copy Req’d”. Other references such as Technical Manuals which may be required for trouble shooting or standard process instructions for work methods should be marked as “N” under “Copy Req’d”. WPC is required to obtain and package all “Y” references with the TWD upon final release. “N” designated references will only be obtained when identified necessary by production personnel executing the work.

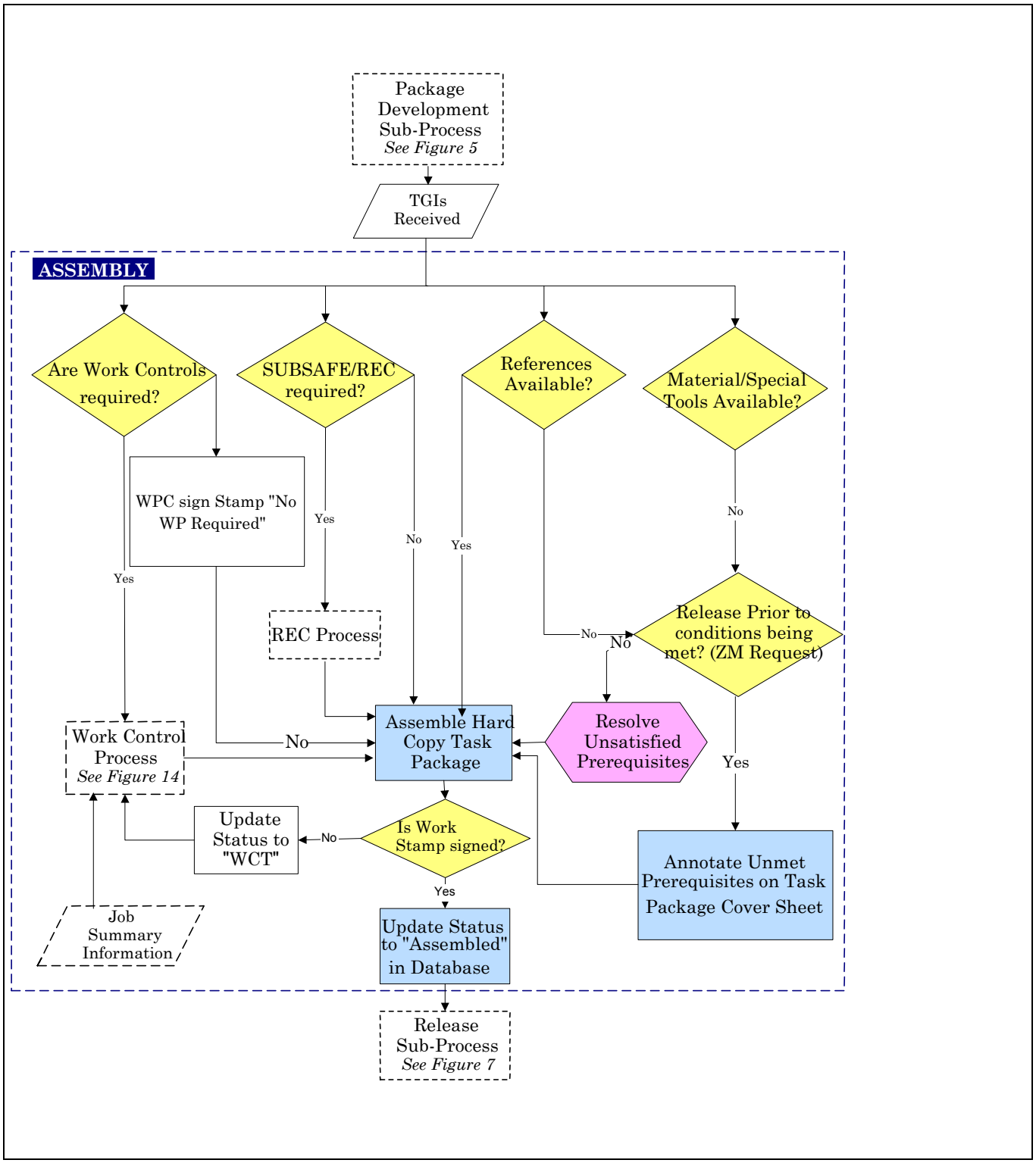


Figure 6. Package Assembly Sub-Process Flowchart

1.2.3.2.1 - For Technical Manuals or other references which are limited in number and must be "checked out" (documents requiring change control), the following options (in order of preference) should be followed:

(1) Include the specific instructions in the TWD and list as an "N" reference.

(2) List as a "Y" reference and refer the reader to the specific page or sections which will be required within the text of the TWD. Forward a copy of those specific pages/sections to WPC via the PEPM for efficient packaging.

(3) List as a "Y" reference and indicate in the text of the TWD that the entire reference will be required. Make provisions through the PEPM to have a reproduction of the manual made and provided to WPC. (This should be the exception.)

Questions regarding reference requirements can be resolved outside the DL process via the PEPM/Trouble Desk.

1.2.3.3 Material Management

See Section II.2.

1.2.3.4 Work Controls

See Section II.3

1.2.3.5 Other Documents

Other Documents consist of other required documentation other than the TGI. Examples include REC forms, Weld Records, Mechanical Joint Records and Material History. These are all the forms that are needed in addition to the TGI to either provide additional documentation or to provide Objective Quality Evidence that the job was performed correctly. In some cases WPC initiates these documents, in others the documents are provided to WPC from another organization. Regardless of how they are generated, WPC is responsible for input and status update of project documents (e.g., RECs, DRs, etc.) as determined by the PMP. Each project should determine which documents need to be used and tracked within the database. WPC must ensure that the Documents are identified to the CU Phase that they support and that have the correct status.

> *Note: Each shipyard has varying local requirements for different forms and corresponding processes regarding additional documentation. These additional OQE requirements should be clearly identified (including process flowcharts for the same) in the project specific PMP.*

1.2.4 Task Package Release

Package release is triggered by the timeframe established in the Packaging Strategy. Release of work should be controlled in order to prevent unauthorized work from starting or authorized work from being performed in the incorrect order which could result in "deck plate" problems and schedule conflicts.

1.2.4.1 - Prior to releasing, the work packager ensures (through verification of the Task Package Check List) that the package has all required documents and is complete and ready for the mechanic to go to work. The following is a brief checklist of some attributes that are checked prior to releasing work.

(1) Material and special tool requirements staged/resolved

(2) Proper work authorization (WP, NPOD, SPOD, etc.)

(3) Latest change or version of TWD included/verified in AIM

(4) All additional documents included/correctly mapped (RECs, etc.)

(5) Released TGIs are stamped “OFFICIAL”.

Update the status of the package to "released" in the AIM database. Ensure the file copy of all TWDs within the package is updated to reflect the official working copy. Maintain a copy of the package cover sheet marked up during the assembly process for future reference.

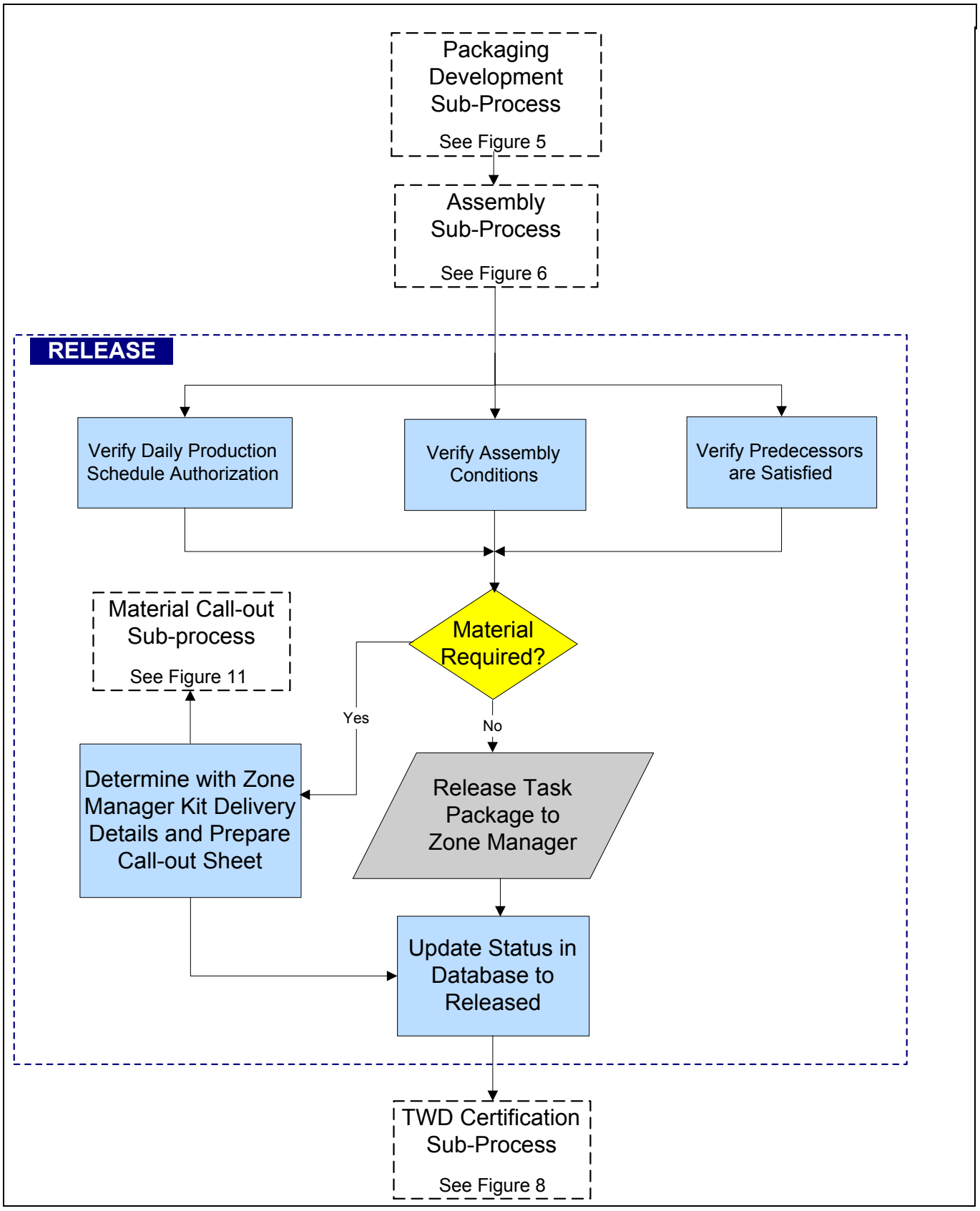


Figure 7. Package Release Sub-Process Flowchart

1.2.5 TWD Certification

After receipt of a completed “Official Working Copy” TWD and any associated DLs from execution, Work Packaging will update the status to "complete" in AIM based on the "Completion of Work Review" signature made by cognizant execution supervisor/work leader on the cover sheet. The TWD then will have a certification review accomplished by the applicable organization. Following the certification review, modify the status in the AIM database from "complete" to "certified". For DRs, modify status in the AIM database from "OPEN" to "CLOSED" (when using the Project DR Log, indicate “certified” adjacent to the appropriate DR line item). File the completed TWD and associated DLs in the projects completed TWD repository.

1.2.5.1 Initial WPC Review

The “Official” TWD and all associated DLs are turned into WPC after the Acceptance of Completed Work signature by the Shop Supervisor. WPC personnel will conduct the following initial review of the TGI.

(1) Determine if a physical inspection is based on the TWD cover sheet required and/or an independent QA review is required. Route the TWD as required after completion of the initial WPC review.

(2) Ensure the "latest change" block (for TGIs) is correct as designated in the AIM database and review the "List of Effective Pages" to ensure all required sheets are included. All Deficiency Logs (DLs) initiated against the package should be properly annotated on the Cover Sheet and included in the TWD. Verify all DLs are properly annotated by reviewing the Trouble Desk Problem Log as a second check.

(3) Verify all required data is entered and within the criteria specified and all signature requirements are met throughout the TWD, associated DLs and any other document or attachments as specified on the "List of Effective Pages". If any of the above items are incomplete or unsatisfactory, return subject TWD to the cognizant Zone manager for correction which also may require Trouble Desk guidance.

(4) Forward TWD or copy of TWD cover sheet to Non-nuclear Work Control for clearance of Work Authorization Form (WAF)/Line items.

1.2.5.2 - Work containing (I)/(V) requirements or SUBSAFE attributes. TWDs (which includes DRs) and all associated DLs containing Inspection (I) and/or Verification (V) requirements per Quality Program Manual (NAVSEA TL855-AA-STD-010) and/or SUBSAFE attributes is to be certified by Code 130 personnel in accordance with current Code 130 guidelines.

1.2.5.3 *Naval Nuclear Work* - Naval Nuclear work will be certified by Code 139 in accordance with NAVSEA and Shipyard instructions. Once the TGI is certified, Code 139 will sign the Work Authorization Form (WAF) complete and route it to Code 2340 for closure.

1.2.5.4 - NEPD cognizant work handled by EPD. TWDs and all associated DLs defined as Nuclear Engineering and Planning Department (NEPD) cognizant will be certified in accordance with project specific agreement for NEPD cognizant work handled by the Engineering and Planning Department (EPD). (Normally Nuclear cognizant work is funded under a Nuclear COAR and is written, scheduled, packaged, and certified by Nuclear Job Planning and Work Packaging guidelines.)

1.2.5.5 - *Other Work*. All other TWDs may be certified by assigned WPC personnel in accordance with Shipyard and Project instructions. On non-I&V type TGIs that require data to be recorded (such as those requiring URO/MRC data to be reported to NAVSEA), Trouble Desk engineers/technicians will assist in the technical certification to ensure criteria is met.

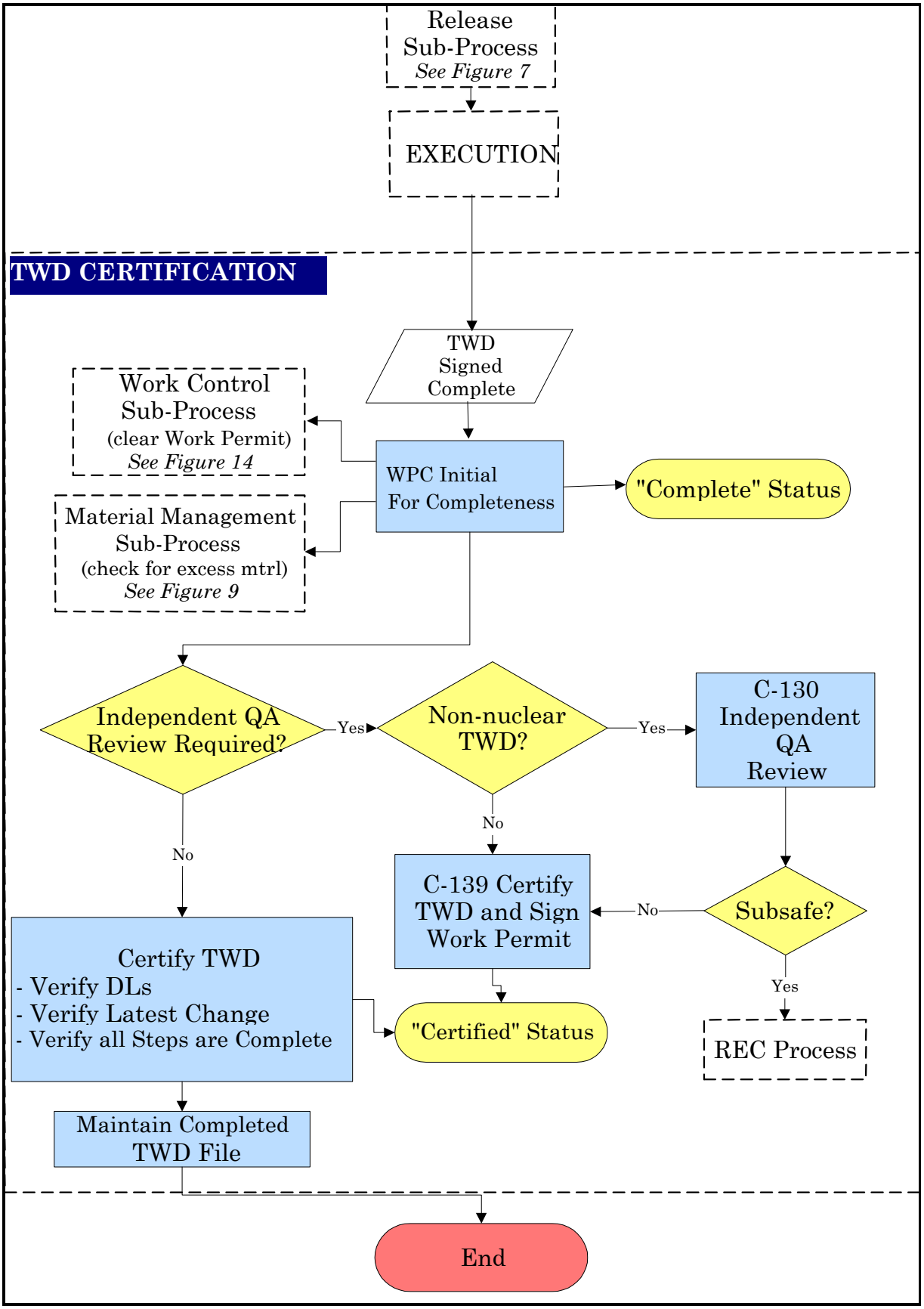


Figure 8. TWD Certification Sub-Process Flowchart

1.3 Task Packaging Metrics

Executive level and project detail level metrics are required to be established to track performance of WPC during both the planning and execution phases. This information becomes critical in early identification of performance problems as well as providing vital feedback for other projects across shipyards to determine best practices and validate lessons learned. Project specific detail metrics should be developed and tracked by the WPC Leader using the Nominal Planning Timeline to ensure packaging is on track for achieving a "fast start." Metrics should include tracking the following (as a minimum) on a monthly basis. Enclosure (2) provides an example.

- (1) Total Number of Short/Long Form non-test TGIs to-date
- (2) Number Received to-date
- (3) Number in "Packaged" status
- (4) Number in "Hold" status (awaiting work control authorization)
- (5) Number in "Assembled" status
- (6) Number in "Released" status
- (7) Number in "Working", "Complete" and "Certified" status

1.4 Prefabrication Work

Prefabrication is defined as shop work (manufacture of components, systems or portions of systems) which may be accomplished prior to ship arrival to support the project execution strategies. This work shall be identified in "fabrication", (F) phases to allow efficient segregation from other shipboard or shop work. Timely completion of prefabrication work is a key element in achieving a successful "Fast Start" as illustrated in the Nominal Planning Timeline. The baseline strategy for managing prefab work consists of the following key elements.

1.4.1 Identification

Work containing significant potential prefabrication shall be scoped by Production and Engineering prior to initial Job Summary issue to identify and logically group work in "F" phases. Identification of the majority of prefab work should be complete in the A-15 to A-7. Through upfront identification, the prefab (F) phases can be prioritized and accelerated through the Job Summary approval and TWD issue processes ahead of other shipboard and shop work. Prefab material can also be expedited independent of shipboard material.

1.4.2 Tracking

Once identified by the project team, WPC should maintain a list of all prefab work and material and associated status. WPC will track and progress prefab work through Job Summary approval, TWD issue, packaging and assembly and final release to production. Weekly status of all prefab work should be reviewed by project management personnel to ensure the "fast start" constraint for releasing all known prefab by A-3 months is achieved. WPC will release each prefab Task Package to the cognizant prefab Zone Manager or inside shop coordinator with scheduled completion dates clearly annotated.

1.4.3 Scheduling

A prefabrication schedule shall be established by A-4 (in conjunction with 90% of all Job Summaries and CU phases being approved) based on prefab work identified. The final schedule completion dates should be in agreement with project strategy and inside shop current work load, resources and other commitments.

1.4.4 Execution

A Zone Manager should be assigned to track, progress and manage prefab work once released. The assigned zone manager is responsible to ensure accurate progress is maintained problems elevated and overall schedule is achieved.

2. Material Management

2.1 Material Management Overview

The Material Management process manages material from the time of requisition by the engineering and planning department until delivery to execution for a given project. This process also provides for movement/storage of ripout material, consumable/pre-expended type material, kitting and pier support and is responsible for the final disposition of excess material at time of Job closure. The Project Team must determine the level of manning/funding and the overall project specific material management plan (to be included as part of the Project Management Plan, PMP) as appropriate according to the Availability type, size, duration, project facility and within the NAVSEA benchmark for direct services. Figure 9 defines the four (4) sub-groups which make up the material handling and the major functions performed.

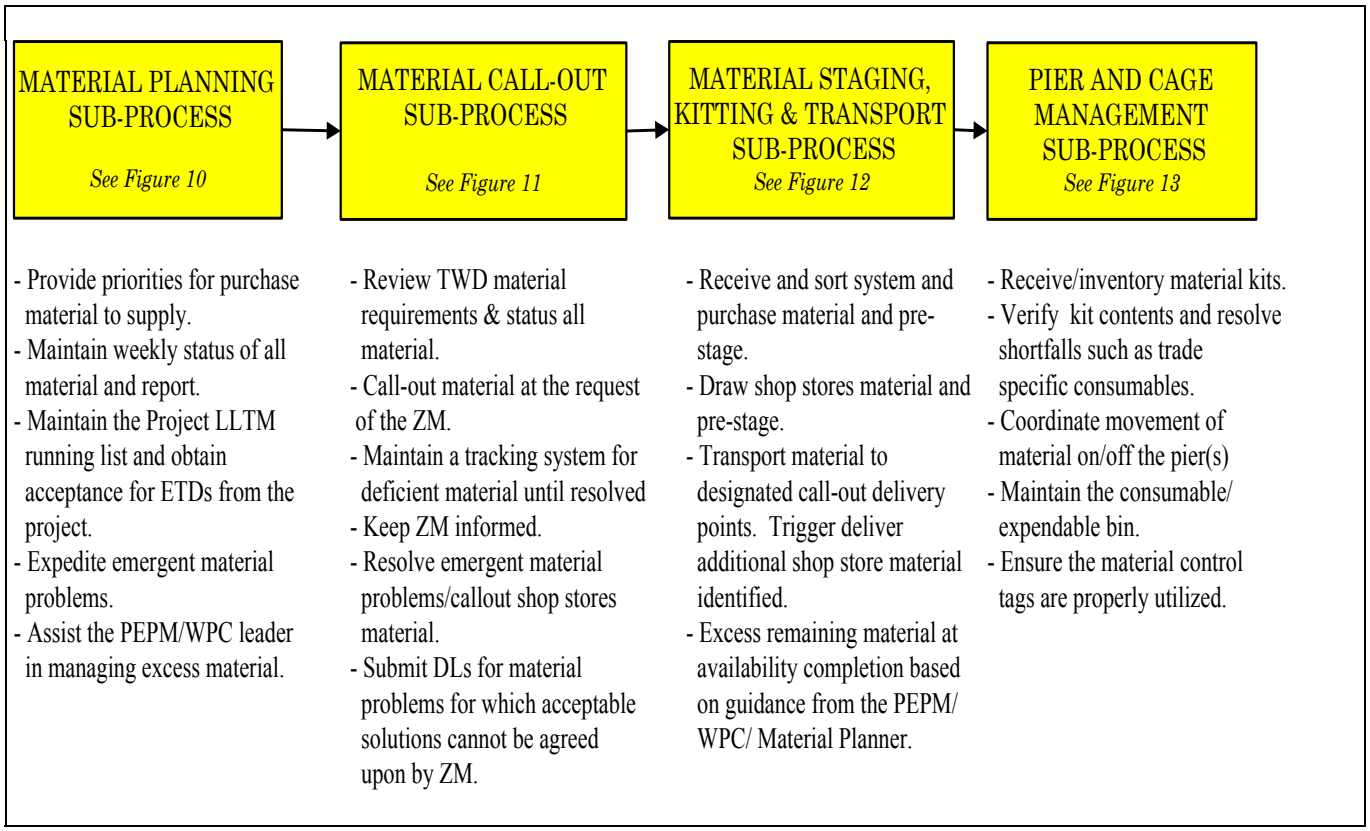


Figure 9. Material Management High Level Process Diagram

2.2 Material Management Description

2.2.1 Material Planning

Material planning personnel are co-located with supply department purchase and expediting personnel. A dedicated material planning representative is assigned to each project early in the planning process about the time material ordering commences (see Nominal Planning Timeline, Figure 1). The material planning representative is responsible for maintaining the Long Lead Time Material (LLTM) list with input from cognizant technical codes, prioritizing purchase work load based on input from the PEPM and publishing weekly project material status via the weekly material planning report. During execution, the material planner is the projects POC for resolving material delivery date problems and expediting emergent critical material through supply. After Availability completion, the material planner and the PEPM are responsible for issuing the project excess material report within 30 days of Availability completion along with instructions to C-500 regarding excess material disposition. Figure 10 illustrates the Material Planning sub-process.

2.2.2 Material Callout

WPC personnel review Technical Work Documents (TWDs) to determine material requirements and the status of the listed material during the Task Package Development and Assembly process (see Section 1). This is accomplished through querying MAT01 for applicable document numbers. The status for each material item listed within the TWD (RFI, Due/ETD, Unawarded, etc.) is provided to the Zone Manager (ZM) with the Task Package for review. Material items not on hand with delivery dates which do not support CU Phase schedule start date must be resolved with the ZM. TWDs with unresolved material problems (i.e., ETDs not accepted by the ZM) shall be reported to the Trouble Desk for resolution (substitution, alternate source, fabricate vice purchase, etc.) via DL. The affected package may be placed in "PRB" status in AIM by the packager until an acceptable resolution is obtained. Material call-out personnel will prepare the Material Kit Request for RFI material and forward to kitting personnel to ensure material items are delivered to the project cage or other designated delivery point based on ZM request. Any items not on hand at that time will be tracked and the ZM kept informed of status until receipt. Material callout personnel will also solve emergent material problems and process all call-outs for additional shop stores material needed to eliminate the need for "walk-up" material chits by mechanics. Figure 3 illustrates the Material Call-out Sub-Process.

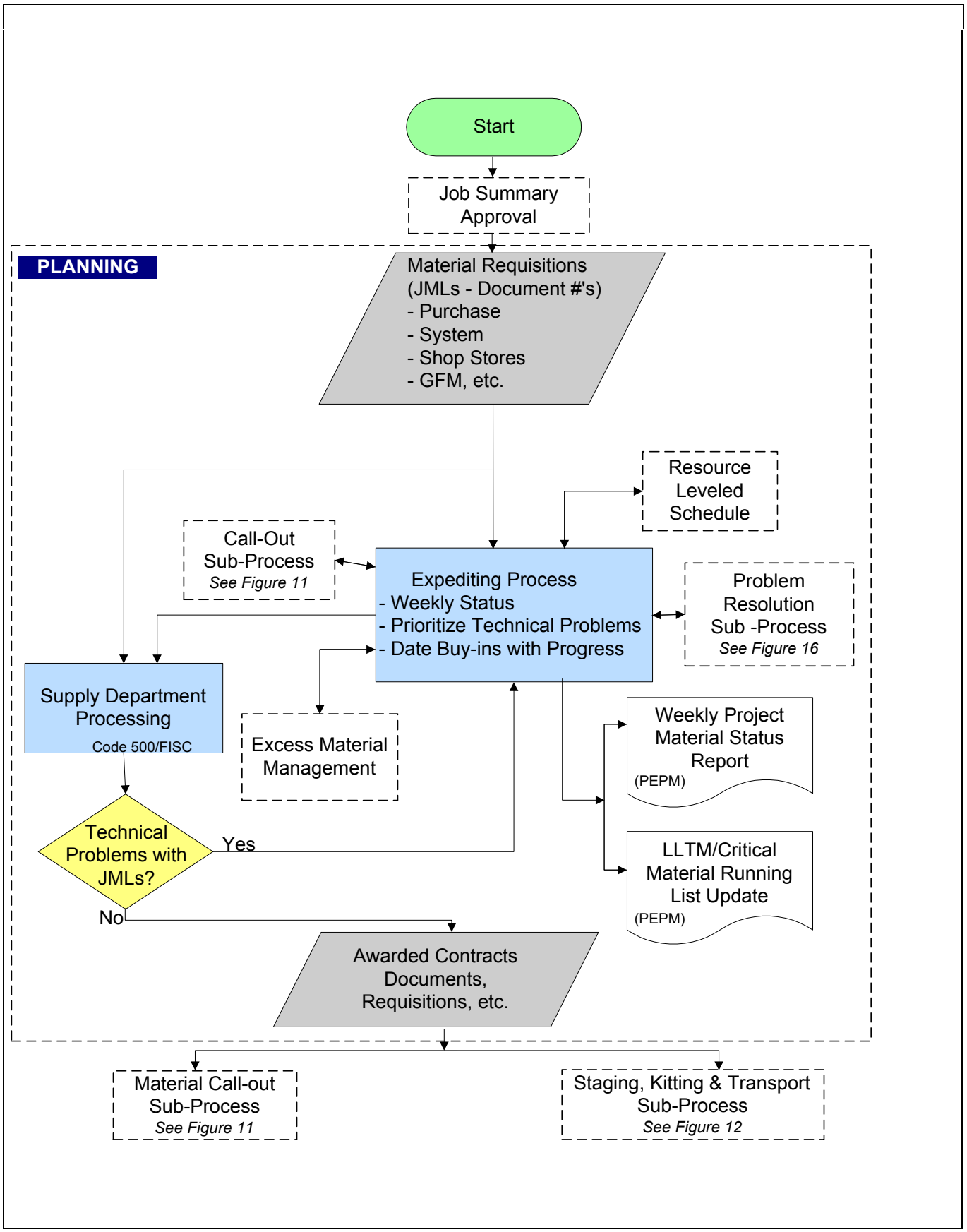


Figure 10. Material Planning Sub-Process Flowchart

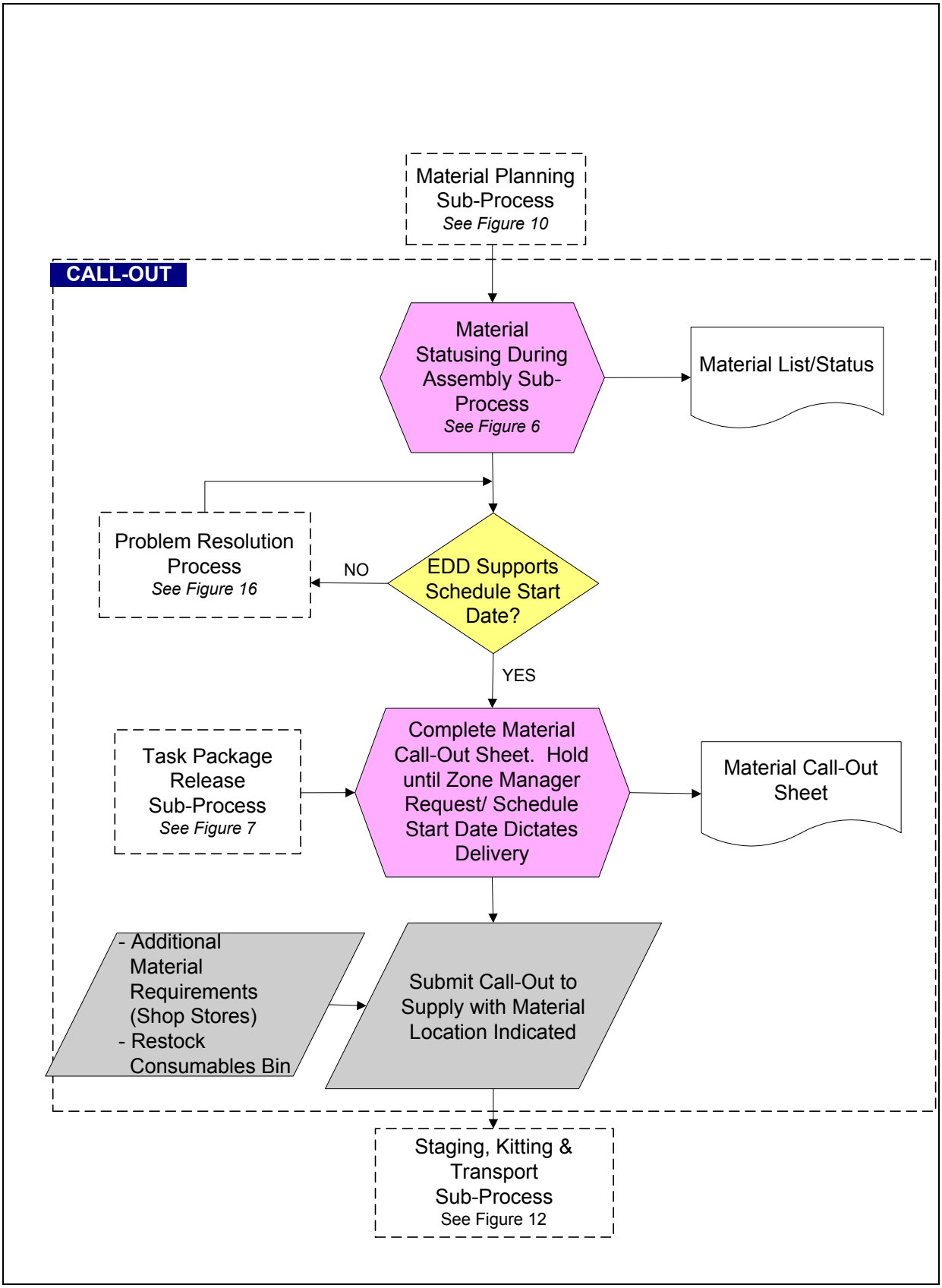


Figure 11. Material Callout Sub-Process Flowchart

2.2.3 Material Staging, Kitting, and Transport

After receipt by the Supply Department, material is forwarded to designated project staging/kitting areas by Code 500 personnel. Material kitters assemble kits as specified by the call-out request which is prepared and submitted by material callout personnel within WPC. The kit request provides a list of material to be kitted by document number as well as the date required and physical location for delivery. Only RFI material should be entered on a Kit Request. Material Kitters prepare material kits based on the Kit Request and transport to the designated delivery point on the Kit Request. Kitters, when designated by the project's material plan, track and deliver shop fabricated material and ripout material as part of the material kit for shipboard installation task packages. Material Kitters must maintain up-to-date status of kit requests to ensure backlog, holdups, transportation, etc. do not result in execution delays. The Staging, Kitting and Transport process is illustrated in Figure 12.

2.2.4 Pier and Cage Support

Project material cages are established for each project to provide a secure lay-down area for material arriving from kitting until issuance to the mechanic. Separate cages may be established and dedicated to specific large ship alterations or where a high volume of material warrants. Pier/Cage support personnel are responsible for inventorying and signing for material kits, adding additional trade specific consumable/expendable type material, maintaining an organized method to manage kit location or to whom a kit was issued to (as well as partial kit issuance), assisting in the transport of forklift material and maintaining the consumables bin. The waterfront material handlers manage the material arriving and leaving the pier through coordination with crane teams and transportation personnel. Like the material kitters, these personnel should be forklift qualified which enables them to assist in moving material on the pier as well as the loading and unloading of trucks. Pier Support personnel provide for transportation of ripout material for disposal, repair, storage or shipment as designated by material control tags which are affixed to all material leaving the vessel by the mechanic. Pier/Cage Support sub-process is illustrated in Figure 13.

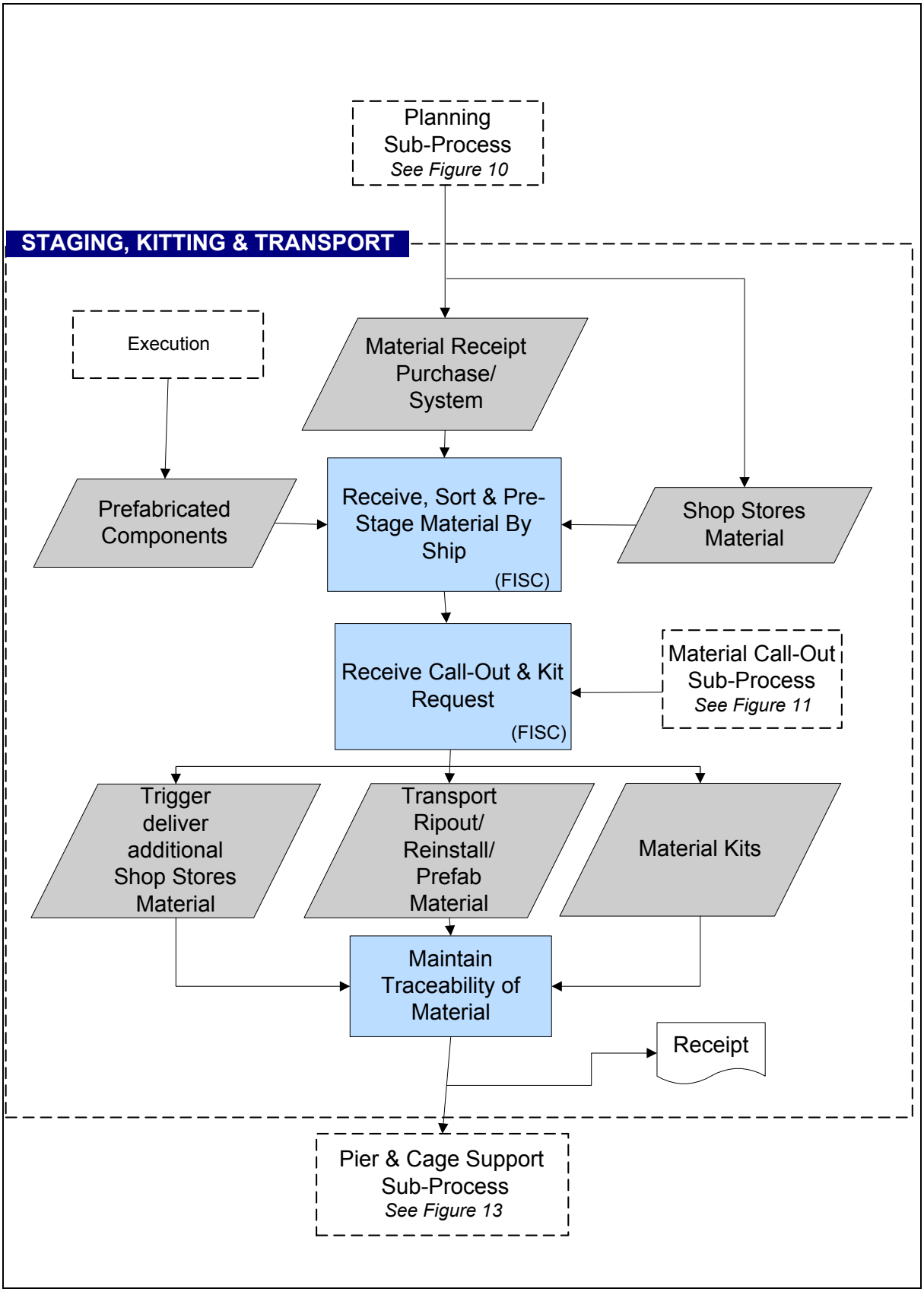


Figure 12. Material Staging, Kitting, and Transportation Sub-Process Flowchart

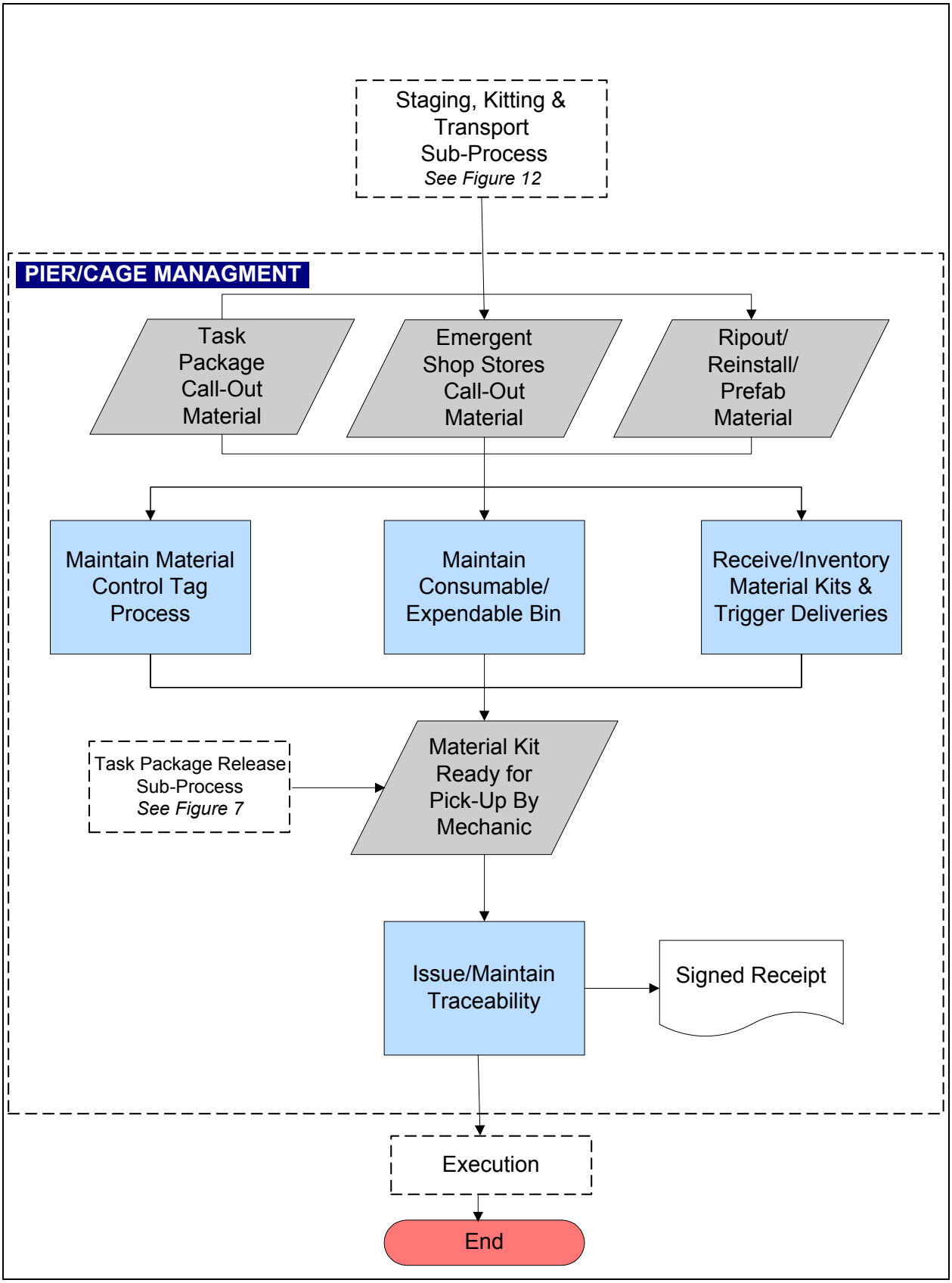


Figure 13. Pier/Cage Management Sub-Process Flowchart

2.2.5 Excess Material Management

Excess material is primarily generated as the result of canceled/sub-contracted work or completed jobs for which all material requisitioned was not used. WPC plays a key role in managing excess material as follows:

(1) On each Availability, standard Job Orders and Key ops should be established for incrementally transferring customer or shipyard responsible excess material during project planning and execution.

(2) When work is *canceled/deferred*, non-recoverable material cost must be accurately captured and appropriate recommendations made to have material kits issued to the customer or ship for future installation. All remaining material for canceled/deferred work is considered excess due to customer actions and is transferred to the appropriate Job Order/Key Op and statused to Mat Cat "5" to ensure proper cost accounting at Availability completion. Once in Mat Cat "5" status, the system will be automatically interrogated by other projects (for system items) for possible transfer/issue to another current/upcoming Availability.

(3) When work is *sub-contracted* by the project, the contract documents should contain provisions to ensure RFI material is issued to the contractor as "GFM". All remaining material is considered excess due to project strategy and is transferred to the appropriate Job Order/KO and statused to Mat Cat "5" to ensure proper cost accounting at Availability completion.

(4) When work is *completed* (at the CU Phase level), WPC will review remaining material status and transfer to another CU Phase if appropriate. Remaining material (RFI or due) will then be transferred to the appropriate Job Order/KO depending if it was LLT or contingent material requiring an up-front ordering decision or considered excess due to originator ordering error. Again, financial impact can be decreased by proper statusing in MAT01 by WPC at the time of CU Phase completion (vice Availability completion).

2.3 Material Management Metrics

Metrics for material management must be established as part of the PMP and implemented at about A-10 months in accordance with the Nominal Planning Timetable, Figure 1. Executive level tracking should primarily indicate the percentage of total material items RFI. The goal is to be at approximately 90% at A-0. Project specific metrics should include tracking material in the following categories:

(1) Purchase Items: Required, Ordered, Awarded, Due, RFI

(2) System Items: Required, Ordered, Backordered, Due, RFI

(3) Shop Stores Items: Required, Available, Issued (staged with project DMI)

(4) AERP Equipment Status

(5) Long Lead Time Material Status

(6) CCRP Components:

Enclosure (3) provides an example of project level material status to be maintained/ updated on a weekly basis.

3. Work Control Process

3.1 Work Control Description

3.1.1 Work Authorization Form (WAF) Preparation

The Work Control Group (WCG) is technically responsible for the authorization of all work via Work Authorization Forms (WAF) on a given Availability. Packagers authorized by the WCG can determine if a Work Authorization Form (WAF) is required during the Assembly Process. This allows the Work Authorization Form (WAF) Process to run in parallel with the rest of the assembly process and decreases the number of TWDs routed through WCG. Non-Nuclear System isolation requirements are determined prior to Availability start based on Job Summary information so that the number of System Transfers and/or Work Authorization Forms (WAF) required can be minimized to include the maximum amount of authorized work within the boundaries established. Non-nuclear System Transfer Work Authorization Forms (WAF) for initial work must be prepared and tagouts coverage checked (at a minimum) in advance of Availability start as illustrated in Figure 1 and Figure 15 to ensure release of work packages is not delayed. General nuclear isolation requirements are determined prior to Availability start based on Job Summary information and an isolation plan is developed for releasing work within the first 30 days of the Availability. Refer to the System Status and Plant Condition Plan for specific strategies. Specific isolation for nuclear work will be determined for each package during assembly. The following steps are taken by Work Control during the assembly process of a Task Package:

3.1.1.1 - WCG shall review the Task Package as necessary to determine work authorization requirements at the Technical Work Document (TWD) level. Non-nuclear TWDs (TGIs, Short Forms, DRs) will be referenced on "A" sheets of existing Work Authorization Forms (WAF) (prepared during the Job Summary review process) or new Work Authorization Form (WAF) are prepared as required in accordance with current local shipyard instructions. For Nuclear TWDs, specific isolation will be determined and a Work Authorization Form (WAF) prepared per current Shipyard instructions.

3.1.1.2 - Process Work Authorization Forms (WAF) in accordance with applicable shipyard instructions. Ensure additional authorizations are obtained such as SPOD, TPOD, NPOD and DPS as applicable.

3.1.1.3 - DLs (TGI dependent) and DRs (independent) are routed through Work Control at the discretion of Trouble Desk to ensure proper isolation is established to accomplish the DL/DR resolution prior to release. Any questions should be resolved through the assigned CTE. Ensure Work Authorization Form (WAF) status is updated in Document Tracking and CUs are properly mapped in the AIM database.

3.1.2 Work Authorization Form (WAF) Closure

As completed Non-nuclear TWDs and associated DLs are received by Work Packaging, closure of the Work Authorization Form (WAF) is coordinated with the Work Control group as part of the TWD completion/certification process. Code 139 will sign off on the Work Authorization Form (WAF) for Completion of work upon certification of Nuclear TWDs and route the Work Authorization Form (WAF) to the Work Control group for closure. The non-nuclear WCG will sign-off Work Authorization Form (WAF) line items corresponding to the completed TWD based on the work completion verification signature on the coversheet of the TWD and the “Corrective Action Complete” block on the cover sheet of all associated DLs (or DRs). Non-nuclear Work Authorization Forms (WAF) are closed at the discretion of the Non-nuclear CTE based on system test status and plant conditions after all line items charged against a given Work Authorization Form (WAF) are complete.

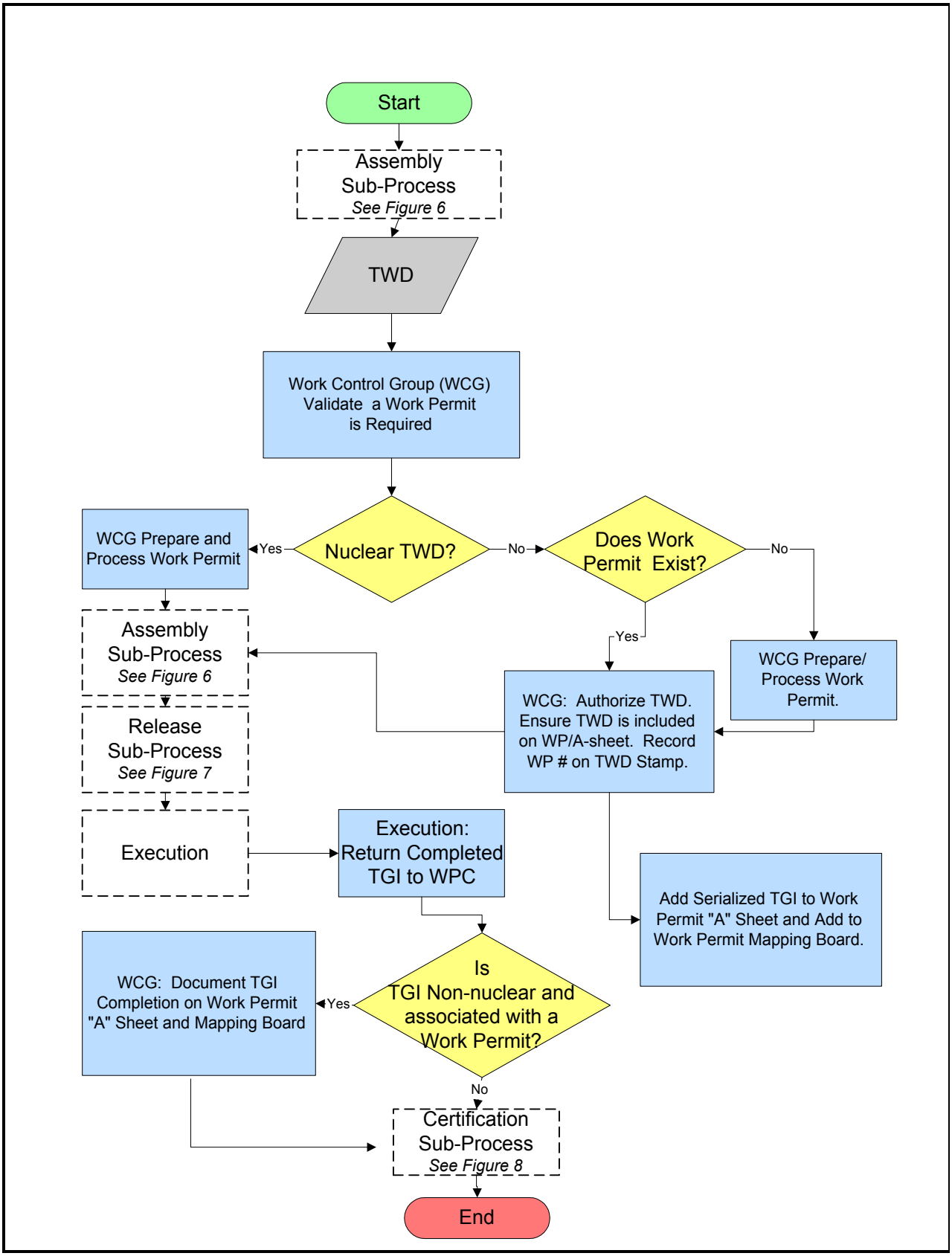


Figure 14. Work Control Process Flowchart

3.2 System Transfer Process (Non-Nuclear)

System Transfer consists of two (2) parts: System Turnover and System Turnback. System Turnover (sometimes referred to as System Take-down) is defined as the process of depressurizing, draining, de-energizing, tagging out and transferring operational and tagout control of a system to the shipyard to facilitate authorized work and testing. System Turnback is the process of verifying work and testing is complete to the extent necessary to return system tagout and operational control back to ships force sufficiently in advance of Key Events. Upon the completion of the Job Summary process, the level of work within the various ship systems is evaluated to determine the System Transfer (ST) boundaries. The determination may be made that, regardless of the level of work, the simplest and most effective approach is to transfer all non-nuclear systems. The determination of transfer boundaries is by a logical division of ship systems into distinct areas based on isolation/tagout points and Key Event requirements. Once the transfer boundaries are established, a plan for execution of System Transfers (Turnover and Turnback) must be developed. This plan shall include temporary systems needed prior to individual system turnovers, Arrival testing, Key Event (i.e., Cool-down and Docking) sequencing and early work considerations such as hull cuts. The following are key aspects of the System Transfer process as illustrated in Figure 15:

(1) System Transfers (STs) will be identified during the A-9 timeframe in conjunction with issuance of 90% of required Job Summaries. A System Transfer Job Summary will be established with a CU Phase for each System Transfer and Turn-Back to allow integration into the project Resource Leveled Schedule (RLS). Turnovers and turn-backs will be scheduled via Non-TGI CUPHs in AIM. (System Turn-Back is defined as the process by which a given system, transferred to the Shipyard, is returned to Ship's Force. The Turn-Back should be in parallel with any Ship's Force desired evolutions such as valve lineup and/or hand-over-hand integrity inspection of the system. See Figure 15 for Turn-Back sequence differences between Work Control and Operational Control.)

(2) Temporary service CU Phases required to support STs will be established and identified as predecessors to applicable ST CUPHs. The determination, establishment and packaging of prerequisite temporary service TGIs associated with the system transfers is key to timely accomplishment of ST and the release of associated work. Early assignment of a Temporary Service Coordinator is critical to ensure temporary service support required for STs.

(3) System Transfer boundaries and isolations are identified and processed via System Transfer Work Authorization Forms (WAF). All work (and status) will be mapped to the appropriate ST WP to ensure accountability prior to ST WP clearance.

(4) Any ship system which could directly affect the reactor plant or conduct of reactor plant testing will not be taken down until the required non-nuclear interface support systems are installed and operational.

3.2.1 System Transfer Work Authorization Form (WAF) Preparation

Work Authorization Forms (WAF) with tagout proposals, will be developed for the individual System Transfers during the A-10 to A-4 timeframe. Preliminary system drawings will also be highlighted showing these boundaries. The following is a list of standard System Transfer Work Authorization Forms (WAF):

		DMP/ERO/EOH
ST WP	**System Title**	Turnover Before or After Docking (Suggested)
1	AHP/EMBT/ALP***	Docking + 3 days
2	MSW	Docking + 5 days
3	ASW	Docking + 2 days
4	STILL/EVAP SYSTEM	Docking + 2 days
5	LUBE OIL SYSTEM	Docking + 4 days
6	MAIN STEAM & AUX STEAM SYSTEMS	Arrival + 7 days
7	COND & FEED SYSTEM	Arrival + 7 days
8	SS HYDRAULICS SYSTEM	Docking + 11 days
9	SCRUB/BURN SYSTEM	Arrival + 7 days
10	O2/N2 SYSTEM	Arrival + 7 days
11	R114 SYSTEM	Docking + 18 days
12	TRIM & DRAIN SYSTEM	Docking + 3 days
13	PLUMBING SYSTEM	Arrival + 6 days
14	FO/COMP SYSTEM	Docking + 1 day
15	TORPEDO HANDLING SYSTEM	Arrival + 6 days
16	LP BLOWER SYSTEM	Docking + 8 days
17	MBT/CAVDR/VV SYSTEM	Docking + 1 day
18	VENT/CAC SYSTEM	Docking + 12 days
19	CW AFT SYSTEM	Docking + 25 days
20	PW/GALLEY SYSTEM	Arrival + 6 days
21	RSS SYSTEM	Arrival + 7 days
22	ATMOS ANAL SYSTEM	Docking + 12 days
23	ERFW SYSTEM	Docking + 13 days
24	EAFW AFT SYSTEM	Docking + 13 days
25	DIESEL SUPPT SYSTEM	Docking + 2 days
26	3 IN LAUNCHER SYSTEM	Docking + 1 day
27	PROP SHAFT SYSTEM	Docking + 4 days
28	MAST/ANTENNA SYSTEM	Arrival + 18 days
29	SALVAGE AIR SYSTEM	Docking + 1 day
30	DEPTH GAGE SYSTEM	Docking + 3 days

ST WP	System Title	Turnover Before or After Docking (Suggested)
31	EXT HYD SYSTEM	Docking + 3 days
32	SPM SYSTEM	Docking + 2 days
33	ANCHOR & CAP SYSTEM	Docking + 8 days
34	LP AIR COMP SYSTEM	Arrival + 6 days
35	STEERING & DIVING SYSTEM	Docking + 10 days
36	HPAC SYSTEM	Docking + 7 days
37	EAB SYSTEM	Docking + 5 days
38	INTEGRATED ANNOUNCING	Docking + 13 days
39	HATCHES SYSTEM	Docking + 1 day
40	GRAV DRAIN SYSTEM	Docking + 1 day
41	AUX DRAIN SYSTEM	Docking + 1 day
42	AHP AFT/BK#4 SYSTEM	Docking + 22 days
43	ATF SYSTEM	Arrival + 7 days
44	CW FWD SYSTEM	Docking + 8 days
45	SONAR SYSTEM	Arrival + 4 days
46	TORPEDO/FIRE CONTROL SYSTEM	Arrival + 4 days
47	EAFW FWD SYSTEM	Arrival + 4 days
48	400 HZ SYSTEM	Arrival + 3 days
49	LIGHTING SYSTEM	Docking + 12 days
50	60 HZ SYSTEM	Docking + 12 days
51	IC CKT SYSTEM	Docking + 13 days
52	500KW/DC PWR SYSTEM	Docking + 12 days
53	NAVIGATION SYSTEM	Arrival + 4 days
54	RADIO SYSTEM	Arrival + 4 days
55	RADAR/ECM SYSTEM	Arrival + 4 days
56	NAV & IC SWBDS SYSTEM	Docking + 14 days
57	VIB REDUCER SYSTEM	Docking + 4 days
58	TORPEDO TUBE SYSTEM	Docking + 2 days
59	VERTICAL LAUNCH SYSTEM	Docking + 3 days

Table 1. Standard List of System Transfer Work Authorization Forms (WAF)

3.2.2 A-3 Month Evolution

Preparation of system takedown/transfer tagout proposals, in conjunction with the A-3 shipcheck, is vital to presenting SF with an accurate takedown plan. At A-3 the takedown plan will be presented to SF in conjunction with providing crew training on Shipyard procedures for Work Authorization Forms (WAF) and tagouts. The temporary services required for the particular ship can be tailored at this time (i.e., some commands have a greater sensitivity to losing such items as battery amp-hour meter than others).

3.2.3 Mapping TGIs to Work Authorization Forms (WAF)

As TGIs become available, they will be mapped to the applicable ST WP via the “A” Sheet. Temporary service work and work that cannot wait until the applicable system takedown shall be associated with their own WP.

3.2.4 A-2 Week Evolution

In conjunction with A-2 week training, resolve any tagout issues prior to the ship's deployment to the Shipyard. A Work Control Group Representative should ride the boat in route to the Shipyard and authorize the "arrival" WPs. Further detail training is also conducted as required in route to the Shipyard.

3.2.5 System Transfer (ST):

(1) *Pre-Docking System Transfers*: Those STs, which have no predecessors, shall be executed at arrival. Takedown of those systems with predecessors, but not required to be operational for Docking, must be pursued to completion prior to Docking; so as to not create a backlog and thus slow the after-docking system takedowns/transfers.

(2) *Post Docking System Transfers*: Once docked, sequential steps per the takedown plan must be aggressively pursued to facilitate rapid takedown and transfer of the remaining systems.

3.3 Work Control Metrics

A list of all System Take-Downs/Transfers and the actual date processed and cleared based on the week of the Availability shall be maintained by the CTE. Enclosure (4) provides an example based on previous DMPs, EROs and EOHs.

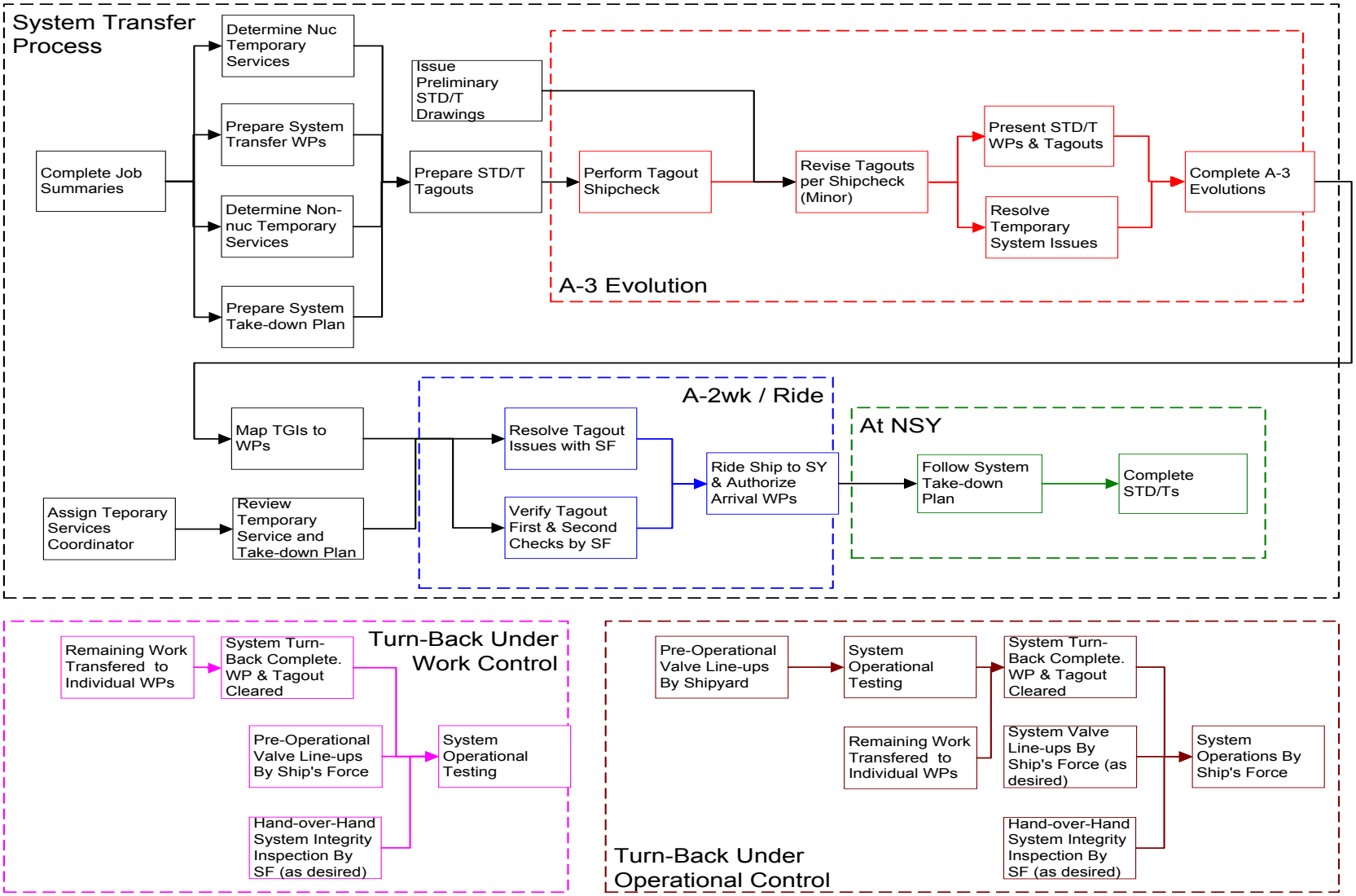


Figure 15. System Transfer (Non-nuclear) Process Diagram

4. Resolving Project Problems

4.1 Problem Resolution Overview

The process for resolving project problems must be controlled, time responsive, and efficient. Constant deck plate level communication between mechanics, supervisors and Trouble Desk personnel must be practiced in order to minimize production delays. The process must ensure the correct area of expertise is assigned to different problem types and that the Trouble Desk is made up of the right mix of engineering disciplines to meet changing demands of the work package as an Availability progresses.

4.1.1 Problem Categorization

Questions and problems identified during the accomplishment of work vary in nature. Some of these issues are questions requiring interpretation or normal intervention by production supervision or Trouble Desk personnel. Others are administrative or minor in nature but require EPD involvement in the form of "pen and ink" changes to the Technical Work Document (TWD). The remaining types of problems are technical in nature and must be resolved and formally documented via Deficiency Log, DL (problems within the scope of work) or Deficiency Report, DR (problems outside the scope of work - New Work). Further explanation and examples of each type of deficiency resolution method are provided below.

4.1.1.1 Production Process Issues

(Documentation not required). It is not cost effective or necessary to document all production process questions and resolution issues normally encountered during the performance of work. For these types of issues, the resolution is within the authority and responsibility of production supervision or Trouble Desk representatives and should be handled at that level without any formal documentation. Typical examples of these type issues are as follows:

- Work Sequence
- Shop Preference
- Craftsmanship
- Standard shop practices and processes
- General interpretation of drawing or other reference material requirements that are not Non-Deviational
- Questions regarding tooling, facility or assist craft support
- Dimension specified on an arrangement plan cannot be met - A review of plan details and notes indicates the installation is not "Non-Deviational" and can proceed by applying allowed drawing dimensional tolerances.

4.1.1.2 Administrative Issues (Pen and Ink change)

Minor administrative/typographical changes to written instructions may require Trouble Desk personnel to make "pen and ink" changes to the TWD. "Pen and Ink" changes shall be accomplished by a Trouble Desk representative and accompanied by his/her signature, check number, code (parent), and date. In addition, the Trouble Desk shall enter corrections in AIM when appropriate to ensure "capturing" for future projects (i.e., allowance adjustments, addition or change of Shop/TSD, typographical error corrections, reference changes, etc.):

- An obvious error in page numbering or reference designation in a TWD
- Change in shop sign-off designation
- Modifications to the TWD reference list
- Error in material Document or Stock No.
- Minor allowance and/or shop/trade skill changes (Project's Trouble Desk Manager will authorize a change to be entered directly into the AIM database)

4.1.1.3 Technical Changes Within Scope (DL Required)

When verbal resolution or "pen and ink" changes are not appropriate as discussed above, written documentation of the problem resolution in the form of a serialized DL may be required. A serialized DL becomes an official part of a TWD and must be certified as part of that package. Generally, any one of the following is the basis for requiring official serialization:

- Resolution requires technical changes to the TWD
- Resolution affects work completion verification or certification of the TWD
- Resolution results in changes (which may be non-technical) justifying capturing for "lessons learned"

Examples of such changes or problems which require formal documentation via serialized DL include:

- Dimensional variations beyond drawing tolerances
- Material Substitutions/omissions
- Equipment location changes
- Modification of system design parameters
- Technical changes to the specified instructions or requirements
- Changes in joint closure or fabrication methods

4.1.1.4 New Work (DR Required)

If the problem is determined to be **out of the work scope** of the TWD (new work), the problem will be converted to a Deficiency Report (DR) by the Trouble Desk Control Point. After authorization from the Project Engineering and Planning Manager (PEPM) through the Business and Strategic Planning Office (BSPO), the DR will be assigned to the appropriate Trouble Desk personnel for resolution. These resolutions may take the form of written instructions directly on the DR form or a formal TWD. Examples of "new work" DR scenarios include:

4.1.1.5 Funding Changes

Historically, funding issues were reported via the DL process which was cumbersome for the originator, Trouble Desk, and those involved with certification at job completion. To eliminate this confusion and facilitate subsequent analysis of the DL process as a whole, funding problems identified during the accomplishment of work are identified and tracked separate from the routine correction of discrepancies. This process allows quick resolution without creating a bottleneck in the resolution and certification processes.

4.2 Problem Resolution Description

The Problem Resolution Process is illustrated in Figure 16 and describes as follows:

4.2.1 DL/DR Processing

In many cases, a problem can be resolved in parallel with other parts of the TWD being accomplished; therefore, it is not necessary to return the entire task package to the Trouble Desk unless so requested. The Trouble Desk will log in the problem in the problem log and verify the serial. The problem will be evaluated as follows:

(1) If the problem is **within the work scope** of the associated TWD, the **DL** will be prioritized and assigned to appropriate Trouble Desk personnel for resolution. The technical content or complexity of resolutions documented and authorized is not limited on the DL provided all resulting work is within the original scope of the approved CU Phase. Formal revision of the TWD to implement deficiency resolutions should be based on time required as well as ability to clearly convey the technical changes and instructions by use of the DL form. The resolution will be returned to Work Packaging for processing prior to release as applicable.

(2) If the problem is determined to be **out of the work scope** of the TWD and considered new work, the problem will be transferred to a **Deficiency Report (DR)** by checking the "DR" box at the top of the form and serializing to allow independent tracking. Utilizing document tracking in the AIM database, the next sequential serial number shall be obtained from the database and required data entered. After authorization from the PEPM through BSPO, the DR will be assigned to the appropriate Trouble Desk personnel for resolution. Items involving significant new work and/or require detailed instructions shall be resolved by establishing new CU Phase(s) and issuing the associated. The resolution will be forwarded to Work Packaging as appropriate for proper processing prior to release.

4.2.2 Processing Other Deficiencies

Deficiencies discovered independent of the accomplishment of a TWD (i.e., walk-through inspections, S/F or Project reported deficiencies, Code 130 surveillance inspection deficiencies, etc.) shall be submitted to the Trouble Desk via the combination Deficiency Log (DL)/Deficiency Report (DR) form. The header information may be left blank and the Trouble Desk will determine the appropriate open CU Phase (or establish a new one) to assign the deficiency based on the scope of problem described (i.e., Pre-Criticality Discrepancy Correction, Surveillance Inspection Discrepancy Correction, S/F or Project reported deficiency, etc.). In some cases, such as Engineering and Planning Department Walk-through inspections, a separate abbreviated process may be implemented to manage a high volume of deficiencies efficiently over short periods, independent of the DL/DR process under the direction of the PEPM.

4.3 Problem Resolution Metrics

Managing problem backlog in WPC/Trouble Desk is critical in avoiding costly production delays. Problem status should be monitored daily to ensure the Trouble Desk is manned with the proper number and mix of personnel and to quickly address areas needing attention prior to them getting out of control. This status sheet will effectively monitor the various areas involved in resolving project problems. Enclosure (5) provides an example of such metrics.

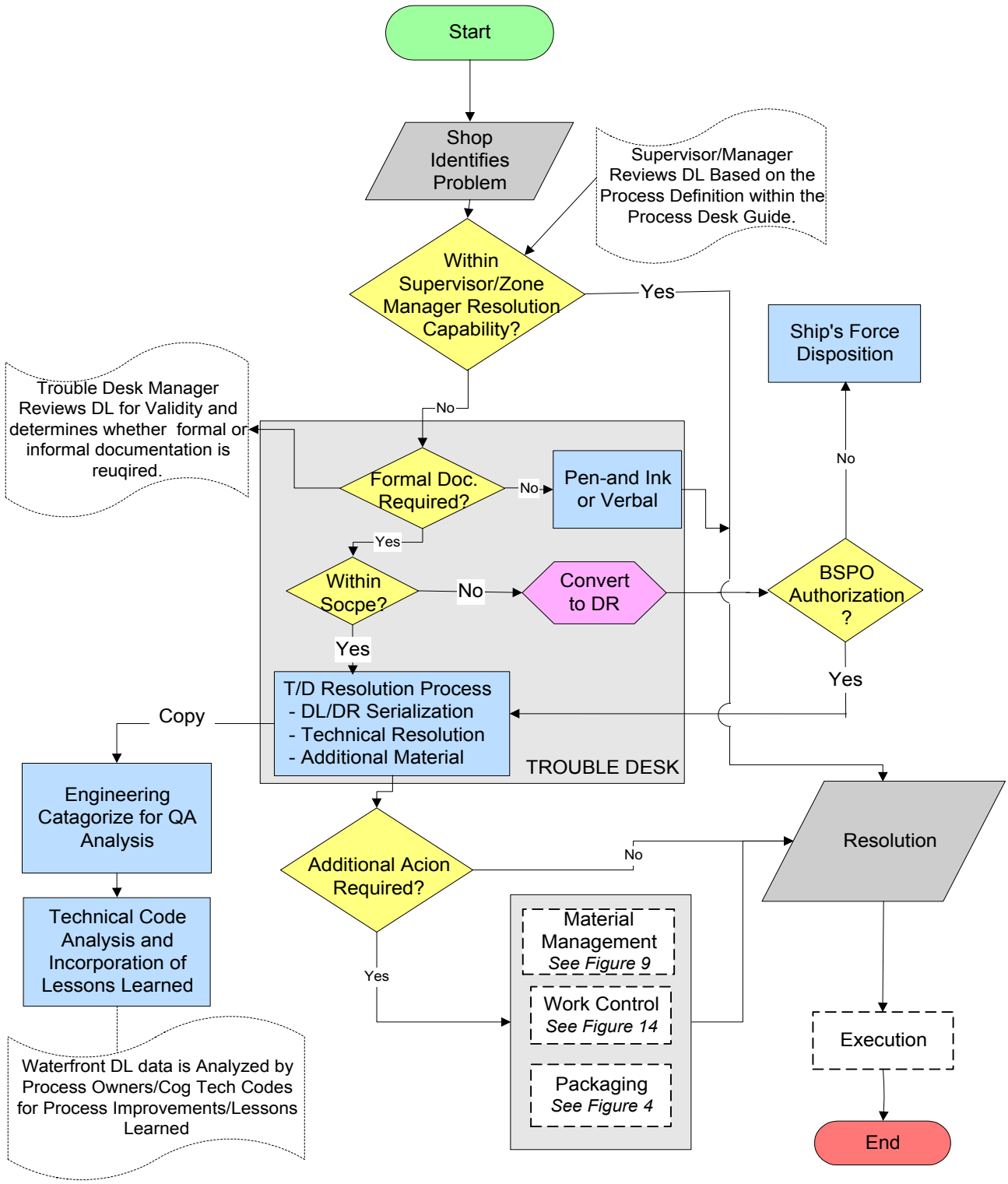


Figure 16. Problem Resolution Process Flowchart

Work Packaging and Control
Corporate Process Guide
SSN-688 Class Major Availability

Part III

Enclosures

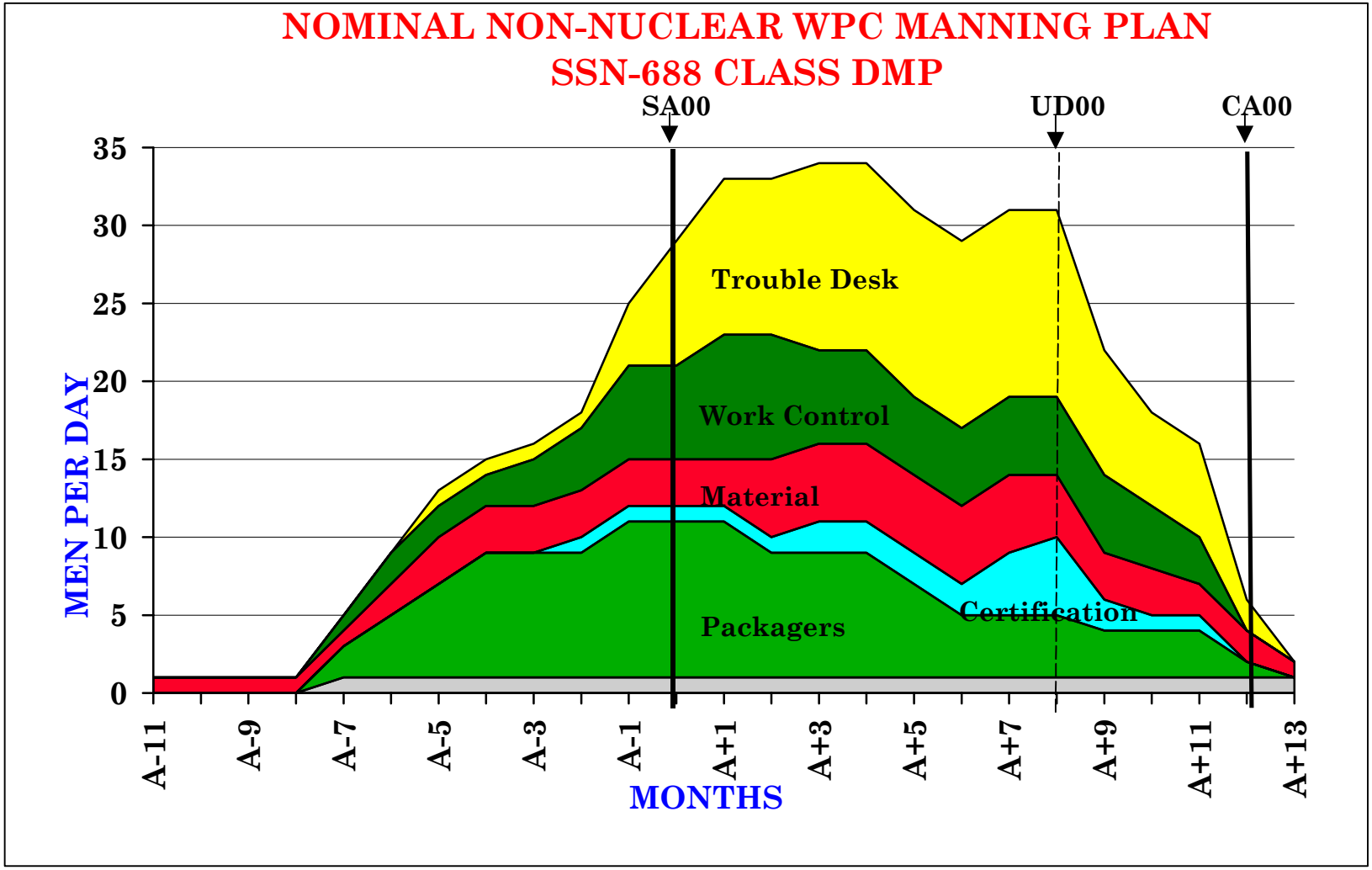
Description	Page No.
1. WPC Manning Profile/Benchmark Roll-up	1-1
2. Task Packaging, Assembly and Release Project Level Metrics	2-1
3. Material Management Project Level Metrics	3-1
4. Work Control Project Level Metrics	4-1
5. Problem Resolution Project Level Metrics	5-1

Non-Nuclear WPC Nominal Manning Plan Work Sheet

SSN688 CLASS DMP

												12 Month Nominal Availability														
Function	A-11	A-10	A-9	A-8	A-7	A-6	A-5	A-4	A-3	A-2	A-1	A-0	A+1	A+2	A+3	A+4	A+5	A+6	A+7	A+8	A+9	A+10	A+11	A+12	A+13	Totals
WPC Leader					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
MDs per Month					20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	420
Packagers					2	4	6	8	8	8	10	10	10	8	8	8	6	4	4	4	3	3	3	1	0	
MDs per Month					40	80	120	160	160	160	200	200	200	160	160	160	120	80	80	80	60	60	60	20	0	2360
Certification										1	1	1	1	1	2	2	2	2	4	5	2	1	1			
MDs per Month										20	20	20	20	20	40	40	40	40	80	100	40	20	20	0	0	520
Material	1	1	1	1	1	2	3	3	3	3	3	3	3	5	5	5	5	5	5	4	3	3	3	2	1	
MDs per Month	20	20	20	20	20	40	60	60	60	60	60	60	60	100	100	100	100	100	100	80	60	60	60	40	20	1480
Work Control					1	2	2	2	3	4	6	6	8	8	6	6	5	5	5	5	5	4	3	0		
MDs per Month					20	40	40	40	60	80	120	120	160	160	120	120	100	100	100	100	100	80	60	0	0	1720
Trouble Desk							1	1	1	1	4	8	10	11	11	11	11	11	11	8	8	6	6	2		
MDs per Month							20	20	20	20	80	160	200	220	220	220	220	220	220	160	160	120	120	40	0	2440
WPC TOTAL	1	1	1	1	5	9	13	15	16	18	25	29	33	34	33	33	30	28	30	27	22	18	17	6	2	0
MDs/Month	20	20	20	20	100	180	260	300	320	360	500	580	660	680	660	660	600	560	600	540	440	360	340	120	40	8940

Functional Summary	NAVSEA Benchmark	QAC % (Avg 95K NN MDs)
WPC/WPC Manager	1.95%	2.93%
Work Certification	0.10%	0.55%
Material Coordination	1.20%	1.56%
Work Control	0.90%	1.81%
Trouble Desk	2.20%	2.57%
WPC Total	6.35%	9.41%

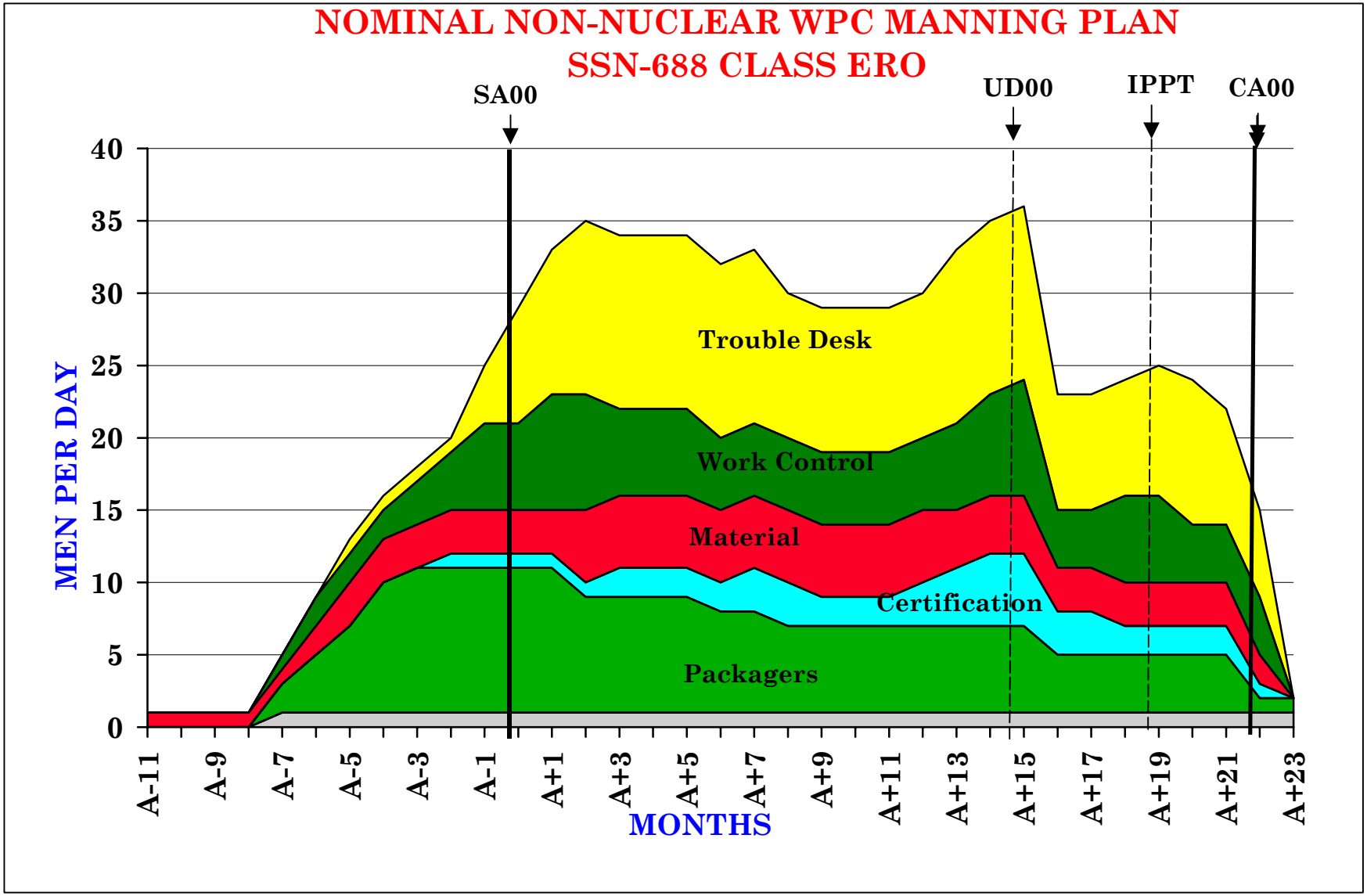

NOMINAL NON-NUCLEAR WPC MANNING PLAN
SSN-688 CLASS DMP
SA00
UD00
CA00
35
30
25
20
15
10
5
0
MEN PER DAY
Trouble Desk
Work Control
Material
Certification
Packagers
A-11
A-9
A-7
A-5
A-3
A-1
A+1
A+3
A+5
A+7
A+9
A+11
A+13
MONTHS

Non-nuclear WPC Nominal Manning Plan Work Sheet
SSN688 CLASS ERO

												22 Month Nominal Availability																				
Function	A-11	A-10	A-9	A-8	A-7	A-6	A-5	A-4	A-3	A-2	A-1	A-0	A+1	A+2	A+3	A+4	A+5	A+6	A+7	A+8	A+9	A+10	A+11	A+12	A+13	A+14	A+15	A+16	A+17	A+18	A+19	A+20
WPC Leader					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MDs per Month					20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Packagers					2	4	6	9	10	10	10	10	10	8	8	8	8	7	7	6	6	6	6	6	6	6	6	4	4	4	4	4
MDs per Month					40	80	120	180	200	200	200	200	200	160	160	160	160	140	140	120	120	120	120	120	120	120	120	80	80	80	80	80
Certification										1	1	1	1	1	2	2	2	2	3	3	2	2	2	3	4	5	5	3	3	2	2	2
MDs per Month										20	20	20	20	20	40	40	40	40	60	60	40	40	40	60	80	100	100	60	60	40	40	40
Material	1	1	1	1	1	2	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	4	4	4	3	3	3	3	3
MDs per Month	20	20	20	20	20	40	60	60	60	60	60	60	60	100	100	100	100	100	100	100	100	100	100	100	80	80	80	60	60	60	60	60
Work Control					1	2	2	2	3	4	6	6	8	8	6	6	6	5	5	5	5	5	5	5	6	7	8	4	4	6	6	4
MDs per Month					20	40	40	40	60	80	120	120	160	160	120	120	120	100	100	100	100	100	100	100	120	140	160	80	80	120	120	80
Trouble Desk							1	1	1	1	4	8	10	12	12	12	12	12	12	10	10	10	10	10	12	12	12	8	8	8	9	10
MD's per Month							20	20	20	20	80	160	200	240	240	240	240	240	240	200	200	200	200	200	240	240	240	160	160	160	180	200
WPC TOTAL	1	1	1	1	5	9	13	16	18	20	25	29	33	35	34	34	34	32	33	30	29	29	29	30	33	35	36	23	23	24	25	24
MDs/Month	20	20	20	20	100	180	260	320	360	400	500	580	660	700	680	680	680	640	660	600	580	580	580	600	660	700	720	460	460	480	500	480

DSS Functional Summary	NAVSEA Benchmark	QAC % (Avg 180K NN MDs)
WPC/WPC Manager	1.95%	2.47%
Work Certification	0.10%	0.63%
Material Coordination	1.20%	1.28%
Work Control	0.90%	1.64%
Trouble Desk	2.20%	2.68%
Total WPC	6.35%	8.70%

	22 Month Nominal Availability								
Function	A+16	A+17	A+18	A+19	A+20	A+21	A+22	A+23	Totals
WPC Leader	1	1	1	1	1	1	1	1	
MDs per Month	20	20	20	20	20	20	20	20	620
Packagers	4	4	4	4	4	4	1	1	
MDs per Month	80	80	80	80	80	80	20	20	3820
Certification	3	3	2	2	2	2	1		
MDs per Month	60	60	40	40	40	40	20	0	1140
Material	3	3	3	3	3	3	2		
MDs per Month	60	60	60	60	60	60	40	0	2300
Work Control	4	4	6	6	4	4	4		
MDs per Month	80	80	120	120	80	80	80	0	2960
Trouble Desk	8	8	8	9	10	8	6		
MD's per Month	160	160	160	180	200	160	120	0	4820
WPC TOTAL	23	23	24	25	24	22	15	2	0
MDs/Month	460	460	480	500	480	440	300	40	15660


NOMINAL NON-NUCLEAR WPC MANNING PLAN
SSN-688 CLASS ERO
SA00
UD00
IPPT
CA00
MEN PER DAY
40
35
30
25
20
15
10
5
0
Trouble Desk
Work Control
Material
Certification
Packagers
A-11
A-9
A-7
A-5
A-3
A-1
A+1
A+3
A+5
A+7
A+9
A+11
A+13
A+15
A+17
A+19
A+21
A+23
MONTHS

Nuclear Nominal WPC Manning Plan
SSN 688 Class DMP

								12 Month Nominal Availability													
Function	A-7	A-6	A-5	A-4	A-3	A-2	A-1	A-0	A+1	A+2	A+3	A+4	A+5	A+6	A+7	A+8	A+9	A+10	A+11	A+12	Totals
WPC Leader	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
MDs per Month	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	400
Work Packagers	1	1	1	3	4	5	5	5	5	4	4	4	4	3	3	3	2	1	1	1	
MDs per Month	20	20	20	60	80	100	100	100	100	80	80	80	80	60	60	60	40	20	20	20	1200
Certification							1	1	1	1	1	1	1	2	3	4	2	2	2	1	
MDs per Month							20	20	20	20	20	20	20	40	60	80	40	40	40	20	460
Material	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
MDs per Month	20	20	20	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	740
Work Control Group		1	1	1	2	2	3	4	4	4	4	4	3	3	3	3	3	3	3	1	
MDs per Month					40	40	60	80	80	80	80	80	60	60	60	60	60	60	60	20	980
Trouble Desk						1	3	3	3	3	3	3	3	3	3	3	3	3	3	1	
MDs per Month						20	60	60	60	60	60	60	60	60	60	60	60	60	60	20	820
WPC Total	3	4	4	7	9	11	15	16	16	15	15	15	14	14	15	16	13	12	12	7	
MDs/Month	60	80	80	140	180	220	300	320	320	300	300	300	280	280	300	320	260	240	240	140	4660

Nominal Nuclear Work Package (MDs)	35000
	QAC %
WPC/WPC Manager	4.57%
Work Certification	1.31%
Material Coordination	2.11%
Work Control	2.80%
Trouble Desk	2.34%
Total WPC	13.02%

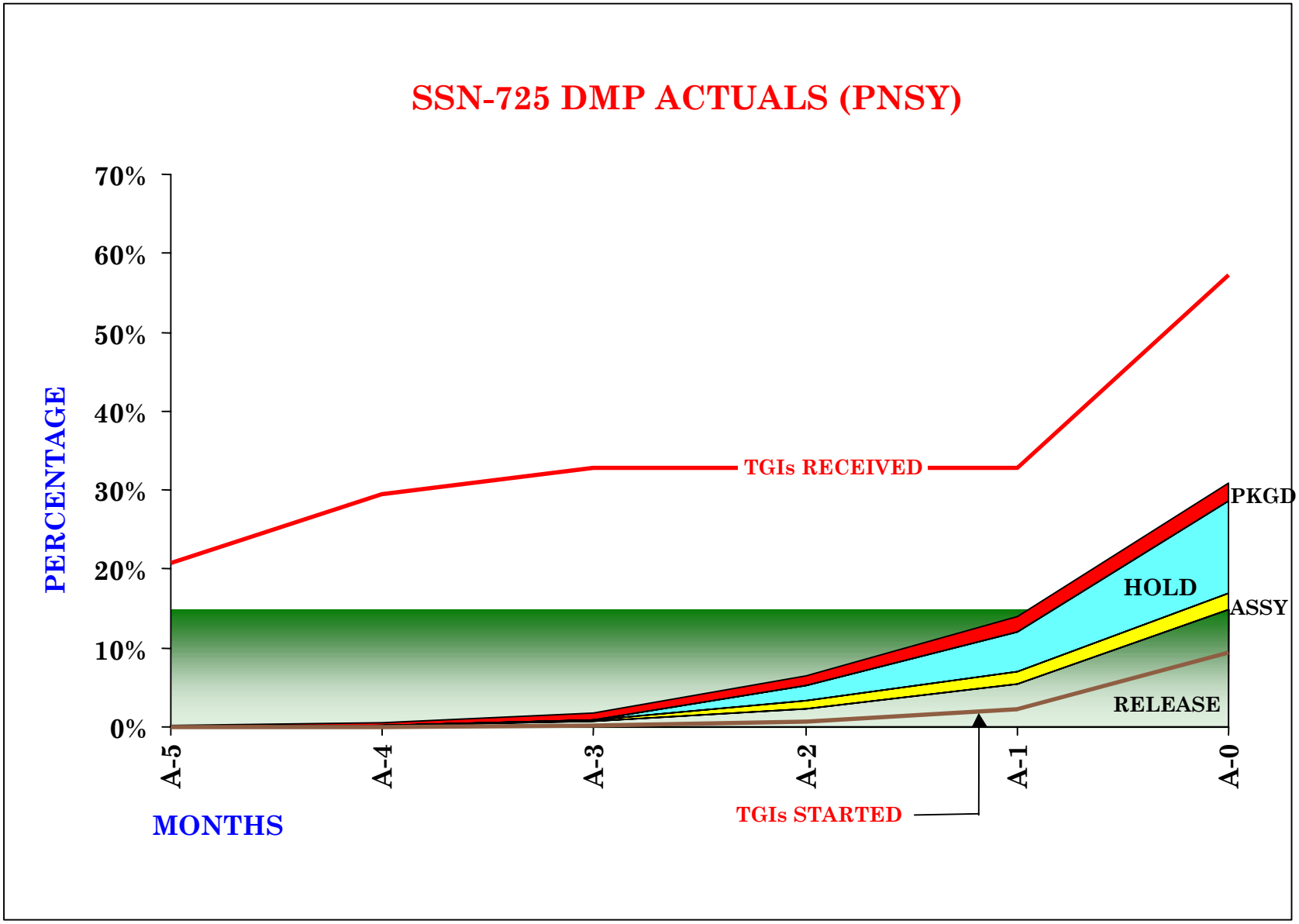
Nuclear Nominal WPC Manning Plan
SSN 688 Class ERO

								21 Month Nominal Availability																						
Function	A-7	A-6	A-5	A-4	A-3	A-2	A-1	A-0	A+1	A+2	A+3	A+4	A+5	A+6	A+7	A+8	A+9	A+10	A+11	A+12	A+13	A+14	A+15	A+16	A+17	A+18	A+19	A+20	A+21	A+22 Totals
WPC Leader	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MDs per Month	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20 600
Work Packagers	1	1	1	3	4	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	3	3	2	2	2	2	2	1	1	1
MDs per Month	20	20	20	60	80	100	100	100	100	80	80	80	80	80	80	80	80	80	80	80	60	60	40	40	40	40	40	20	20	20 1860
Certification							1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	4	2	2	2	1	1	1	1
MDs per Month							20	20	20	20	20	20	20	20	20	20	20	20	20	20	40	60	80	40	40	40	20	20	20	20 660
Material Kitting	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MDs per Month	20	20	20	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40 1140
Work Control Group		1	1	1	2	2	3	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1
MDs per Month					40	40	60	80	80	80	80	80	60	60	60	60	60	60	60	60	60	60	40	40	40	40	40	40	40	20 1440
Trouble Desk						1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1
MDs per Month						20	60	60	60	60	60	0	0	0	0	0	0	0	0	0	0	60	60	60	60	60	60	60	60	20 820
WPC Total	3	4	4	7	9	11	15	16	16	15	15	15	14	14	14	14	14	14	14	14	14	15	14	12	12	12	11	10	10	7
MDs/Month	60	80	80	140	180	220	300	320	320	300	300	300	280	280	280	280	280	280	280	280	280	300	280	240	240	240	220	200	200	140 7180

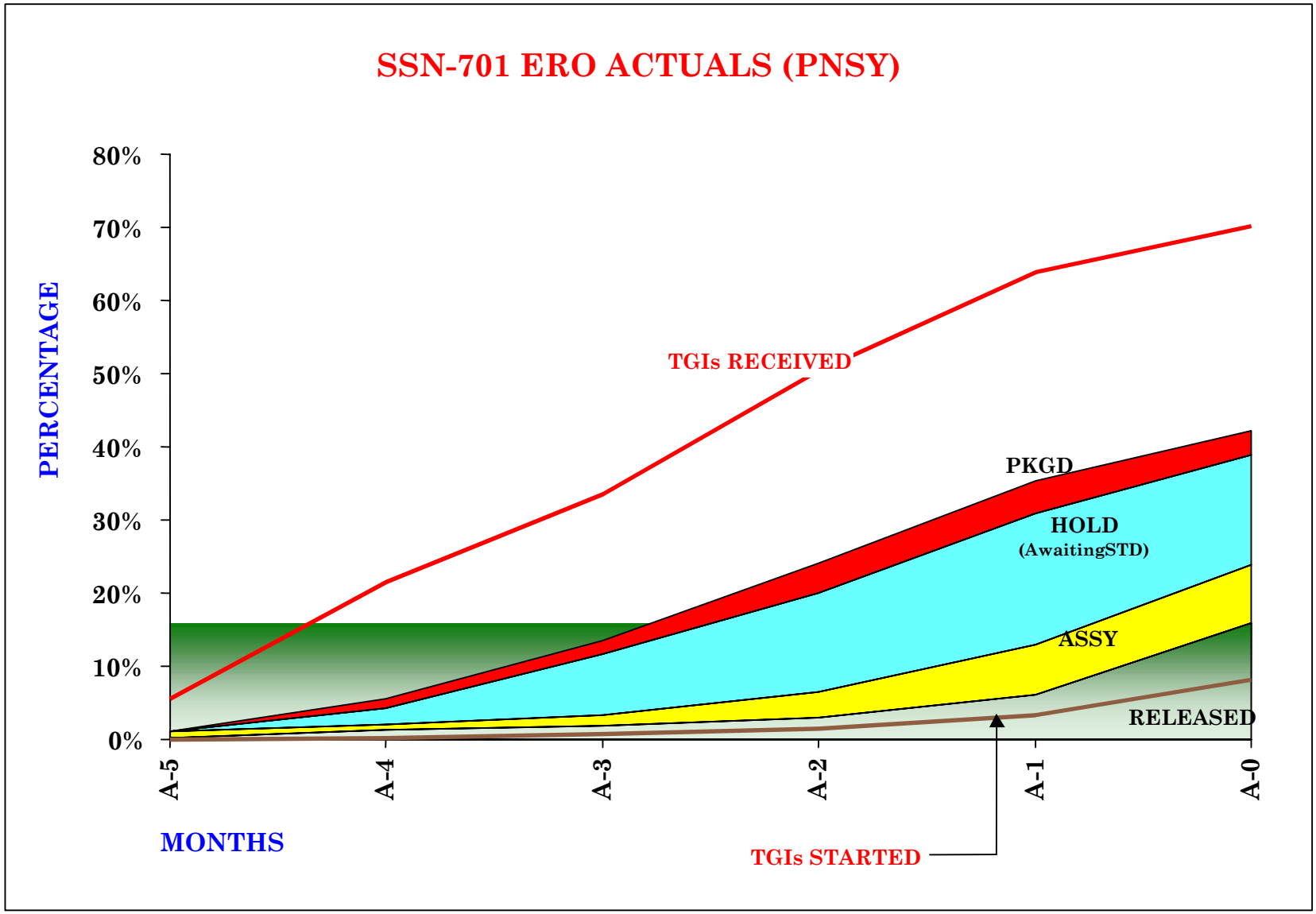
Enclosure (1)

Nominal Nuclear Work Package	60,000 mds
	QAC%
WPC/WPC Manager	4.10%
Work Certification	1.10%
Material Coordination	1.90%
Work Control	2.40%
Trouble Desk	1.37%
Total WPC	11.97%

Task Packaging Project Level Metrics



Task Packaging Project Level Metrics (Cont'd)



Project Specific Weekly Material Summary Sheet

(Example)

USS _____(SSN____)

Weekly Material Status Summary

Week: _____

Total Ship Material:

			Outstanding Material					
		RFI Mtrl	Material Due		Unawarded		Back-Ordered	
Material Type	Total Ordered	Total Docs RFI	This Week	Last Week	This Week	Last Week	This Week	Last Week
Purchase								
System								
Shop Stores								
Total								

Percent Total Material Ordered:_____

Prefab Material:

			Outstanding Material					
		RFI Mtrl	Material Due		Unawarded		Back-Ordered	
Material Type	Total Ordered	Total Docs RFI	This Week	Last Week	This Week	Last Week	This Week	Last Week
Purchase								
System								
Shop Stores								
Total								

AERP Material:

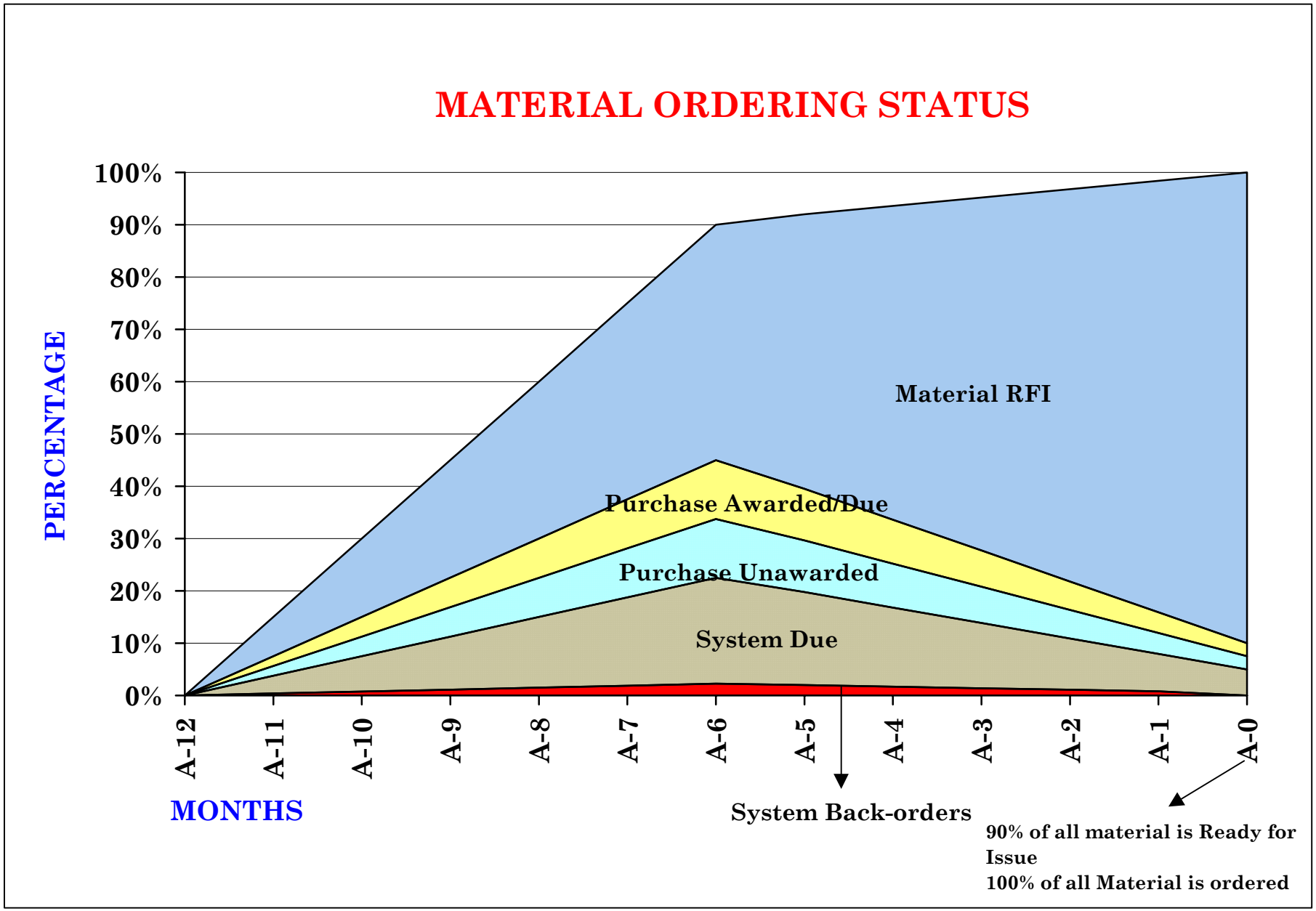
Job Summary	Doc. Number	Item Description	ETD	Remarks

LLT Material:

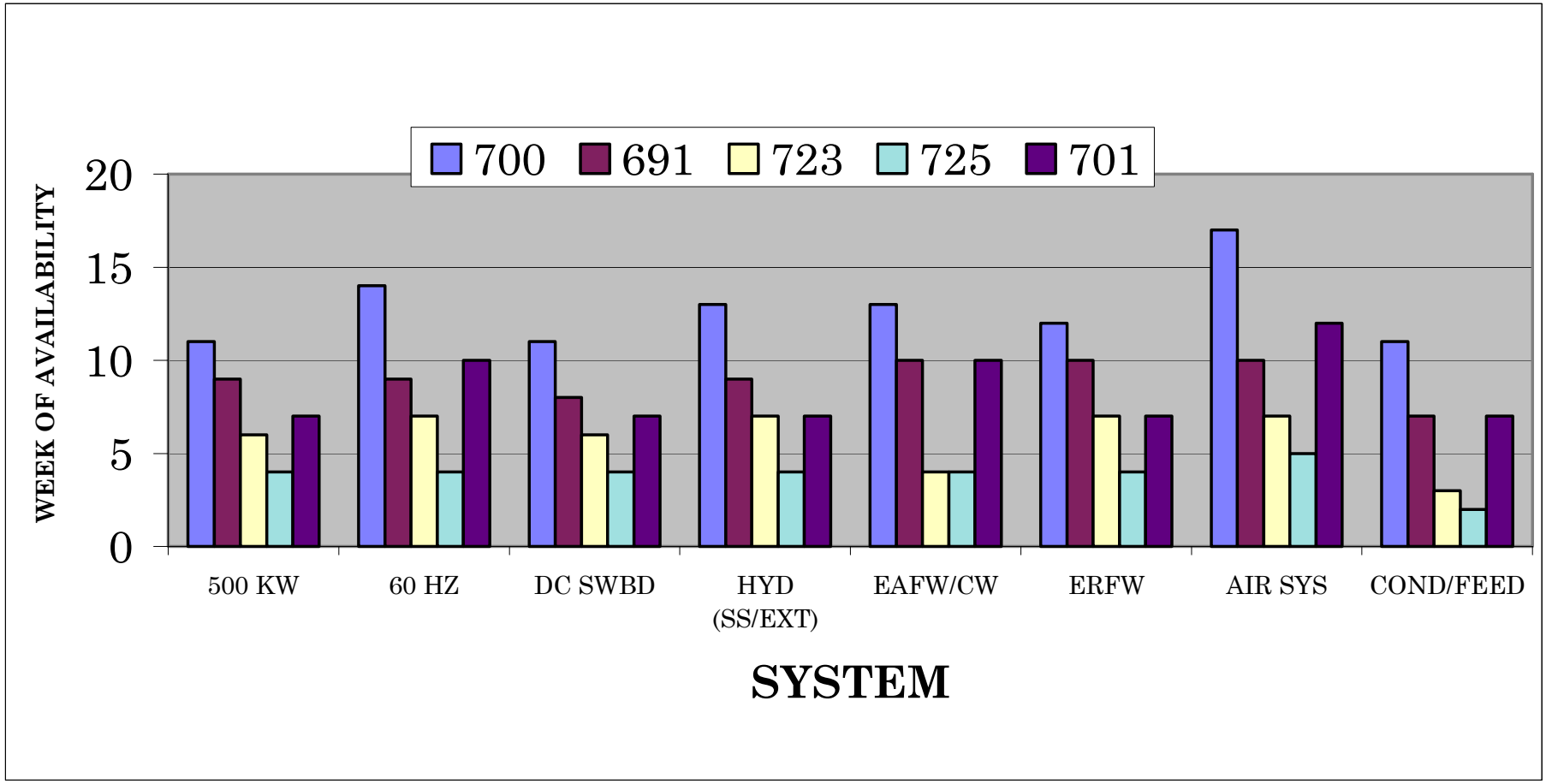
Job Summary	Doc. Number	Item Description	ETD	Remarks

CCRP Material

Number Required	EDD do not meet A-0	Number RFI


MATERIAL ORDERING STATUS
PERCENTAGE
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Material RFI
Purchase Awarded/Due
Purchase Unawarded
System Due
A-12
A-11
A-10
A-9
A-8
A-7
A-6
A-5
A-4
A-3
A-2
A-1
A-0
MONTHS
System Back-orders
90% of all material is Ready for Issue
100% of all Material is ordered

System Take-Down Profiles



Project Specific Daily Problem Summary Sheet

(Example)

USS _____(SSN___)
Daily Trouble Desk Summary
Date: _____

(Note: Below tables are auto-filled by Project Problem Log.)

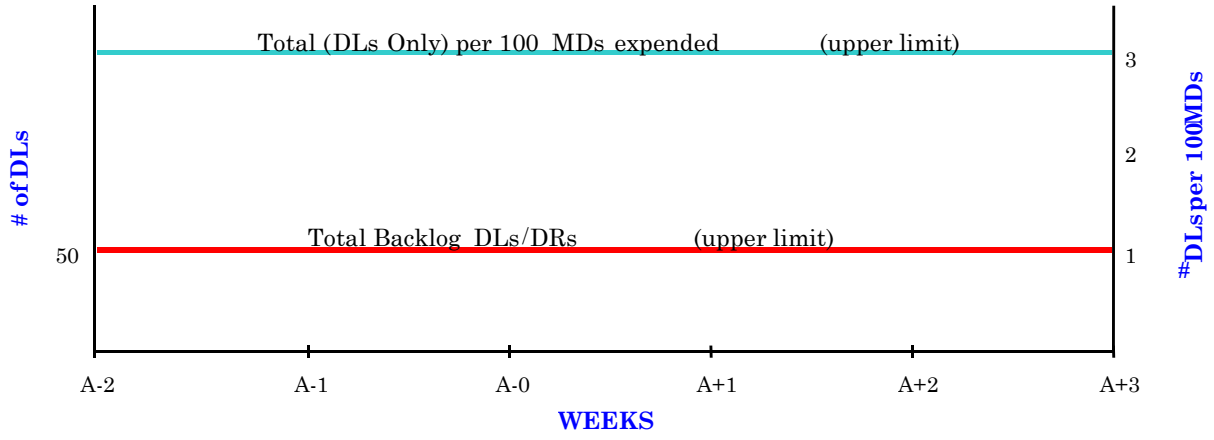
DL Analysis:

Discipline	Total To-Date	Received Today	Corrected Today	Outstanding/ Backlog
Combat				
Electrical				
Mechanical				
Structural				
Total DLs				

DR Analysis:

Discipline	Total To-Date	Received Today	Corrected Today	Authorization Outstanding	Outstanding/ Backlog
Combat					
Electrical					
Mechanical					
Structural					
Total DRs					

PROJECT DL/DR TREND



APPENDIX H

New Work Strategy

(To be provided later)

APPENDIX I

Special Evolution Schedule

USS La Jolla (SSN-701) Arrival (NE00)
100 Hour Schedule

ID	Task Name	Duration	Start	Finish	Predecessor	Job Order	Zone Mgr	Comments	Resource Names
1	ARRIVAL	2h	08/21/98	08/21/98		04401S06	Sullivan	X72 Pri 1, 1300 ETA	Tug Office,X72
2	Install Fwd Brow Platform	1h	08/21/98	08/21/98	1	03101R04	Sullivan	X72 Pri 2	X64,X72,X11
3	Install Fwd Brow	0.5h	08/21/98	08/21/98	2	03101R04	Sullivan	X72 Pri 3	X72
4	Install Aft Brow Platform	1h	08/21/98	08/21/98	3	03101R04	Sullivan	X72 Pri 4	X11,X72,X64
5	Install Aft Brow	0.5h	08/21/98	08/21/98	4	03101R04	Sullivan	X72 Pri 5	X72
6	Topside RAD Survey	1h	08/21/98	08/21/98	2	86005S04	Scardina		c/105
7	Install CCP Poly Bottles	4h	08/21/98	08/21/98	3	08011S01	Scardina		X56,C/2340
8	Load Reduc Gear Dehumidifier	1h	08/21/98	08/21/98	3	04402R02	Sullivan	X72 Pri 6 Load Unit Only,stage S06	X72,X99
9	Load Sparge Vent Tank	1h	08/21/98	08/21/98	3	08012S01	Scardina	S72 Pri 7	X56,X72
10	Install Grounding Cable	4h	08/21/98	08/21/98	5	03803R01	Sullivan		X99,270.3
11	Install Aft Shore Power	4h	08/21/98	08/21/98	4,7,8	03101R05	Sullivan	X72 Pri 8,Need W.P.061	X99,SF
12	Perform F-18 Test	8h	08/21/98	08/22/98	11	86013S05	Price		2340,SF,105.3.134
13	RAD Posting in Hull	4h	08/21/98	08/21/98	6		Scardina		105.3
14	Sample/Analyze CWSTs	2h	08/21/98	08/21/98	2		Price		2340,SF
15	C/105 Eng Room Survey	1d	08/21/98	08/22/98	13	86005S05	Scardina		105.3
16	Install Temp Trim and Drain	4h	08/21/98	08/21/98	3	03101R07	Sullivan	Need W.P.063	X99,SF
17	Install Temp Sanitary	3h	08/21/98	08/21/98	3	03101R06	Sullivan	Need W.P.062	X99,SF
18	Install Temp Potable Water	1h	08/21/98	08/21/98	3	03101A01	Sullivan	Need W.P.084	X99
19	Install ECC Telephone	4h	08/21/98	08/21/98	5	08009R05	Scardina	Need W.P.064	X99,SF,X51
20	Install Watch Shack & Telephones	3h	08/21/98	08/21/98	2	03301S07	Sullivan		X99
21	Install TPW to SD-8O	1d	08/21/98	08/22/98	5	85019S07	Scardina		X99,X56,2340
22	Offload Hydrogen Bottles	1d	08/21/98	08/22/98	5	82701U03	Scardina	X72 Pri 9,NO HOT WORK	X11,X72,SF
23	Install Topside Lighting	5h	08/21/98	08/21/98	5	03603R13	Sullivan	Stand and brow lighting only	X99

USS La Jolla (SSN-701) Arrival (NE00)
100 Hour Schedule

ID	Task Name	Duration	Start	Finish	Predecessor	Job Order	Zone Mgr	Comments	Resource Names
24	Install Access Egress Bds	2h	08/21/98	08/21/98	20	03602A06	Sullivan		X64
25	Install Temp Svc Air Patch #6	8h	08/21/98	08/21/98	6	03601R08	Sullivan		X99(TLD)
26	Install Temp Ventilation P#6	3h	08/24/98	08/24/98	6		Sullivan		X99(TLD)
27	Install RA-18 Poly Bottle	1d	08/21/98	08/22/98	6	08011S02	Scardina		SF
28	Rx Shutdown	4h	08/22/98	08/22/98	12		Price		2340,SF
29	Drain CWST #1	2h	08/22/98	08/22/98	28		Price	Wheeler Support 8/22 AM & PM	2340,SF,X71
30	Load CPW	8h	08/22/98	08/23/98	29		Price		
31	Install NUC PMG	20d	08/22/98	10/05/98	28		Banks		X99
32	Install Lagging CP-15 BFPL	16h	08/22/98	08/23/98		82802S02	Scardina		X64,105.3
33	Install Temp LN2 Supply	1d	08/22/98	08/24/98	28	08012H02	Scardina		X56
34	Install CS-18 BFPL	1d	08/23/98	08/24/98	28	86019S09	Scardina		X56,2340
35	Install RA-29 Poly Bottle	3h	08/23/98	08/23/98	6		Scardina		
36	Install CH-4/39 Poly Bottle	3h	08/23/98	08/23/98	6		Scardina		
37	Install CD-23 Test Equipment	16h	08/23/98	08/24/98	6		Scardina		
38	Instrumented Water Slugs	8h	08/24/98	08/24/98			Digilio		X38,CS0,SF
39	Remove Towed Array Covers	4d	08/24/98	08/28/98	3	13201U04	Theriault	X72 Pri _____	X64,X72
40	Install Topside Rails/Kickboards	1d	08/24/98	08/25/98	6	03301R02	Sullivan	X72 Pri 10	X64,X72
41	Inst Temp Nitrogen Equip	3d	08/24/98	08/27/98		62303S02	Scardina		X56,X99
42	Load Air Dry Manifolds	1d	08/24/98	08/25/98	6	04402R10	Sullivan		X99
43	Install Rad Vent Blwr Platform	16h	08/24/98	08/25/98	28	03402R08	Lauze	X72 Pri 13	X11,X72
44	Off Load Blhd Mtd Spares	3d	08/24/98	08/27/98	6	04501U02		Start in NLON	SFX17
45	Pre Ovhl Shaft Alignment Rdgs	1d	08/24/98	08/25/98	6	20301/02	Davis	Need W.P.093	X38
46	Weigh Off Loaded Materials	3d	08/24/98	08/27/98	6	03201S10			SF,500

USS La Jolla (SSN-701) Arrival (NE00)
100 Hour Schedule

ID	Task Name	Duration	Start	Finish	Predecessor	Job Order	Zone Mgr	Comments	Resource Names
47	Interior Lead Pnt Samples	4d	08/24/98	08/28/98	6	60501D02	Sullivan		X71
48	Rx Plant CD <200F include RPFW	1d	08/24/98	08/25/98	30	86013S05	Price		2340,SF
49	30 hr post Shutdown Rad Survey	2d	08/25/98	08/27/98	48,28	85301S01	Malec		105
50	Inst 500KW MG Positive Press	1d	08/25/98	08/28/98		04402S02	Coles		S99
51	Install Draft Markers	1h	08/25/98	08/25/98	40	03301A01	Sullivan	X72 Pri 11 SPOD	X64,X72
52	Install Sail Racetrack	4h	08/25/98	08/25/98	51	03301S04	Sullivan	X72 Pri 12	X64,X72
53	Rmv MS-5 Handwheel P#6	2h	08/25/98	08/25/98	48	03702U04	Theriault	Need W.P.078, after cooldown	X38
54	Offload Pyrotechnics	8h	08/25/98	08/25/98	6			SPOD NO HOT WORK	SF
55	Sample Oxygen Banks	1d	08/25/98	08/28/98	6	53301S01	Devlin	Need W.P.071	X56
56	Inst Temp Firefighting Sys	2d	08/25/98	08/27/98	6	03601R06	Sullivan		X99
57	Scrub Hull and Prop	4d	08/25/98	08/29/98		13101A19	Sullivan	Need W.P.067	X72
58	Install Temp Diesel Exhaust	3h	08/25/98	08/25/98	52	03401R01	Sullivan	Need W.P.069	X17,X64
59	Open RC & Ventilate	8h	08/25/98	08/25/98	48		Valliere		105.3,SF
60	Install RA-15 Gage Manifold	12h	08/25/98	08/25/98		08004S05	Scardina		X56
61	Inst Temp Pwr Batt Amp Hr Meter	4h	08/26/98	08/26/98		03502S15	Sullivan		X99
62	Install Cascon system	2d	08/26/98	08/28/98	6	03502R06	Sullivan	X72 Pri 16 Load Equipment Only	X99
63	Install Patch 6 Coaming	1d	08/26/98	08/27/98	25	03702T01	Theriault	X72 Pri 15 (Rmv SHT inNLON)	X11,X72
64	Remove Ships Rad Signs	1d	08/27/98	08/28/98	49	82532U07	Scardina		105
65	Install Spill Kits	4h	08/27/98	08/27/98	49	08001R03	Scardina		105
66	Test Patch 6 Coaming	1d	08/27/98	08/28/98	63		Theriault		X11
67	Rmv Ltg & Fdln Interfer P#6	4h	08/27/98	08/27/98	49	03702U06	Theriault	Need W.P.____, after cooldown	X51
68	Rmv Hyd Ppg Interfer P#6	4h	08/27/98	08/27/98	49	03702U09	Theriault	Need W.P.006	X56
69	Inst Lkg Device Rudder	4h	08/27/98	08/27/98	6	03401R04	Sullivan	Need W.P. 070	X38

APPENDIX J

DMP, ERO and EOH Key Event and Milestone Listing

For SSN 688 Class Submarines

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DMP, ERO and EOH Key Event and Milestone Listing

For SSN 688 Class Submarines

BPMP EVENT ID	BPMP TITLE	DEFINITION
CA00	**COMPLETE AVAILABILITY**	**TYCOM CONCURS WITH OVERHAUL COMPLETION DATE**
CA01	NUC SERVICES START IPPTP TO COMPLETE AVAILABILITY	NUC SERVICES FROM START IPPTP TO COMPLETE AVAILABILITY COMPLETED
CA07	REFUELING FACILITY RESTORATION COMPLETE	ALL MECHANICAL/ELECTRICAL SYSTEMS AND COMPLEX REMOVED/RESTORED
CA08	REFUELING SHIPOUTS COMPLETE	PV HEAD, CORE BARREL SHIPPING & STORAGE CONTAINER & POWER UNIT SHIPPING CONTAINER SHIPPED OFF YARD
CA09	POST REFUELING COMPLETE	POST USE EQUIPMENT INSPECTIONS COMPLETE
CC00	**COMPLETE COLD OPS**	**COMPLETE COLD OPS TESTING**
CP00	**COMPLETE IPPTP**	**COMPLETE INTEGRATED PROPULSION PLANT TESTING**
CR00	**COMPLETE REFUELING**	**COMPLETE REFUELING (LAST WELD)**
CR01	NUC SERVICES START REFUELING TO COMPLETE REFUELING	NON-REFUELING NUC PRODUCTION SERVICES FROM START REFUELING TO COMPLETE REFUELING COMPLETED
CR20	COMPLETE PREREQs FOR CLOSURE HEAD REMOVAL	PREREQs SIGNED TO SUPPORT CLOSURE HEAD REMOVAL (PRL-2)
CR30	COMPLETE PREREQs FOR FUEL REMOVAL	PREREQs SIGNED TO SUPPORT FUEL REMOVAL (PRL-3)
CR40	COMPLETE PREREQs FOR CORE BARREL REMOVAL	PREREQs SIGNED TO SUPPORT CORE BARREL REMOVAL (PRL-4)
CR50	COMPLETE PREREQs FOR UPRIGHTING P.U.S.C.	PREREQs SIGNED TO SUPPORT UPRIGHTING P.U.S.C. (PRL-5)
CR60	COMPLETE PREREQs FOR POWER UNIT INSTALLATION	PREREQs SIGNED TO SUPPORT POWER UNIT INSTALLATION (PRL-6)
CR70	COMPLETE PREREQs FOR SEAL WELDING	PREREQs SIGNED TO SUPPORT SEAL WELDING (PRL-7)
CT00	**COMPLETE COMBAT SYSTEMS DOCKSIDE TESTING**	**ALL COMBAT SYSTEMS DOCKSIDE TESTING COMPLETE**
CT01	ALL MASTS OPERATIONAL	ALL MASTS, ANT AND ASSOCIATED SAIL COMPONENTS WORK & TESTING COMPLETE
CT81	TORPEDO TUBE & WEAPON SYS READY FOR TESTING	TORPEDO TUBES & WEAPONS SYSTEMS READY TO SUPPORT TESTING.
CU00	**COMPLETE FUEL REMOVAL**	**COMPLETE FUEL REMOVAL**
CW00	**START CWS TESTING**	**REQUIRED SHIPS SYSTEMS READY TO SUPPORT COMBAT SYSTEM TEST PROGRAM**
CW01	EAFW SYS OPERATIONAL	EAFW SYSTEM READY TO SUPPORT EQUIPMENT OPERATIONS.

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For SSN 688 Class Submarines

CW02	FAN ROOM OPERATIONAL	VENT FANS 1,2,3,4,5,6,8 + COOLING COILS 1,2 AND ASSOCIATED VENT PIPING IS INSTALLED TO SUPPORT SYSTEM OPERATIONS
CW08	VLS SUPPORT SYS READY TO SUPPORT CW00	ALL VLS SUPP SYS(HYD-HML, HMS, MFD, APV GRAVITY DR, HIGH PRESS AIR, EXT HYD)
DD00	**DOCK SHIP**	**SHIP HAS BEEN PLACED IN DRYDOCK, IS ON BLOCKS, AND DOCK IS PUMPED**
DD01	INITIAL REACTOR PLANT COOLDOWN	REACTOR PLANT COOLDOWN COMPLETE
DT00	**COMPLETE DOCK TRIALS**	**DOCK TRIALS ARE COMPLETE**
DT02	COMPLETE PRODUCTION WORK STEERING & DIVING SYSTEM	STEERING & DIVING PRODUCTION WORK COMPLETE TO SUPPORT OPS TESTING
DT04	START STEERING AND DIVING OPERATIONAL TESTS	STEERING AND DIVING HYDRAULIC POWER PLANT OPERATIONAL AND CONTROL SURFACES READY TO SUPPORT TSA ALIGNMENTS.
DT07	COMP SALVAGE INSPECTION	CONDUCT SALVAGE INSPECTION
DT08	SAIL CLOSEOUT COMPLETE	SAIL CLOSEOUT COMPLETE
DT42	PRODUCTION WORK COMPLETE TO SUPPORT START DOCK TRIALS	ALL PRODUCTION WORK CODED TO DT00 COMPLETE.
EG00	**END GUARANTEE PERIOD**	**END OF POST AVAILABILITY GUARANTEE PERIOD**
FC00	**START FAST CRUISE**	**ALL REQUIRED WORK CERTIFIED COMPLETE; COMMENCE SHIPS FORCE FAST CRUISE**
FC42	COMPLETE PRODUCTION WORK FOR FAST CRUISE	ALL PRODUCTION WORK CODED TO FC00 IS COMPLETE
HB00	**HABITABILITY**	**ALL SIGNIFICANT BERTHING & MESSING HABITABILITY WORK COMPLETE**
HB05	COMPLETE HB00 SPACE TURNOVER	HB00 LIVING/MESSING SPACES INSPECTED AND TURNED OVER TO S/F.(EXCLUDES PIPING SYSTEMS AND TANKS)
HB07	REINSTALL PATCH #15 COMPLETE	PATCH #15 (SERVICE CUT) COMPLETELY INSTALLED.
HB08	INSPECTION & REPAIRS COMPLETE WEAPONS SHIPPING HATCH	ALL WORK ON WEAPONS SHIPPING HATCH COMPLETE.
JS00	**COMPLETE APPROVAL OF JOB SUMMARIES AND CU PHASES**	**COMPLETE APPROVAL OF JOB SUMMARIES AND CU PHASES ARRIVAL MINUS 4 MONTHS**
JS01	FINALIZE JOB SUMMARIES (ISSUE 1)	FINALIZE JOB SUMMARIES (ISSUE 1)
JS02	FINALIZE JOB SUMMARIES (ISSUE 2)	FINALIZE JOB SUMMARIES (ISSUE 2)
JS03	ISSUE REVISED AWP	Authorized Work Package Issue 2 is officially transmitted by SUBMEPP to SHAPEC & Executing Activity. See BPMP APPENDIX D.
JS04	PRE-FAB SCHEDULE ISSUED	PRE FAB SCHEDULE ISSUED

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DMP, ERO and EOH Key Event and Milestone Listing

For SSN 688 Class Submarines

MP00	**COMP MAST/SCOPE INSTALLATION**	**MAST AND SCOPES COMPLETE, INSTALLED ON OIL (EXCLUDES BRA-24)**
MP01	ALL SAIL STRUCT RPRS/MODS COMP (INCLUDES ZINC INST.)	ALL STRUCTURAL SAIL WORK IWO MAST/ANTENNAS IS COMPLETE. (INCLUDES EXTERIOR OF SAIL)
MP02	COMP SAIL INTERNAL PRESERVATION	SAIL INTERIOR IS COMPLETE/READY FOR MAST/ANTENNA INSTALLATION. (EXCLUDES MINOR TOUCHUP)
MP03	SAIL CLOSEOUT COMPLETE	SAIL CLOSEOUT COMPLETE
NE00	**START/NEST/DOCKSIDE**	**SHIP ARRIVES**
PB00	**PLAN FOR PLANNING BRIEF**	**Planning brief presented per BPMP.**
PB01	BEGIN PLANNING STATUS REPORTING	Regular reporting of planning product development metrics monthly per BPMP Figure 2.3-2 & Paragraph 4.5.4.4.
PB02	COMPLETE BASELINE KEY EVENT AND MILESTONE NETWORK	Nominal Key Event And Milestone Network Entered In BAIM And Scheduled In PSS. System Transfers and Turnbacks Entered In BAIM. System Transfers Scheduled In PSS.
PB03	ISSUE OF EXECUTION STRATEGIES COMPLETE	ISSUE OF EXECUTION STRATEGIES COMPLETE.
PS00	**PLANNING START**	**Planning Start, ARRIVAL MINUS 20 MONTHS**
PU00	**STAND UP INITIAL PROJECT TEAM**	**Project Management Team assigned full time, PS , PEPM , & Business Office Rep.**
RL00	**COMPLETE RESOURCE LEVELED SCHEDULE**	**Defined As Complete Upon Official Issue Of Resource Leveled Schedule As Defined In BPMP** Section 4.4
RM00	**COMPLETE R/O OF MAJOR COMPONENTS**	**NON-HATCHABLE ITEMS REMOVED FROM SHIP.**
RM01	COMP R/O HULL CUT #1	HULL CUT #1 IS REMOVED FROM THE SHIP, HULL IS BEVELED-GROUND AND TAPED OVER.
RM02	ALL AERP COMPONENTS AVAILABLE	ALL COMPONENTS IDENTIFIED IN THE OWP ARE AVAILABLE.
RM04	COMP R/O ALL MASTS & SCOPES	ALL MASTS AND ANTENNAS ARE REMOVED FROM THE SHIP AND SHIPPED TO THE REPAIR FACILITY.
RM05	COMP R/O HULL CUT #5	HC #5 IS REMOVED FROM THE SHIP, HULL IS BEVELED-GROUND AND TAPED OVER.
RM06	COMP R/O SHAFT & PROP.	PROPELLER AND SHAFT IS REMOVED FROM THE SHIP AND SHIPPED TO REPAIR/STORAGE FACILITY.
RM07	COMP R/O 500KW MG SET ROTORS	MG SETS ARE REMOVED FROM THE SHIP, FDNS AND STUDS ARE BEVELED AND GROUND/PREPPED FOR R/I.
RM08	COMP R/O STERN PLANES & RUDDERS	PLANES AND RUDDERS ARE REMOVED FROM THE SHIP AND SENT TO BLAST AND PNT (INCLUDES FWTR PLANES)
RM09	COMP R/O H&BU VALVES	ALL FLANGED HULL/BACKUP VALVES ARE REMOVED FROM THE SHIP AND SHIPPED TO THE STORAGE FACILITY
RM12	MAIN CONDENSER AIR DRY STARTED	CONDENSER AIR DRIES ARE IN PROGRESS.
RM13	ALL STEAM PLANT AIR DRIES ARE STARTED.	STEAM PLANT AIR DRIES ARE IN PROGRESS.
RM14	SWBDS DEENERGIZED FOR OVHL	TEMPORARY POWER IS INSTALLED AND SWBDS ARE DEENERGIZED.

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RM15 RM16	COMP R/O HULL CUT #15 COMP R/O HULL CUT # 20	PATCH # 15 CUT & REMOVED FROM SHIP. PATCH #20 CUT & REMOVED FROM SHIP.
RM19	COMPLETE R/O ER NUC I&C PANELS	RC, PPI, NI, RPCP, SBP, SGWLC, DPS REMOVED FROM SHIP.
RM20	COMPLETE R/O OF ALL SHOP REPAIRABLES	ALL ITEMS REQUIRED TO BE SENT TO X-31 FOR RPR ARE REMOVED FROM SHIP AND READY TO BE SENT TO X-31.
RM21 RM22	COMP R/O HULL CUT #21 COMP R/O HULL CUT #22 SERVICE PATCH	PATCH #21 CUT & REMOVED FROM SHIP. PATCH #22 CUT & REMOVED FROM SHIP.
RM25	COMP R/O HULL CUT # 25	HC #25 IS REMOVED FROM THE SHIP, HULL IS BEVELED-GROUND AND TAPED OVER.
RM33	COMPLETE R/O HULL CUT #33	HULL CUT #33 IS REMOVED FROM THE SHIP, HULL IS BEVELED-GROUND AND TAPED OVER.
RM34	COMP R/O ER SERVICE HULL CUT #6	HULL CUT #6 IS REMOVED FROM THE SHIP, HULL IS BEVELED-GROUND AND TAPED OVER.
RM35	COMPLETE R/O ALL INTFS FOR REMOVAL OF NUC I&C PANELS	FLOW PATH INTF. FOR RC, PPI, NI, RPCP, SBP, SGWLC AND DPS CABINETS HAVE BEEN REMOVED.
RM36	ALL SYSTEM TRANSFERS FROM S/F TO S/Y COMPLETE	INITIAL S/F TO S/Y TRANSFERS ARE PROCESSED AND ASSOCIATED CUIs REPORTED COMPLETE.
RM37	WORK DISCOVERY INSPECTIONS COMPLETE	I, H, A, W PHASES IDENTIFIED BY PROJECT AS WORK DISCOVERY COMPLETE.
RM 40	COMPLETE R/O HULL CUT #35	HULL CUT #35 IS REMOVED FROM THE SHIP, HULL IS BEVELED-GROUND AND TAPED OVER.
RM 41	**COMPLETE R/O HULL CUT #37**	**HULL CUT #37 IS REMOVED FROM THE SHIP, HULL IS BEVELED-GROUND AND TAPED OVER**
SA00	**START AVAILABILITY**	**CNO START DATE**
SA01	PREFAB MFG. COMP TO START OVERHAUL	PRE FAB FOR SA00 COMPLETE
SA02	NUC SERVICES TO START AVAILABILITY	NUC SERVICES TO START AVAILABILITY
SA03	COMPLETE ARRIVAL INSPECTION & TEST	ALL POTS TESTING COMPLETE & REVIEWED.
SA04	SUBMIT FINAL REVIEW ESTIMATE	Estimates has been prepared and accepted by the Executing Activity Business Office for submittal to the customer. See BPMP APPENDIX D.
SA05	COMPLETE WPC RELEASE OF TGIs FOR PREFAB REQUIRED BEFORE A+2	Prefabrication identified in all Job Summaries completed for Event JS00 to Production Shops for accomplishment of work.
SA06	BEGIN WORK PACKAGING	Processing of services and Pre-fab TGIs are being issued and reasonably expected to continue.
SA07	WPC RELEASE SERVICES TGIs	Release the first 60 days of production TGIs for pre-staging temporary services to support Production Shops.
SA08	CONDUCT READINESS TO START BRIEF.	AS DEFINED BY BPMP PARAGRAPH 4.2
SA10	COMPLETE ASSEMBLING 1st 60 DAYS OF WORK PACKAGES	PROGRESSING WORK PACKAGING AND DELIVERY TO SUPPORT 1ST 60 DAYS

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DMP, ERO and EOH Key Event and Milestone Listing

For SSN 688 Class Submarines

SA13	COMPLETE ISSUE OF TGIs FOR WORK STARTING 1st 60 DAYS	COMPLETE ISSUE OF TGIs FOR ALL JOBS STARTING BY A+60 DAYS (INCLUDING PRE-FAB JOBS).
SC00	**START COLD OPS**	**COMMENCE COLD OPS TESTING**
SC01	AIR BANK & AHP PIPING READY FOR COLD OPS	AHP PIPING AND AIR BANK IS READY AS REQUIRED FOR COLD OPS.
SC02	ENERGIZE SWBDS	ALL PRODUCTION WORK & PTIs ARE PERFORMED AND DEFICIENCIES CLEARED, SWBDS ENERGIZED.
SC03	ALL SECONDARY SYSTEMS READY TO SUPPORT SC00	ALL HP&A SECONDARY SYS READY FOR SC00
SC04	COMPLETE ALL NUC I&C S/A FDN MODS & MACHINING	ALL I & C FDNs READY TO LAND PANELS
SC05	COMPLETE LOAD & LAND NUC I&C PANELS ON FDNS	RC, PPI, NI, RPCP, SBP, SGWLC, DPS CABINETS BOLTED TO THEIR FDNS.
SC07	COMPLETE GROOM NUC I&C PANELS	ALL WORK COMPLETE, PANELS READY TO ENERGIZE
SC09	PRODUCTION WORK COMPLETE FOR SG HYDRO	ALL PRODUCTION WORK TO SUPPORT SG HYDRO COMPLETE
SC10	PRODUCTION WORK COMPLETE FOR MC HYDRO	ALL PRODUCTION WORK TO SUPPORT MC HYDRO COMPLETE
SC11	COMPLETE PREREQs FOR PLANT FILL/COLD OPS	ALL PRODUCTION WORK & PREREQs TO SUPPORT PLANT FILL/START COLD OPS COMPLETE
SC12 SC14	COMP LAND PATCH #21 PORT LOOP FILL	PATCH #21 LANDED IN PLACE. FILL PORT LOOP
SC15	REMOVE REFUELING BOOT	REFUELING BOOT AND WORK PLATFORM REMOVED.
SC17	SHIPS BATTERY READY TO SUPPORT BATTERY CHARGE	BATTERY, DISCONNECT SWITCH, ICV LEADS, AGITATION PIPING INSTALLED. 20# AIR OR TEMP AGITATION AIR AVAILABLE.
SC19	500KW MG SETS READY FOR PIPING & CABLING	SSMGs ON MOUNTS READY FOR CONNECTION.
SC20	500KW MG SETS READY FOR TEST	ALL SYSTEMS CONNECTED AND ON MOUNTS.
SC22 SC24 SC26 SC28	COMP LAND SERV PATCH #22 COLLAPSE PZR BUBBLE PORT LOOP BLOWDOWN COMP LAND PATCH #20	PATCH #22 LANDED IN PLACE. COLLAPSE PZR BUBBLE. PORT LOOP BLOWDOWN COMPLETE. PATCH #20 LANDED IN PLACE.
SC30	MANEUVERING RESTORED	MANEUVERING RESTORED.
SC31	RCP PUMP CHANGEOUT COMPLETE	RCP PUMP CHANGEOUT COMPLETE.
SC42	COMPLETE PRODUCTION WORK FOR START COLD OPS	ALL PRODUCTION WORK CODED TO SC00 COMPLETE.

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For SSN 688 Class Submarines

SP00	**START IPPTP**	**START INTEGRATED PROPULSION PLANT TESTING**
SP07	NUC SERVICES COMPLETE REFUELING TO START IPPTP	NUC SERVICES FROM COMPLETE REFUELING TO START IPPTP COMPLETED
SP08	COMPLETE ER CLOSEOUT	ENGINE ROOM COMPARTMENT CLOSEOUT IS COMPLETE.
SP15	START PRE RSE	START OF PRE-PORSE
SP16	START RSE	START OF PORSE
SP42	COMPLETE PRODUCTION WORK TO START IPPTP	ALL PRODUCTION WORK CODED TO SP00 COMPLETE.
SR00	**START REFUELING**	**START REFUELING**
SR02	FACILITIES READY TO SUPPORT TRAINING	ALL MECHANICAL/ELECTRICAL SYSTEMS READY TO SUPPORT TRAINING.
SR03	LAND RAE ON BOAT	RAE LANDED SHIPBOARD ON RSC
SR07	RAE READY FOR USE	ALL ELECTRICAL/MECHANICAL SYSTEMS READY TO SUPPORT RAE FOR USE
SR08	COMPLETE PREREQs FOR BREACHING PRIMARY BOUNDARY	PREREQs SIGNED TO SUPPORT BREACHING OF PRIMARY BOUNDARY (PRL-1).
SR09	ESTABLISH NI-DHR SYSTEM	NI-DHR SYSTEM OPERATIONAL.
SR10	COMPLETE R/O HULL CUT #24	PATCH #24 CUT & REMOVED FROM SHIP.
SR11	COMP R/O HULL CUT # 26	PATCH #26 CUT & REMOVED FROM SHIP.
SR13	RC READY TO SUPPORT REFUELING	REFUELING ENVELOPE ESTABLISHED TO SUPPORT REFUELING.
SR14	NUC SERVICES START AVAILABILITY TO START REFUELING	NUC SERVICES FROM START AVAILABILITY TO START REFUELING COMPLETED
SS00	**READINESS TO STEAM**	**COMPLETE PREREQUISITE LIST TO PERFORM ENGINE ROOM TESTING.**
SS01	COMP MSW SYSTEM STRENGTH TEST	MSW STRENGTH TEST COMPLETE. TEST EQUIPMENT REMOVED.
SS03	COMPLETE RC CLOSEOUT (RCCO)	REACTOR COMPARTMENT CLOSED OUT
SS04	COMP RPR OF MS/AS/GS/HPD SYSTEM	ALL REPAIRS OF MAIN STEAM, AUX STEAM, GLAND SEAL, AND HIGH PRESSURE DRAINS SYS. VALVES ARE COMPLETE.
SS05	ALL LO SYSTEMS OPERATIONAL	ALL LUBE OIL SYSTEMS ARE OPERATIONAL TO SUPPLY OILS TO MACHINERY
SS06	SPACE CLOSEOUT COMPLETE ER UL	SPACE CLOSEOUT COMPLETE ENGINE ROOM UPPER LEVEL TO SUPPORT READINESS TO STEAM.
SS07	SPACE CLOSEOUT COMPLETE ER ML	SPACE CLOSEOUT COMPLETE ENGINE ROOM MIDDLE LEVEL TO SUPPORT READINESS TO STEAM.
SS08	SPACE CLOSEOUT COMPLETE ER LL	SPACE CLOSEOUT COMPLETE ENGINE ROOM LOWER LEVEL TO SUPPORT READINESS TO STEAM.
SS09	SPACE CLOSEOUT COMPLETE ER NUC ZONES	SPACE CLOSEOUT COMPLETE ENGINE ROOM NUCLEAR ZONES TO SUPPORT READINESS TO STEAM.
SS10	COMP LAND HULL CUT #6	HC#6 LANDED IN PLACE
SS11	COMPLETE SSTG REASSEMBLY	ALL TURBINE & GENERATOR CASING & CONTROL VLVS INSTALLED, READY FOR REPIPING.

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For SSN 688 Class Submarines

SS13	COMPLETE R/I R-114 COMPONENTS	SYSTEM IS INSTALLED, COMPLETE TO SUPPORT PRESSURE TESTING.
SS42	COMPLETE PRODUCTION WORK FOR SS00	ALL PROD WORK TO SS00 COMPLETE
ST00	**START SEA TRIALS**	**SHIP UNDERWAY FOR OPERATIONAL TESTING AT SEA.**
TG01	COMPLETE ISSUE OF TGIs TO SUPPORT ISSUE 1 WORK	COMPLETE ISSUE OF TGIs TO SUPPORT ISSUE 1 WORK
TG02	COMPLETE ISSUE OF TGIs TO SUPPORT ISSUE 2 WORK	COMPLETE ISSUE OF TGIs TO SUPPORT ISSUE 2 WORK
UD00	**COMPLETE UNDOCKING**	**SHIP IS AFLOAT**
UD02	COMP RPR SHAFT COMPONENTS	ALL SHAFT COMPONENTS TO SUPPORT SHAFT INSTL ARE REPAIRED /READY FOR R/I. INCLUDES: SHAFT /PROP /BRGS /SEAL /HOUSING AND SSW ASSEMBLIES.
UD05	COMP LOADOUT/LAND HULL CUT #5	HULL CUT #5 IS LANDED IN PLACE
UD06	COMP OVHL STEERING & DIVING COMPONENTS.	ALL STEERING & DIVING COMPONENTS ARE OVERHAULED, RUDDERS AND PLANES, INCLUDING FWTR OR BOW PLANES, ARE READY FOR R/I (IF REMOVED).
UD07	START R/I SHAFT	SHAFT INSERTED INTO THE STERN TUBE.
UD08	COMP REPAIR OF H&BU VALVES IN SHOP	SHOP REPAIR OF ALL (AUTHORIZED) HULL & BACKUP VALVES IS COMPLETE. INCLUDES TDU.
UD09	COMP INST & TEST H&BU VALVES REPAIRED IN SHOP	COMPLETE INSTALLATION & TESTING OF ALL HULL& BACKUP VALVES BELOW N+4 THAT WERE REPAIRED IN SHOP.
UD11	COMP LOADOUT/LAND HULL CUT #1	HULL CUT #1 LANDED IN PLACE.
UD12	COMP R/I UNDWTR SNR XDUCERS & HYDROPHONES	ALL UNDERWATER SONAR TRANSDUCERS AND HYDROPHONES ARE INSTALLED, ASSOCIATED W/WS ARE COMPLETE IN TANKS AND BELOW WATERLINE.
UD14	COMP HULL RPRS FOR UNDOCK (INCLUDES SHT)	COMPLETE ALL REPAIRS ISSUED FOR URO-MRC 001 THRU 004 FOR UNDOCKING
UD15	FINAL PAINT BILGES	COMPLETE FINAL PAINT OF BILGES. (INCLUDES AMR BILGE AND VALVE OP STATION)
UD20	COMP ASW STRENGTH TEST	WORK AND STRENGTH TEST IS COMPLETE ON ASW SYSTEM TO SUPPORT UNDOCK AND OPS TESTS.
UD23	COMP 3" LAUNCHERS FOR UNDOCK	INSTALLATION AND TESTING OF 3" LAUNCHER IS COMPLETE TO SUPPORT UNDOCK TO PROTECT TO N+4.
UD25	COMP LOADOUT/LAND HULL CUT #25	PATCH #25 LANDED IN PLACE
UD26	DIESEL SUPPORT SYSTEMS COMP	ALL SYSTEMS REQUIRED FOR DIESEL OPS COMPLETE AND TESTED EXCEPT IC SYSTEMS ASSOCIATED WITH SNORKEL MAST.
UD27	COMPLETE DIESEL OPS	DIESEL OPS TEST IS COMPLETE, READY TO SUPPORT UNDOCKING. (S/F MILESTONE)
UD28	COMP LEAD BIN INSP & ISSUE INSTRUCTIONS	COMP LEAD BIN SAMPLE INSP & ISSUE INSTRUCTION FOR INSP REMAINING LEAD BINS (IF REQ)
UD32	COMP HULL INTEGRITY INSP.(URO MRC)	HULL SURVEY INSPECTIONS ARE COMPLETE, INSTRUCTIONS ARE COMPLETE AND ISSUED.

Appendix J

DMP, ERO and EOH Key Event and Milestone Listing

For SSN 688 Class Submarines

UD33	HYD SYS OPERATIONAL	HYD POWER PLANT SYS STRENGTH & TTNS & OPER TEST COMP, READY TO DELIVER HYD POWER TO ANY MAJOR COMPONENT OR SUBSYSTEM ON DEMAND.
UD34	COMPLETE LOADOUT & LAND HULL CUT #33	HULL CUT #33 LANDED IN PLACE.
UD37	COMP PRESERVATION TT/TEP OUTBD AREAS.	ALL TT/TEP OUTBOARD AREAS SURVEYED AND PRESERVED READY TO SUPPORT R/I OF EQUIP.(GRATES, TEP DOORS, ZINCS)
UD38	TT READY FOR UNDOCK	ALL WORK AND TESTING IS COMPLETE FOR TORPEDO TUBES, IMPULSE TANKS, AND EJECTION PUMPS, READY TO SUPPORT UNDOCKING.
UD39	VLS UNDOCKING WORK AND TESTING COMPLETE	ALL VLS SYSTEM WORK AND TESTING REQUIRED FOR UNDOCKING COMPLETE AND CERTIFIED
UD40	COMPLETE LOADOUT & LAND HULL CUT #35	HULL CUT #35 LANDED IN PLACE
UD41	COMPLETE LOADOUT & LAND HULL CUT #37	HULL CUT #37 LANDED IN PLACE
UD42	COMP PRODUCTION WORK FOR UNDOCK	ALL PRODUCTION WORK CODED TO KEY EVENT "UD00" IS COMPLETE. SHIP IS READY TO UNDOCK.
UD43	ALL TOWED ARRAYS READY FOR UNDOCK	ALL OK276 AND THINLINE TOWED ARRAY EQUIP REQ'D FOR UNDOCK INSTALLED & TESTED
UD44	REPAIR TRIM VALVES/COMPONENTS	SHOP COMP REPAIRS OF ONE INCH AND LARGER VALVES AND ACTUATORS AS IDENTIFIED IN AWP. SHOP TEST OF TRIM PUMP & PRIMING PUMP IS COMPLETE AND READY FOR INSTALLATION.
UD45	COMPLETE LOADOUT & LAND HULL CUT #24	HULL CUT#24 LANDED IN PLACE
UD46	COMPLETE LOADOUT & LAND HULL CUT #26	HULL CUT#26 LANDED IN PLACE
UD47	COMPLETE INSTALLATION OF SHT ZONE 140	HULL CUT #24 & #26 SHT RESTORED TO SUPPORT UD00
UD48	SPM READY TO SUPPORT UNDOCK	SPM READY TO SUPPORT UNDOCK
UD49	COMPLETE RESTORE BCP	BCP RESTORATION COMPLETE, BCP READY TO ENERGIZE.
UD59	COMP STERN END WORK	STERN END MACHINING COMP IN MUD TANK, RUDDERS, & STERN PLANES INSTL'D, ALL LINKAGE & CROSSHEAD ALIGNMENTS AND SYSTEM WORK COMP INCL HARD STOP READINGS. ALL SHAFT & PROP INSTALLATION & PRELIM TESTING IS COMPLETE TO SUPPORT UNDOCKING.
UD60	MBTS 4&5 WORK COMPLETE FOR UNDOCK	ALL PRODUCTION WORK COMP IN MBT 4 & 5, READY.
UD61	MBTS 1,2,3 WORK COMP FOR UNDOCK	ALL PRODUCTION WORK COMPLETE IN MBT 1,2 & 3 TANKS READY FOR FINAL CLOSEOUT
UD64	INTERNAL TANK WORK COMP FOR UNDOCK	ALL INTERNAL TANKS REQ'D FOR UNDOCK READY FOR FINAL CLOSEOUT.
UD66	COMP RPR/REPL ASW VLVS & CMPNTS FOR UNDOCK	COMP RPR/REPL ASW HULL AND BACKUP VALVES TO SUPPORT UNDOCKING

Appendix J

DMP, ERO and EOH Key Event and Milestone Listing

For SSN 688 Class Submarines

UD67	COMP RPR IN PLACE MSW VALVES	COMP IN PLACE REPAIR OF MSW VALVES & ALL TESTING COMP TO SUPP UNDOCK
UD72	COMP EMBT STRENGTH TEST	COMP EMBT RPR & STRENGTH TESTING TO SUPP UNDOCK.
UD73	EXT HYD SYS FLUSHED & TESTED	EXT HYD SYS FLUSHED & HYDROSTATIC TESTED, RESTORED & READY TO SUPP EXT HYD OPER
UD81	REMOVE RAE	RAE REMOVED AND LANDED ON TRAINING BASE
UD83	COMP PRESERVATION OF VLS OUTBD AREAS	ALL VLS OUTBD AREAS SURVEYED & AREAS PRESERVED READY TO INSTL EQUIP.
WN00	CONDUCT IPM	Conduct Initial Planning Meeting per BPMP APPENDIX D
WN02	COMPLETE INITIAL PLANNING ESTIMATE	Comp when estimate has been prepared and accepted by Executing Activity Business Office for use at the IPM or BSPO Sales Estimate comp.
WN03	COMPLETE TEST AND INSPECTION PERIOD	BPMP APPENDIX D in the section "Begin Test and Inspection Period) including all elements identified in that section.
WN04	CONDUCT PLANNING MEETING	Meeting held per requirements of BPMP.

APPENDIX K

Life Cycle Maintenance Process
for the Baseline Project
Management Plan

K. Life Cycle Maintenance Process for the Baseline Project Management Plan

K.1 Purpose

To establish a management plan for life cycle maintenance of the Baseline Project Management Plan (BPMP). This plan describes the change process requirements and identifies the related responsibilities and requirements for maintaining the BPMP.

K.2 Background

This plan was developed to maintain the BPMP for planning and executing SSN688 Class Depot Modernization Periods (DMP), Engineered Refueling Overhauls (ERO), and Engineered Overhauls (EOH). The establishment of a formal life cycle maintenance process is necessary to ensure successful accomplishment of this objective. Utilizing a formal process will ensure effective coordination and management of the BPMP and will ensure:

a. Standardized format for all change request responses.
b. Timely evaluation and incorporation of change request.
c. Automated tracking system for all review comments.
d. Consistent distribution of all changes to the manual.
e. A historical database containing all background information that led to changes and revisions to the BPMP.

K.3 Responsibilities and Requirements

This section defines the responsibilities and requirements of all activities involved in supporting the life cycle maintenance process of the BPMP.

K.3.1 Naval Sea Systems Command – NAVSEA 04X

The Naval Sea Systems Command (NAVSEA) 04X will:

a. Review and evaluate all BPMP change requests. Provide a single consolidated NAVSEA endorsement for each proposed change in preparation of issuing an official change/revision to the manual. Notify SUBMEPP of this endorsement via letter within sixty calendar days of receipt.
b. Designate a NAVSEA 04X point of contact to act as BPMP coordinator.
c. Provide funding for the life cycle maintenance of the BPMP.

d. Sponsor annual BPMP Review Meetings. The purpose of these meetings is to reach agreement on any changes that were not resolved during the year. An aggregate review of the changes that were approved during the year will also be conducted to ensure that no conflicting or redundant changes are incorporated into the final annual revision.
e. Resolve conflicting comments with other stakeholders when required within thirty days of notification that conflicts exist.
f. Identify changes to the BPMP distribution list.

K.3.2 Naval Sea Systems Command Support Codes

NAVSEA support codes (SEA08 and PMS393) will:

a. Review and evaluate all BPMP change requests. Provide comments or concurrence to SEA04X BPMP Coordinator within forty-five calendar days of receipt of the change, in order support consolidated NAVSEA response within sixty days.
b. Identify changes to the BPMP distribution list.
c. Attend all BPMP Review Meetings.

K.3.3 Type Commander

The Type Commander (TYCOM) will:

a. Review and evaluate all BPMP change requests within sixty calendar days of receipt of the change
b. Designate a single SUBLANT and SUBPAC point of contact to act as BPMP coordinator
c. Review and endorse all change packages in preparation of issuing an official change/revision to the manual. Submit endorsement or comments using the Change Response Form. Provide response electronically, by fax, or mail to the SUBMEPP BPMP Change Coordinator
d. Resolve conflicting comments with other stakeholders when required
e. Identify changes to the BPMP distribution list
f. Attend all BPMP Review Meeting

K.3.4 Submarine Maintenance Engineering, Planning, and Procurement

Submarine Maintenance Engineering, Planning, and Procurement (SUBMEPP) will:

a. Issue a letter of acknowledgment to the submitting activity within 7 calendar days of receiving the change request
b. Manage an automated tracking system for all BPMP change requests and provide a periodic status report of changes to the stakeholders

c. Incorporate approved changes into the BPMP and forward all change packages to the stakeholders for review in preparation of issuing an official annual change/revision to the manual
d. Notify NAVSEA, SUBLANT, and SUBPAC of conflicting comments on change requests when required
e. Prepare a response letter for NAVSEA 04X signature to the submitting activity (with a copy to all shipyards) within 7 days of receiving of concurrence from NAVSEA, SUBLANT, and SUBPAC
f. Maintain the BPMP distribution list
g. Support NAVSEA in the performance of customer surveys and evaluations, as requested
h. Adjudicate all editorial change requests on behalf of the stakeholders
i. Identify yearly budget requirements for life cycle maintenance of the BPMP to NAVSEA
j. Attend all BPMP Review Meetings
k. Coordinate the development and transition of the BPMP into CD-ROM format

K.3.5 User Activities

User Activities will:

a. Submit change requests to SUBMEPP, using the required change request form contained in the manual.
b. Provide the following information on the change request form.
    (1) A clear description of the problem including applicable chapter, paragraph(s) and page(s).
    (2) The recommended change containing the specific words to be added, deleted, or modified.
    (3) Rationale for the recommended change.
c. Update procedures to implement changes upon receipt of the response letter in x.3.4.e above.

K.4 Change Process

This section defines the change process for the BPMP. The change process is an integral part of BPMP life cycle maintenance. The process is described in detail below and relates to the flow chart shown in Figure (1).

a. All User Activities will submit BPMP change requests using the change request form located in the front of the manual.

b. Upon receipt of a change request, SUBMEPP will send a reply to the submitting activity notifying them that the change request has been received. SUBMEPP will log the change request into a database. SUBMEPP will adjudicate all editorial change requests. For non-editorial change requests, SUBMEPP forward the request to NAVSEA, SUBLANT, and SUBPAC for their review and approval within 7 calendar days of receipt. All change requests sent to stakeholders for review will include the following:

   (1) Change Request Response Form.
   (2) Appropriate reference material (e.g., previous change requests, applicable instructions, etc.).
   (3) Applicable marked up pages showing the requested change incorporated.

c. Stakeholders will review the change request and provide a resolution to SUBMEPP electronically or via letter or fax using the Change Request Form within sixty calendar days of receipt.
d. SUBMEPP will notify stakeholders of all unresolved change requests within 7 calendar days of receipt of conflicting comments. An unresolved change request is a change request that does not receive unanimous approval or disapproval from all applicable stakeholders.
e. NAVSEA 04X will adjudicate all unresolved change requests and will forward the resolution to SUBMEPP within thirty days of notification that conflicts exist.
f. SUBMEPP will prepare a formal response for NAVSEA 04X signature to the submitting activity based upon the final resolution within 7 days of receipt of consolidated responses.
g. NAVSEA 04X will review and sign out approval letter within 7 days of receipt.
h. SUBMEPP will incorporate the approved change into a BPMP change package. This change package will contain approved changes incorporated into the applicable pages of the manual and will be distributed according to the approved distribution list.
i. An annual BPMP change conference will be hosted by NAVSEA 04X to reach agreement on any changes that were not resolved during the year. An aggregate review of the changes that were approved during the year will also be conducted to ensure that no conflicting or redundant changes are incorporated into the final annual revision.

BASELINE PROJECT MANAGEMENT PLAN
EXECUTION STRATEGY CHANGE REQUEST FORM

FROM:_____

ACTIVITY/SHIP:_____

CODE/DEPT/SHOP:_____DATE:_____

ORIGINATOR:_____TEL EXT:_____

PAGE NO._____PARA NO._____FIGURE_____TABLE_____

PROBLEM DESCRIPTION:

RECOMMENDED CHANGE:

RATIONALE:

BASELINE PROJECT MANAGEMENT PLAN
EXECUTION STRATEGY CHANGE REQUEST FORM

REVIEWER:_____

ACTIVITY:_____

CODE/DEPT:_____DATE:_____TEL EXT:_____

PROPOSED CHANGE:

PAGE NO._____PARA NO._____FIGURE_____TABLE_____

CONCURRENCE/COMMENTS:

RATIONALE:

SIGNATURE:_____ DATE:_____

APPENDIX L

Ship's Force Recommended Reading

The performance of ship's force in executing their duties and responsibilities prior to and during the DMP/ERO/EOH is crucial to the success of the Availability.

The sections of the BPMP listed below should be read by the Commanding Officer, Executive Officer, Department Heads, the Chief of the Boat, Department LPOs, the 3-M Coordinator, and the ERO/DMP/EOH Coordinator.

SECTION	TITLE
	Foreword
1	Project Overview
2	Planning Overview
3.3.2	Work Integration Team
4.5	Development of Execution Strategies
4.5.1	Introduction
4.5.4.1	Plan for Developing Execution Strategies
4.5.4.2	Fast Start Strategy
4.5.4.2.5	Open and Inspection Work
4.5.4.3	Strategy for Plant/Space Preparation for SS00 and HB00
4.5.4.4	Strategy for Plant Conditions and System Status, Non-Nuclear System Transfer, and Temporary Systems/Services
4.5.4.6	Ship's Force and Contractor Work Integration Plan
4.5.4.7	Communications Strategy
4.5.4.8	Combat System Availability Planning and Execution Strategy
4.5.5	Development of Optional Execution Strategies
4.5.6.1	Work Discovery Testing, Inspection, and Technical Assessment Plan
4.5.6.3	Work Definition Plan
4.5.6.5	Proactive Performance Metrics
4.5.6.6	Key Event and Milestone Management Plan
	BPMP APPENDICES
B	Baseline Executive Level Project Planning Timetable (PPTT)
D	Work Definition and Integration Guidelines
F	Performance Metrics
J	DMP, ERO and EOH Key Event and Milestone Listing

Appendix M

Training Program for the Ship's Force
DMP/ERO/EOH Coordinator

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3	Minimum Recommended Training Plan	M-3-1
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1. Introduction

Proper integration of ship's force into the project team and the shipyard is critical to the success of an availability. A key resource to assist in integrating the operationally oriented ship's force into the industrial shipyard environment is the DMP/ERO/EOH Coordinator. This individual will be a nuclear trained Limited Duty Officer (LDO); however, it should be noted that many do not have the in-depth knowledge of shipyard organization, operations, and processes required to provide the assistance needed to prepare ship's force for a seamless integration into the shipyard. Therefore, a DMP/ERO/EOH Coordinator training plan is essential to provide a solid foundation for success.

This appendix provides guidance to train a nuclear trained Limited Duty Officer assigned to be the Ship's Force DMP/ERO/EOH Coordinator during a submarine availability.

2. Program Goals

This training program is to ensure the DMP/ERO/EOH Coordinator is prepared to:

- Successfully perform the duties defined in the SSORM Article 1204, BPMP Section 3.3, JFMM Volume II Section 3.5.1.2 and Volume V Section 1.5.7, SSAM, other directives, as well as meet the Commanding Officer's expectations.
- Ensure Ship's Force is properly trained on Shipyard processes, procedures, and operations.
- Establish solid relationships with the Project Team members in order to facilitate integration between the Ship and the Shipyard.

This training program integrates the training on technical knowledge requirements with the building of solid relationships between the DMP/ERO/EOH Coordinator and the other members of the Project Team, the Shipyard, the ship, and the TYCOM. These relationships will facilitate integration of the ship into the shipyard and provide the DMP/ERO/EOH Coordinator a solid network to enhance success.

3. Program

Since the shipyard experience level of nuclear-trained Limited Duty Officers varies greatly, the base program was developed for those with little or no shipyard experience. This base program can then be tailored for the individual's experience, the time allowed for training, and schedules of the project and ship. Some examples of tailored programs are provided.

Since there is a limited time to train, the training program leverages the DMP/ERO/EOH Coordinator's previous experience and utilizes methods other than classroom training. A training program of simply classroom training would not build the relationships that are essential to success. Each phase of the training has objectives, items to be performed/discussed/etc., and criteria for success. This is to maximize the success of each step of the program, to ensure the DMP/ERO/EOH Coordinator meets and works with those individuals he will interact with during the course of the availability, and to minimize the unproductive use of the DMP/ERO/EOH Coordinator's time.

Due to the unpredictable schedule of the submarine and the demands immediately placed on the DMP/ERO/EOH Coordinator after reporting to the ship, this training plan assumes that any training scheduled after his report is at great risk; therefore, training should be scheduled prior to the individual's report date to the ship. The optimum timing of the training prior to report allows the DMP/ERO/EOH Coordinator meet the requirement to report to the submarine at approximately A-10 months before the availability starts. This report date is consistent with previous guidance, allows the DMP/ERO/EOH Coordinator to properly assist the ship to prepare for the availability, and allows DMP/ERO/EOH Coordinator to complete his needed qualifications before the start of the availability.

3.1. Base Program

The base program was developed for the junior LDO with little or no shipyard experience and is approximately 8-9 weeks in duration. The program's summary is shown in figure 1. The training syllabus is contained in enclosure M-1.

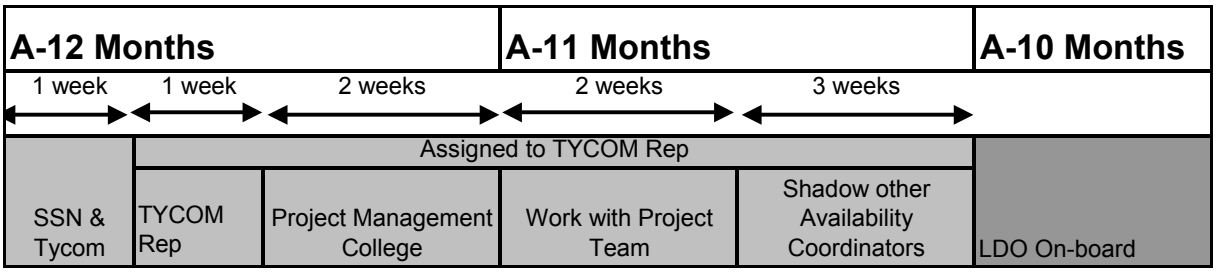

Figure 1 - Base Program Timeline

3.1.1. Training Overview

Week 1 – SSN & TYCOM

The DMP/ERO/EOH Coordinator first meets with his new Commanding Officer, Executive Officer, Engineer Officer, and other key ship's force team members to establish a dialog with them, to begin to establish him as a member of the wardroom and the crew, and to ensure the DMP/ERO/EOH Coordinator completely understands his role during the training.

Next, the DMP/ERO/EOH Coordinator meets with the respective TYCOM N4 staff. This provides a high-level view of the availability, an opportunity to learn the TYCOM issues that could affect the Availability, and an opportunity meet the TYCOM staff that he may deal with during the course of the Availability.

Weeks 2-9 – Shipyard

The DMP/ERO/EOH Coordinator is then assigned to the Shipyard TYCOM Representative at the executing shipyard. The Shipyard TYCOM Representative is responsible for monitoring the progress of the DMP/ERO/EOH Coordinator and mentoring him through the shipyard phase of his training.

Week 2 - Shipyard TYCOM Representative

The first week at the shipyard is spent with the Shipyard TYCOM Representative so the DMP/ERO/EOH Coordinator fully understands specific shipyard and current availability issues, meets key players in the shipyard, understands what training the shipyard will provide and when it will be provided, and fully understands the Shipyard TYCOM Representative's role in Submarine Availabilities and Shipyard. Although the rest of the time is spent at Project Management College with his Project Team, working with his Project Team, and shadowing other DMP/ERO/EOH Coordinators, he will periodically meet with the Shipyard TYCOM Representative in order assess progress against the criteria for success in Enclosure and ensure he understands the practical application of all he has learned.

Weeks 3-4 – Project Management College

When attending Project Management College with his Project Team, the DMP/ERO/EOH Coordinator gains insight into Naval Shipyard Project Management and builds relationships with members of the Project Team.

Weeks 5-6 – Project Team

While working with his Project Team at the shipyard, relationships established at Project Management College are reinforced, a further understanding of Naval Shipyard Project Management and planning processes is developed, and the knowledge of the project's status relative to BPMP is gained.

Weeks 7-9 – DMP/ERO/EOH Coordinators

The DMP/ERO/EOH Coordinator then spends 3 weeks with other DMP/ERO/EOH Coordinators executing availabilities so he harvests lessons learned and best practices from his contemporaries, fully understand the expectations of the DMP/ERO/EOH Coordinator, and understand the relationships between the Shipyard, Ship's Force, TYCOM, and the DMP/ERO/EOH Coordinator. The optimum is for this period to be spent on more than one project so the DMP/ERO/EOH Coordinator views more than one availability in execution. Also, if there is not an availability of the type the DMP/ERO/EOH Coordinator will be performing in progress at the shipyard he will be in, consideration should be given to sending him to a project in a different shipyard that is executing the same type of availability as his ship will undergo.

3.1.2. Base Program for Portsmouth Naval Shipyard

Since Portsmouth Naval Shipyard does not fully man a project team until approximately A-6 months, the program is modified for availabilities conducted at Portsmouth Naval Shipyard. The 4-week period when the DMP/ERO/EOH Coordinator is at Project Management College and with the Project Team is replaced with 3 weeks where the DMP/ERO/EOH Coordinator works with the Submarine Project Planning Group (see figure 2). The syllabus has been modified since the period with the project team was designed to build on the knowledge and relationships established during Project Management College (see enclosure M-2).

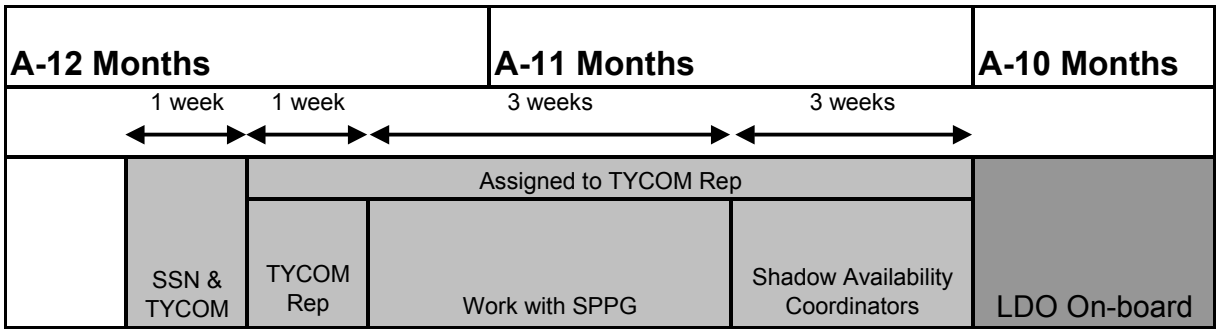

Figure 2 - Base Program Timeline for Portsmouth Naval Shipyard

3.2. Developing a Tailored Program

Since the base program is built for a Limited Duty Officer with little or no shipyard experience, each program will need to be tailored to the individual's experience. Also, the schedules (ship, project, etc.) may vary and must be accounted for within the training program. Finally, due to the availability of nuclear trained Limited Duty Officers, the individual assigned may not be ordered to the ship until after A-10 months which will also affect the program.

3.2.1. Minimum Duration

Since there will be considerable pressure to shorten the training program due to the demands on the ship and the availability of nuclear trained Limited Duty Officers, a minimum recommended program has been developed (figure 3 and enclosure M-3). A situation when this would be used is if the DMP/ERO/EOH Coordinator is assigned to report very late in the pre-availability period. This balances the competing priorities of providing a knowledgeable DMP/ERO/EOH Coordinator with the tools to succeed and the needs of the ship to have the DMP/ERO/EOH Coordinator onboard to ensure the availability preparations are on-track. This program is not the preferred approach and introduces risk. If Project Management College is not occurring during the period, work with the project team should be substituted.

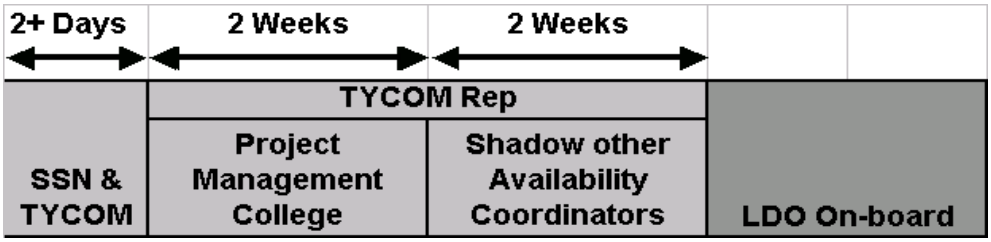

Figure 3 - Minimum Recommended Program Timeline

3.2.2. Individuals' Backgrounds

The experience base of the Limited Duty Officers assigned to be DMP/ERO/EOH Coordinator generally falls into two categories, CVN division officer experience or a repair background at the Squadron, Group, TYCOM, Tender, or SIMA. These two backgrounds result in some differing knowledge requirements that must be filled, but the team and relationship building is needed for both.

3.2.2.1. CVN Division Officer Background

The individual with CVN division officer background typically has shipyard experience as a member of ship's force during a PIA or DPIA. This background will generally result in an individual familiar with the shipyard but lacking in the specific knowledge of planning and executing a submarine availability. Figure 4 and enclosure M-4 give an example of a program for an officer with CVN experience.

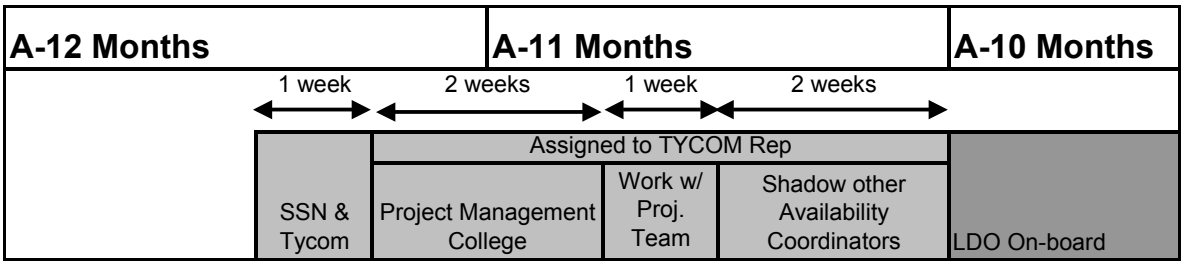

Figure 4 - Program Timeline for Individual with CVN Division Officer Experience

This example takes advantage of the shipyard experience onboard a CVN and focuses on differences between a CVN and a submarine availability. Since the period with the Shipyard TYCOM Representative contains much orientation and familiarization, the time needed is less and has been distributed over the entire period at the shipyard through periodic visits. The period working with the project team is now focused on the differences between the officer's previous experience and a submarine availability, and therefore, the period is reduced to a week. Finally, shadowing other DMP/ERO/EOH Coordinators builds on previous experience and is reduced to only two weeks.

3.2.2.2. Repair Background

A repair background will generally result in an individual familiar with I-level repair planning and execution and the customers' dealing with a shipyard (work definition, screening, etc.). A few of these individuals have been assigned to a shipyard (APS, NSRO, NRMD, etc).

For most in this category, the training program required will be very similar to the base. First, the TYCOM visit may not be required since the individual may already have the required knowledge. However, some contact with the TYCOM N4 staff is required to establish the contacts the DMP/ERO/EOH Coordinator needs for success. Finally, shadowing other DMP/ERO/EOH Coordinators builds on previous experience and knowledge and could be reduced to two weeks.

3.3. Guidelines for Tailoring the Program

The Shipyard TYCOM Representative will be responsible for developing a program tailored to the individual. This should not be simply "plug and chug." Since the experience base of those assigned varies widely (even within the two basic categories above), the process requires a thoughtful, deliberate effort to ensure the individual reports to the submarine as soon as possible and with the tools needed to help the submarine succeed. Some of the items to be considered when developing a tailored training plan are as follows:

The Limited Duty Officer's background must be evaluated and can be provided by the individual assigned and his detailer. Translating this experience into training requirements may be difficult process, but the Shipyard TYCOM Representative has numerous sources to utilize for help, such as the LDO detailer, other DMP/ERO/EOH Coordinators, NRRO Representatives, and NSRO Representatives.

Parts of the given examples may be applicable to the given individual and situation while others may not. Using the applicable pieces, modified as necessary, will help in the faster development of a tailored program.

Since expanding the knowledge that the DMP/ERO/EOH Coordinator brings to the ship is only a part of the objectives, even the most shipyard knowledgeable individual may still need to undergo a program of significant duration. The time for successful team and relationship building must not be overlooked.

Since in the near term the inventory of nuclear trained Limited Duty Officers will prevent the routine assignment to meet the training timeline (start training at approximately A-12 months and report at A-10 months), the Shipyard TYCOM Representative must balance the need to provide Ship's Force with a properly trained DMP/ERO/EOH Coordinator and the need for the LDO to report as soon as possible an assist with preparing the ship for the availability. Any reduction in needed training induces risk into the Ship's Force integration into the shipyard and the success of executing the availability. This is especially acute since the DMP/ERO/EOH Coordinator may have most shipyard knowledge of anyone in the crew. The Shipyard TYCOM Representative with both his submarine command and shipyard experience is in the best position to determine the necessary training requirements.

4. Program Responsibilities

The following are the responsibilities of the personnel involved in executing this training program:

Shipyard TYCOM Representative:

- Develop a training program tailored for the individual assigned and a specific schedule. This will require coordination with the individual's detailer, the TYCOM N4 organization, ship's force, the project superintendent, and other groups within the shipyard. The Shipyard TYCOM Representative will be responsible for the program's overall execution.
- Periodically meet with the DMP/ERO/EOH Coordinators in training while they are at the shipyard to assess progress, provide a ship's force focus for knowledge gained, and mentor the individual.

- Pass program lessons learned and best practices to other Shipyard TYCOM Representatives, and periodically review this appendix with other Shipyard TYCOM Representatives to determine if revision of the appendix is required. All Shipyard TYCOM Representatives as a group are responsible for maintaining and upgrading the overall program.

TYCOM staff (N4):
- Provide input to the Shipyard TYCOM Representative for the tailored training plan.
- Coordinate with Shipyard TYCOM Representative to schedule training plan (visit to TYCOM staff).

Project Superintendent:
- Provide input to the Shipyard TYCOM Representative for the tailored training plan.
- Coordinate with Shipyard TYCOM Representative to schedule training plan (Project Management College and period with Project Team).
- Incorporate the DMP/ERO/EOH Coordinator's training with the project into the project's training plan (Section 3.3.3).
- Ensure the DMP/ERO/EOH Coordinator leaves the shipyard with the lesson plans, references, schedule, etc. for all the shipyard pre-availability training.
- Provide the Shipyard TYCOM Representative with changes to the project schedule and Project Management College schedule.
- Provide feedback to Shipyard TYCOM Representative concerning the training program. This should occur periodically after the DMP/ERO/EOH Coordinator reports to the submarine and through the completion of the availability. The feedback should include additional items to include, items to remove, and recommendations to improve the program.

Ship's Force Commanding Officers:
- Provide input to the Shipyard TYCOM Representative for the tailored training plan.
- Coordinate with Shipyard TYCOM Representative to schedule training plan (visit to submarine).
- Provide feedback to Shipyard TYCOM Representative concerning the training program. This should occur periodically after the DMP/ERO/EOH Coordinator reports to the submarine and through the completion of the availability. The feedback should include additional items to include, items to remove, and recommendations to improve the program.

DMP/ERO/EOH Coordinators:
- Provide input to the Shipyard TYCOM Representative for the tailored training plan.
- Provide feedback to Shipyard TYCOM Representative concerning the training program. This should occur periodically after the DMP/ERO/EOH Coordinator reports to the submarine and through the completion of the availability. The feedback should include additional items to include, items to remove, and recommendations to improve the program.

NAVSEA 04X2:
- Distribute Project Management College schedules and any changes to all Shipyard TYCOM Representatives and the Nuclear LDO Detailer (NPC-422).

Base Training Plan for Nuclear trained Limited Duty Officers assigned as DMP/ERO/EOH Coordinator on Submarines

Assumptions for use:

This base program should be utilized when:

1) The nuclear trained Limited Duty Officer who has very little or no shipyard experience.
2) The availability occurs in a Naval Shipyard other than Portsmouth Naval Shipyard.

Objectives - Ensure the DMP/ERO/EOH Coordinator has the knowledge and experience to:

a) Successfully perform the duties as the DMP/ERO/EOH Coordinator in accordance with the SSORM Article 1204, BPMP Section 3.3, JFMM Volume II Section 3.5.1.2 and Volume V Section 1.5.7, and the SSAM as well as meeting the Commanding Officer's expectations.
b) Ensure Ship's Force is properly trained on Shipyard processes, procedures, and operations.
c) Establish solid relationships with the Project Team members in order to facilitate integration between the Ship and the Shipyard.

I. Submarine visit (1-2 days)

A. Objective:

1. Establish dialog with Commanding Officer, Executive Officer, Engineer Officer, and other key ship's force team members.
2. Begin to establish DMP/ERO/EOH Coordinator as a member of the wardroom and the crew.
3. DMP/ERO/EOH Coordinator completely understands his role during the training.

B. Criteria for Success:

1. DMP/ERO/EOH Coordinator has direct email addresses for, direct phone numbers for, and open dialog with Commanding Officer, Executive Officer, and Engineer Officer.
2. DMP/ERO/EOH Coordinator meets all Officers and Chief Petty Officers.
3. DMP/ERO/EOH Coordinator introduced to the crew via quarters, department training, etc.
4. DMP/ERO/EOH Coordinator fully understands that he does not speak for the ship during his training program.
5. DMP/ERO/EOH Coordinator understands Ship's Force current top technical issues concerning the availability so he can research and provide answers to the issues during training period.

II. TYCOM N4 visit (1-2 days)

A. Objective:

1. Provide DMP/ERO/EOH Coordinator with high-level view of Availability and TYCOM issues that could affect the Availability.
2. Discuss syllabus items with:
   a. Action Officers responsible for scheduled ship alterations
   b. Type Desk Officer
   c. Force Maintenance Officer

B. Syllabus:

1. Availability overview
2. Availability Work Package
3. Scheduled Ship Alterations
4. Work Definition Process
5. Work Authorization Process
6. Supplemental Work Procedures
7. Funding Sources and Limitations

C. Criteria for Success:

1. DMP/ERO/EOH Coordinator has phone numbers, email addresses, and dialog with TYCOM N4 staff that may provide assistance during the availability.
2. DMP/ERO/EOH Coordinator understands the availability work scope and applicable TYCOM N4 work authorization process.

III. Report to TYCOM Shipyard Representative (8 weeks)

A. Assigned to TYCOM Rep (1 week)

1. Objective:
   a. Fully understands specific shipyard and current availability issues.
   b. Meets Key Players in the Shipyard.
   c. Fully understands the TYCOM Representative's role in Submarine Availabilities and Shipyard.
2. Syllabus:
   a. "Shadow" TYCOM Representative during the period, observing:
      1) Critiques
      2) Monitor Watches
      3) Meetings with NRRO, NSRO, and Shipyard Management
   b. Shipyard Orientation.
      1) Review Shipyard Organization.
      2) Review Shipyard processes, procedures, and operations.

3. Criteria for Success:
   a. DMP/ERO/EOH Coordinator has experienced the TYCOM Representative's "typical day."
   b. DMP/ERO/EOH Coordinator discusses specific shipyard and current availability issues with TYCOM Representative to the level where he can pass his knowledge on to Ship's Force.
   c. DMP/ERO/EOH Coordinator knows who are the ship's NRRO and NSRO representatives.
   d. DMP/ERO/EOH Coordinator can identify key players in the Shipyard.

B. TAD to Project Management College (Phase I – 2 weeks)

1. Objective:
   a. Build relationship with Project Team
   b. Gain some insight into Naval Shipyard Project Management
2. Syllabus: PMC course syllabus.
3. Criteria for Success:
   a. Establish professional relationship with the project team, including PS, APSs, CTEs, and BSPO (all that are present). Get their phone numbers and email addresses.
   b. Meet PMC Course Objectives

C. TAD from TYCOM SY Representative to Project Team (2 weeks)

1. Objective:
   a. Reinforce relationships established at Project Management College.
   b. Build on understanding of Naval Shipyard Project Management and planning processes.
   c. Gain understanding of project status relative to BPMP.
   d. Understand what training the Shipyard will provide and when it will be provided.
   e. Understand the process work undergoes from identification to screening to adding to AWP to work complete and certified.
2. Syllabus:
   a. Review AIM inputs that Ship's Force affects and outputs that affect Ship's Force.
   b. Review Execution Strategies (if not finalized, review drafts or previous projects' strategies):
      1) Review Plan for Execution Strategies with an APS.
      2) Review Work Definition Plan with an APS.
      3) Review Fast Start Strategy with Project Superintendent.
      4) Review Plan to Develop Software Schedules with PEPM.
      5) Review Time Phased Resource for Planning with Project Superintendent or an APS.

6) Review Key Event and Milestone Management Plan including Work-to-test Sequences, Start Steaming Strategy, and Habitability Strategy with Project Lead Scheduler (include discussion of scheduling and PSS).
7) Review System Status and Plant Conditions Plan with Nuclear CTE.
8) Review Special Attention Job Plan with an APS.
9) Review Plant/Space Inspection and Closeout Plan with a Zone Manager (or equivalent).
10) Review System Transfer/Takedown Plan with Non-nuclear CTE.
11) Review Test Integration Plan with a CTE.
12) Review Temporary System Plan with a CTE (or equivalent).
13) Review Special Resource Requirements Plan with an APS.
14) Review Outside Activity Work Integration Plan with designated work integration leader.
15) Review Ship's Force Task Integration Plan with designated work integration leader (include Ship's Force Integration Database, its inputs and outputs, and Ship's Force requirements).
16) Review Open and Inspection Plan with an APS.
17) Review Pre-Arrival Testing, Inspection and Technical Assessment Plan with Nuclear and Non-nuclear CTEs.
18) Review Work Packaging Strategy with CTE (or equivalent).
19) Review Special Evolution Schedule Strategy with Project Lead Scheduler.
20) Review Integration of New Work Strategy with an APS.
21) Review Communications Strategy with the Project Superintendent.

c. Review preliminary Job Summaries, Job Summary development, and Technical Document development with PEPM.
d. Review Memoranda of Agreement.
e. Review basics of Performance Measurement and Control with APS in order to understand its basic function.
f. Review Availability Work Package with APS (or equivalent).
g. Meet with Shipyard Training Department and review Shipyard supplied training (pre-availability and during availability)

3. Criteria for Success:
   a. DMP/ERO/EOH Coordinator meets Project Team members not at PMC and has contact information for entire team.
   b. DMP/ERO/EOH Coordinator understands Project Team's organization and operation, and whom in the team to contact for various issues.
   c. DMP/ERO/EOH Coordinator's understanding of Naval Shipyard Project Management and planning is greater than after Project Management College.
   d. DMP/ERO/EOH Coordinator can discuss current project status to the level that he may pass this knowledge to Ship's Force upon return.
   e. DMP/ERO/EOH Coordinator has training plans, lesson plans, and schedule for shipyard training to take back to ship.

D. TAD to one or more Submarines in Shipyard to "shadow" an DMP/ERO/EOH Coordinator currently in availability (3 weeks)

1. Objective:
   a. Understand lessons learned prior to and during Availabilities by contemporaries.
   b. Harvest best practices from other DMP/ERO/EOH Coordinators.
   c. Fully understand the Shipyard's and Ship's Force expectations of the DMP/ERO/EOH Coordinator.
   d. Understand the relationships between the Shipyard, Ship's Force, and DMP/ERO/EOH Coordinator.

2. Syllabus:
   a. Review Work Definition, Identification, Screening, and Authorization Processes including problems and potential pitfalls.
   b. Review the tagout requirements (SOMS – if utilized).
      1) If his availability will or may utilize SOMS, the DMP/ERO/EOH Coordinator will thoroughly review and understand the system to a System Expert level.
   c. Review the administrative differences between Shipyard and Fleet Quality Assurance.
   d. Attend JTG meetings (nuclear and non-nuclear).
   e. Attend Ship's Safety Council meeting.
   f. Attend Daily Production Meeting.
   g. Attend Weekly Meeting with Shipyard management.
   h. Review tailored SSAM.
   i. Review unique CO and Engineer Standing Orders.
   j. Review Pre-availability Training Program and any special qualification programs.
   k. Review System Expert Program.
   l. Review Crew Requalification Program.
   m. Observe Management Information Center/Maintenance Operations Center organization and operation.
   n. Review Test procedures and coordination of testing.
   o. Review Assist Ship's Force Funds procedures.
   p. Review Ship's Force Integration Database procedures and Integration of Ship's Force work with Shipyard.
   q. Observe Groom Team Coordination.
   r. Review Sea Trials Agenda and Plan.
   s. Discuss the pitfalls, lessons learned, and best practices encountered during qualifications (EOOW, EDO, OOD, SDO, Submarines, etc.).

3. Criteria for Success:
   a. Obtain soft copies of all availability administration, including:
      1) Tailored SSAM
      2) Pre-availability and availability training programs
      3) System Expert Program
      4) Crew Requalification Program
   b. Possesses the names, email addresses, and phone numbers of other DMP/ERO/EOH Coordinators to have another knowledge source/network for future problems and issues.
   c. Understand predecessors' problems/pitfalls and how to avoid them.
   d. Understand Shipyard processes and their difference from Fleet or Intermediate-level repair facilities' procedures.

Base Training Plan for Nuclear trained Limited Duty Officers assigned as DMP/ERO/EOH Coordinator on Submarines executing availabilities at Portsmouth Naval Shipyard

Assumptions for use:

This base program should be utilized when:

1) The nuclear trained Limited Duty Officer who has very little or no shipyard experience.
2) The availability occurs in Portsmouth Naval Shipyard.

Objectives - Ensure the DMP/ERO/EOH Coordinator has the knowledge and experience to:

a) Successfully perform the duties as the DMP/ERO/EOH Coordinator in accordance with the SSORM Article 1204, BPMP Section 3.3, JFMM Volume II Section 3.5.1.2 and Volume V Section 1.5.7, and the SSAM as well as meeting the Commanding Officer's expectations.
b) Ensure Ship's Force is properly trained on Shipyard processes, procedures, and operations.
c) Establish solid relationships with the Project Team members in order to facilitate integration between the Ship and the Shipyard.

I. Submarine visit (1-2 days)

A. Objective:

1. Establish dialog with Commanding Officer, Executive Officer, Engineer Officer, and other key ship's force team members.
2. Begin to establish DMP/ERO/EOH Coordinator as a member of the wardroom and the crew.
3. DMP/ERO/EOH Coordinator completely understands his role during the training.

B. Criteria for Success:

1. DMP/ERO/EOH Coordinator has direct email addresses for, direct phone numbers for, and open dialog with Commanding Officer, Executive Officer, and Engineer Officer.
2. DMP/ERO/EOH Coordinator meets all Officers and Chief Petty Officers.
3. DMP/ERO/EOH Coordinator introduced to the crew via quarters, department training, etc.
4. DMP/ERO/EOH Coordinator fully understands that he does not speak for the ship during the training period.
5. DMP/ERO/EOH Coordinator understands Ship's Force current top technical issues concerning the availability so he can research and provide answers to the issues during the training period.

II. TYCOM N4 visit (1-2 days)

A. Objective:

1. Provide the DMP/ERO/EOH Coordinator with high-level view of Availability and TYCOM issues that could affect the Availability.
2. Establish dialog with the applicable members of the Type Commander Staff.

B. Syllabus: Discuss items with Action Officers responsible for scheduled ship alterations, Type Desk Officer, and Force Maintenance Officer:

1. Availability overview
2. Availability Work Package
3. Scheduled Ship Alterations
4. Work Definition Process
5. Work Authorization Process
6. Supplemental Work Procedures
7. Funding Sources and Limitations

C. Criteria for Success:

1. DMP/ERO/EOH Coordinator has phone numbers, email addresses, and dialog with TYCOM N4 staff that may provide assistance during the availability.
2. DMP/ERO/EOH Coordinator understands the availability work scope and applicable TYCOM N4 work authorization process.

III. Report to TYCOM Shipyard Representative (7 weeks)

A. Assigned to TYCOM Rep (1 week)

1. Objective:
   a. Fully understands specific shipyard and current availability issues.
   b. Meets Key Players in the Shipyard.
   c. Fully understands the TYCOM Representative's role in Submarine Availabilities and Shipyard.
2. Syllabus:
   a. "Shadow" TYCOM Representative during the period, observing:
      1) Critiques
      2) Monitor Watches
      3) Meetings with NRRO, NSRO, and Shipyard Management
   b. Shipyard Orientation
      1) Review Shipyard Organization
      2) Review Shipyard processes, procedures, and operations.

3. Criteria for Success:
   a. DMP/ERO/EOH Coordinator has experienced the TYCOM Representative's "typical day."
   b. DMP/ERO/EOH Coordinator discusses specific shipyard and current availability issues with TYCOM Representative to the level where he can pass on this knowledge to Ship's Force.
   c. DMP/ERO/EOH Coordinator knows who are the ship's NRRO and NSRO representatives.
   d. DMP/ERO/EOH Coordinator can identify key players in the Shipyard.

B. TAD from TYCOM SY Representative to Submarine Program Planning Group (3 weeks)

1. Objective:
   a. Establish professional relationship with individuals whom have been identified as members or probable members of the project team. Obtain phone numbers and email addresses.
   b. Gain an understanding of Naval Shipyard Project Management and planning processes.
   c. Gain an understanding of project status relative to BPMP.
   d. Understand what training the Shipyard will provide and when it will be provided.
   e. Understand the process work undergoes from identification to screening to adding to AWP to work complete and certified.

2. Syllabus:
   a. Review BPMP Sections 1-4.5.3 with an APS or equivalent.
   b. Review AIM inputs that Ship's Force affects and outputs that affect Ship's Force with a PEPM.
   c. Review processes from work identification through work completion a PEPM.
   d. Review Execution Strategies below and their BPMP reference. (Note: Since not all Execution Strategies will be complete, draft, corporate, or previous projects' Execution Strategies may be reviewed, but the strategy's version nearest to the those to be used by the DMP/ERO/EOH Coordinator's Project Team should be reviewed. Also, the reviews should be with identified members of the DMP/ERO/EOH Coordinator's project team if possible.
      1) Review Plan for Execution Strategies with an APS.
      2) Review Work Definition Plan with an APS.
      3) Review Fast Start Strategy with the Project Superintendent.
      4) Review Plan to Develop Software Schedules with a PEPM.
      5) Review Time Phased Resource for Planning with Project Superintendent or an APS.

6) Review Key Event and Milestone Management Plan including Work-to-test Sequences, Start Steaming Strategy, and Habitability Strategy with a Project Lead Scheduler (include discussion of scheduling and PSS).
7) Review System Status and Plant Conditions Plan with a Nuclear CTE.
8) Review Special Attention Job Plan with an APS.
9) Review Plant/Space Inspection and Closeout Plan with a Zone Manager (or equivalent).
10) Review System Transfer/Takedown Plan with a Non-nuclear CTE.
11) Review Test Integration Plan with a CTE.
12) Review Temporary System Plan with a CTE (or equivalent).
13) Review Special Resource Requirements Plan with an APS.
14) Review Outside Activity Work Integration Plan with work integration leader.
15) Review Ship's Force Task Integration Plan with a work integration leader (include Ship's Force Integration Database, its inputs and outputs, and Ship's Force requirements).
16) Review Open and Inspection Plan with an APS.
17) Review Pre-Arrival Testing, Inspection and Technical Assessment Plan with a Nuclear and Non-nuclear CTEs.
18) Review Work Packaging Strategy with a CTE (or equivalent).
19) Review Special Evolution Schedule Strategy with a Project Lead Scheduler.
20) Review Integration of New Work Strategy with an APS.
21) Review Communications Strategy with the Project Superintendent.

e. Review preliminary Job Summaries, Job Summary development, and Technical Document development with a PEPM.
f. Review Memoranda of Agreement with an APS.
g. Review basics of Performance Measurement and Control with an APS in order to understand its basic function.
h. Review Availability Work Package with an APS (or equivalent).
i. Meet with Shipyard Training Department and review Shipyard supplied training (pre-availability and during availability)

3. Criteria for Success:
   a. DMP/ERO/EOH Coordinator meets Project Team members and has contact information for entire team.
   b. DMP/ERO/EOH Coordinator understands Project Team's organization and operation, and whom in the team to contact for various issues.
   c. DMP/ERO/EOH Coordinator has good understanding of Naval Shipyard Project Management and planning.
   d. DMP/ERO/EOH Coordinator can discuss current project status to the level that he may pass this knowledge to Ship's Force upon return.
   e. DMP/ERO/EOH Coordinator has training plans, lesson plans, and schedule for shipyard training to take back to ship.

C. TAD to one or more Submarines in Shipyard to "shadow" a DMP/ERO/EOH Coordinator currently in an availability (3 weeks)

1. Objective:
   a. Understand lessons learned prior to and during Availabilities by contemporaries.
   b. Harvest best practices from other DMP/ERO/EOH Coordinators.
   c. Fully understand the Shipyard's and Ship's Force expectations of the DMP/ERO/EOH Coordinator.
   d. Understand the relationships between the Shipyard, Ship's Force, and DMP/ERO/EOH Coordinator.

2. Syllabus:
   a. Review Work Definition, Identification, Screening, and Authorization Processes including problems and potential pitfalls.
   b. Review the tagout requirements (SOMS – if utilized).
      (1) If his availability will or may utilize SOMS, the DMP/ERO/EOH Coordinator will thoroughly review and understand the system to a System Expert level.
   c. Review the administrative differences between Shipyard and Fleet Quality Assurance.
   d. Attend JTG meetings (nuclear and non-nuclear).
   e. Attend Ship's Safety Council meeting.
   f. Attend Daily Production Meeting.
   g. Attend Weekly Meeting with Shipyard management.
   h. Review tailored SSAM.
   i. Review unique CO and Engineer Standing Orders.
   j. Review Pre-availability Training Program and any special qualification programs.
   k. Review System Expert Program.
   l. Review Crew Requalification Program.
   m. Observe Management Information Center/Maintenance Operations Center organization and operation.
   n. Review Test procedures and coordination of testing.
   o. Review Assist Ship's Force Funds procedures.
   p. Review Ship's Force Integration Database procedures and Integration of Ship's Force work with Shipyard.
   q. Observe Groom Team Coordination.
   r. Review Sea Trials Agenda and Plan.
   s. Discuss the pitfalls, lessons learned, and best practices encountered during qualifications (EOOW, EDO, OOD, SDO, Submarines, etc.).

3. Criteria for Success:
   a. Obtain soft copies of all availability administration, including:
      1) Tailored SSAM
      2) Pre-availability and availability training programs
      3) System Expert Program
      4) Crew Requalification Program
   b. Possesses the names, email addresses, and phone numbers of other DMP/ERO/EOH Coordinators to have another knowledge source/network for future problems and issues.
   c. Understand predecessors' problems/pitfalls and how to avoid them.
   d. Understand Shipyard processes and their difference from Fleet or Intermediate-level repair facilities' procedures.

Minimum Recommended Training Plan for Nuclear trained Limited Duty Officers assigned as DMP/ERO/EOH Coordinator on Submarines

Assumptions for use:

This program should be utilized when:

1) The nuclear trained Limited Duty Officer assigned has significant shipyard experience (i.e. worked in a Naval Shipyard within the past 5 years for approximately a year or greater), or
2) The nuclear trained Limited Duty Officer assigned will report very late in the pre-availability period (i.e. A-7 or later).
3) The availability occurs in a Naval Shipyard.

Objectives - Ensure the DMP/ERO/EOH Coordinator has the knowledge and experience to:

a) Successfully perform the duties as the DMP/ERO/EOH Coordinator in accordance with the SSORM Article 1204, BPMP Section 3.3, JFMM Volume II Section 3.5.1.2 and Volume V Section 1.5.7, and the SSAM as well as meeting the Commanding Officer's expectations.
b) Ensure Ship's Force is adequately trained on Shipyard processes, procedures, and operations.
c) Establish relationships with the Project Team members in order to facilitate integration between the Ship and the Shipyard.

I. Submarine visit (1-2 days)

A. Objective:

1. Establish dialog with Commanding Officer, Executive Officer, Engineer Officer, and other key ship's force team members.
2. Begin to establish DMP/ERO/EOH Coordinator as a member of the wardroom and the crew.
3. DMP/ERO/EOH Coordinator completely understands his role during the training.

B. Criteria for Success:

1. DMP/ERO/EOH Coordinator has direct email addresses for, direct phone numbers for, and open dialog with Commanding Officer, Executive Officer, and Engineer Officer.
2. DMP/ERO/EOH Coordinator meets all Officers and Chief Petty Officers.
3. DMP/ERO/EOH Coordinator introduced to the crew via quarters, department training, etc.
4. DMP/ERO/EOH Coordinator fully understands that he does not speak for the ship during his training program.

5. DMP/ERO/EOH Coordinator understands Ship's Force current top technical issues concerning the availability so he can research and provide answers to the issues during training period.

II. TYCOM N4 visit (1-2 days)

A. Objective:

1. Provide DMP/ERO/EOH Coordinator with high-level view of Availability and TYCOM issues that could affect the Availability.
2. Discuss syllabus items with:
   a) Action Officers responsible for scheduled ship alterations
   b) Type Desk Officer
   c) Force Maintenance Officer

B. Syllabus:

1. Availability overview
2. Availability Work Package
3. Scheduled Ship Alterations
4. Work Definition Process
5. Work Authorization Process
6. Supplemental Work Procedures
7. Funding Sources and Limitations

C. Criteria for Success:

1. DMP/ERO/EOH Coordinator has phone numbers, email addresses, and dialog with TYCOM N4 staff that may provide assistance during the availability.
2. DMP/ERO/EOH Coordinator understands the availability work scope and applicable TYCOM N4 work authorization process.

III. Report to TYCOM Shipyard Representative (4 weeks)

A. TYCOM Rep (meet initially with TYCOM Rep and then periodically while at shipyard)

1. Objective:
   a) Fully understands specific shipyard and current availability issues.
   b) Meets Key Players in the Shipyard.
   c) Fully understands the TYCOM Representative's role in Submarine Availabilities and Shipyard.
   d) Understand what training the Shipyard will provide and when it will be provided.
2. Syllabus:
   a) "Shadow" TYCOM Representative during the period, observing:
      1) Critiques
      2) Monitor Watches
      3) Meetings with NRRO, NSRO, and Shipyard Management.

b) Shipyard Orientation
   1) Review Shipyard Organization
   2) Review Shipyard processes, procedures, and operations.
c) Meet with Shipyard Training Department and review Shipyard supplied training (pre-availability and during availability)

3. Criteria for Success:
   a) DMP/ERO/EOH Coordinator has experienced the TYCOM Representative's "typical day."
   b) DMP/ERO/EOH Coordinator discusses specific shipyard and current availability issues with TYCOM Representative to the level where he can pass his knowledge on to Ship's Force.
   c) DMP/ERO/EOH Coordinator knows who are the ship's NRRO and NSRO representatives.
   d) DMP/ERO/EOH Coordinator can identify key players in the Shipyard.
   e) DMP/ERO/EOH Coordinator has training plans, lesson plans, and schedule for shipyard training to take back to ship.

B. TAD to Project Management College (Phase I – 2 weeks)

1. Objective:
   a) Build relationship with Project Team
   b) Gain some insight into Naval Shipyard Project Management
2. Syllabus: PMC course syllabus.
3. Criteria for Success:
   a) Establish professional relationship with the project team, including PS, APSs, CTEs, and BSPO (all that are present). Get their phone numbers and email addresses.
   b) Meet PMC Course Objectives.

C. TAD to one or more Submarines in Shipyard to "shadow" an DMP/ERO/EOH Coordinator currently in availability (2 weeks)

1. Objective:
   a) Understand lessons learned prior to and during Availabilities by contemporaries.
   b) Harvest best practices from other DMP/ERO/EOH Coordinators.
   c) Fully understand the Shipyard's and Ship's Force expectations of the DMP/ERO/EOH Coordinator.
   d) Understand the relationships between the Shipyard, Ship's Force, and DMP/ERO/EOH Coordinator.
2. Syllabus:
   a) Review Work Definition, Identification, Screening, and Authorization Processes including problems and potential pitfalls.
   b) Review the tagout requirements (SOMS – if utilized).
      1) If his availability will or may utilize SOMS, the DMP/ERO/EOH Coordinator will thoroughly review and understand the system to a System Expert level.
   c) Review the administrative differences between Shipyard and Fleet Quality Assurance.

d) Attend JTG meetings (nuclear and non-nuclear).
e) Attend Ship's Safety Council meeting.
f) Attend Daily Production Meeting.
g) Attend Weekly Meeting with Shipyard management.
h) Review tailored SSAM.
i) Review unique CO and Engineer Standing Orders.
j) Review Pre-availability Training Program and any special qualification programs.
k) Review System Expert Program.
l) Review Crew Requalification Program.
m) Observe Management Information Center/Maintenance Operations Center organization and operation.
n) Review Test procedures and coordination of testing.
o) Review Assist Ship's Force Funds procedures.
p) Review Ship's Force Integration Database procedures and Integration of Ship's Force work with Shipyard.
q) Observe Groom Team Coordination.
r) Review Sea Trials Agenda and Plan.
s) Discuss the pitfalls, lessons learned, and best practices encountered during qualifications (EOOW, EDO, OOD, SDO, Submarines, etc.).

3. Criteria for Success:
   a) Obtain soft copies of all availability administration, including:
      1) Tailored SSAM
      2) Pre-availability and availability training programs
      3) System Expert Program
      4) Crew Requalification Program
   b) Possesses the names, email addresses, and phone numbers of other DMP/ERO/EOH Coordinators to have another knowledge source/network for future problems and issues.
   c) Understand predecessors' problems/pitfalls and how to avoid them.
   d) Understand Shipyard processes and their difference from Fleet or Intermediate-level repair facilities' procedures.

Training Plan for Nuclear trained Limited Duty Officers with CVN division officer experience assigned as DMP/ERO/EOH Coordinator on Submarines

Assumptions for use:

This program should be utilized when:

1) The nuclear trained Limited Duty Officer assigned has recent experience (within the last 5 years) as a CVN division officer that included a PIA or DPIA in a Naval Shipyard.
2) The availability occurs in a Naval Shipyard.

Objectives - Ensure the DMP/ERO/EOH Coordinator has the knowledge and experience to:

a) Successfully perform the duties as the DMP/ERO/EOH Coordinator in accordance with the SSORM Article 1204, BPMP Section 3.3, JFMM Volume II Section 3.5.1.2 and Volume V Section 1.5.7, and the SSAM as well as meeting the Commanding Officer's expectations.
b) Ensure Ship's Force is properly trained on Shipyard processes, procedures, and operations.
c) Establish solid relationships with the Project Team members in order to facilitate integration between the Ship and the Shipyard.

I. Submarine visit (1-2 days)

A. Objective:
   1. Establish dialog with Commanding Officer, Executive Officer, Engineer Officer, and other key ship's force team members.
   2. Begin to establish DMP/ERO/EOH Coordinator as a member of the wardroom and the crew.
   3. DMP/ERO/EOH Coordinator completely understands his role during the training.

B. Criteria for Success:
   1. DMP/ERO/EOH Coordinator has direct email addresses for, direct phone numbers for, and open dialog with Commanding Officer, Executive Officer, and Engineer Officer.
   2. DMP/ERO/EOH Coordinator meets all Officers and Chief Petty Officers.
   3. DMP/ERO/EOH Coordinator introduced to the crew via quarters, department training, etc.
   4. DMP/ERO/EOH Coordinator fully understands that he does not speak for the ship during his training program.
   5. DMP/ERO/EOH Coordinator understands Ship's Force current top technical issues concerning the availability so he can research and provide answers to the issues during training period.

II. TYCOM N4 visit (1-2 days)

A. Objective:
   1. Provide DMP/ERO/EOH Coordinator with high-level view of Availability and TYCOM issues that could affect the Availability.
   2. Discuss syllabus items with:
      a) Action Officers responsible for scheduled ship alterations
      b) Type Desk Officer
      c) Force Maintenance Officer

B. Syllabus:
   1. Availability overview
   2. Availability Work Package
   3. Scheduled Ship Alterations
   4. Work Definition Process
   5. Work Authorization Process
   6. Supplemental Work Procedures
   7. Funding Sources and Limitations

C. Criteria for Success:
   1. DMP/ERO/EOH Coordinator has phone numbers, email addresses, and dialog with TYCOM N4 staff that may provide assistance during the availability.
   2. DMP/ERO/EOH Coordinator understands the availability work scope and applicable TYCOM N4 work authorization process.

III. Report to TYCOM Shipyard Representative (5 weeks)

A. TYCOM Rep (meet initially with TYCOM Rep and then periodically during period at shipyard)
   1. Objective:
      a) Fully understands specific shipyard and current availability issues.
      b) Meets Key Players in the Shipyard.
      c) Fully understands the TYCOM Representative's role in Submarine Availabilities and Shipyard.
   2. Syllabus:
      a) "Shadow" TYCOM Representative during the period, observing:
         1) Critiques
         2) Monitor Watches
         3) Meetings with NRRO, NSRO, and Shipyard Management
      b) Review Shipyard Orientation, Organization, processes, procedures, and operations – focus specifically on the differences from the availability last experienced.

3. Criteria for Success:
   a) DMP/ERO/EOH Coordinator has experienced the TYCOM Representative's "typical day."
   b) DMP/ERO/EOH Coordinator discusses specific shipyard and current availability issues with TYCOM Representative to the level where he can pass his knowledge on to Ship's Force.
   c) DMP/ERO/EOH Coordinator knows who are the ship's NRRO and NSRO representatives.
   d) DMP/ERO/EOH Coordinator can identify key players in the Shipyard.

B. TAD to Project Management College (Phase I – 2 weeks)
1. Objective:
   a) Build relationship with Project Team
   b) Gain some insight into Naval Shipyard Project Management
2. Syllabus: PMC course syllabus.
3. Criteria for Success:
   a) Establish professional relationship with the project team, including PS, APSs, CTEs, and BSPO (all that are present). Get their phone numbers and email addresses.
   b) Meet PMC Course Objectives

C. TAD from TYCOM SY Representative to Project Team (1 weeks)
1. Objective:
   a) Reinforce relationships established at Project Management College.
   b) Build on understanding of Naval Shipyard Project Management and planning processes.
   c) Gain understanding of project status relative to BPMP.
   d) Understand what training the Shipyard will provide and when it will be provided.
   e) Understand the process work undergoes from identification to screening to adding to AWP to work complete and certified.
2. Syllabus:
   a) Review AIM inputs that Ship's Force affects and outputs that affect Ship's Force.
   b) Review Execution Strategies (if not finalized, review drafts or previous projects' strategies) focusing on the differences for availability experienced:
      1) Review Plan for Execution Strategies and discuss with an APS.
      2) Review Work Definition Plan and discuss with an APS.
      3) Review Fast Start Strategy and discuss with Project Superintendent.
      4) Review Plan to Develop Software Schedules and discuss with PEPM.
      5) Review Time Phased Resource for Planning and discuss with Project Superintendent or an APS.

6) Review Key Event and Milestone Management Plan including Work-to-test Sequences, Start Steaming Strategy, and Habitability Strategy and discuss with Project Lead Scheduler (include discussion of scheduling and PSS).
7) Review System Status and Plant Conditions Plan and discuss with Nuclear CTE.
8) Review Special Attention Job Plan and discuss with an APS.
9) Review Plant/Space Inspection and Closeout Plan and discuss with a Zone Manager (or equivalent).
10) Review System Transfer/Takedown Plan and discuss with Non-nuclear CTE.
11) Review Test Integration Plan and discuss with a CTE.
12) Review Temporary System Plan and discuss with a CTE (or equivalent).
13) Review Outside Activity Work Integration Plan with designated work integration leader.
14) Review Ship's Force Task Integration Plan with designated work integration leader (include Ship's Force Integration Database, its inputs and outputs, and Ship's Force requirements).
15) Review Open and Inspection Plan and discuss with an APS.
16) Review Pre-Arrival Testing, Inspection and Technical Assessment Plan with Nuclear and Non-nuclear CTEs.
17) Review Work Packaging Strategy and discuss with CTE (or equivalent).
18) Review Special Evolution Schedule Strategy and discuss with Project Lead Scheduler.
19) Review Integration of New Work Strategy and discuss with an APS.
20) Review Communications Strategy with the Project Superintendent.

c) Review preliminary Job Summaries, Job Summary development, and Technical Document development with PEPM.
d) Review Memoranda of Agreement.
e) Review basics of Performance Measurement and Control with APS in order to understand its basic function.
f) Review Availability Work Package with APS (or equivalent).
g) Meet with Shipyard Training Department and review Shipyard supplied training (pre-availability and during availability)

3. Criteria for Success:
   a) DMP/ERO/EOH Coordinator meets Project Team members not at PMC and has contact information for entire team.
   b) DMP/ERO/EOH Coordinator understands Project Team's organization and operation, and whom in the team to contact for various issues.
   c) DMP/ERO/EOH Coordinator's understanding of Naval Shipyard Project Management and planning is greater than after Project Management College.

d) DMP/ERO/EOH Coordinator can discuss current project status to the level that he may pass this knowledge to Ship's Force upon return.
e) DMP/ERO/EOH Coordinator has training plans, lesson plans, and schedule for shipyard training to take back to ship.

D. TAD to one or more Submarines in Shipyard to "shadow" an DMP/ERO/EOH Coordinator currently in availability (2 weeks)

1. Objective:
   a) Understand lessons learned prior to and during Availabilities by contemporaries.
   b) Harvest best practices from other DMP/ERO/EOH Coordinators.
   c) Fully understand the Shipyard's and Ship's Force expectations of the DMP/ERO/EOH Coordinator.
   d) Understand the relationships between the Shipyard, Ship's Force, and DMP/ERO/EOH Coordinator.

2. Syllabus:
   a) Review Work Definition, Identification, Screening, and Authorization Processes including problems and potential pitfalls.
   b) Review the tagout requirements (SOMS – if utilized).
      1) If his availability will or may utilize SOMS, the DMP/ERO/EOH Coordinator will thoroughly review and understand the system to a System Expert level.
   c) Review the administrative differences between Shipyard and Fleet Quality Assurance.
   d) Attend JTG meetings (nuclear and non-nuclear).
   e) Attend Ship's Safety Council meeting.
   f) Attend Daily Production Meeting.
   g) Attend Weekly Meeting with Shipyard management.
   h) Review tailored SSAM.
   i) Review unique CO and Engineer Standing Orders.
   j) Review Pre-availability Training Program and any special qualification programs.
   k) Review System Expert Program.
   l) Review Crew Requalification Program.
   m) Observe Management Information Center/Maintenance Operations Center organization and operation.
   n) Review Test procedures and coordination of testing.
   o) Review Assist Ship's Force Funds procedures.
   p) Review Ship's Force Integration Database procedures and Integration of Ship's Force work with Shipyard.
   q) Observe Groom Team Coordination.
   r) Review Sea Trials Agenda and Plan.
   s) Discuss the pitfalls, lessons learned, and best practices encountered during qualifications (EOOW, EDO, OOD, SDO, Submarines, etc.).

3. Criteria for Success:
   a) Obtain soft copies of all availability administration, including:
      1) Tailored SSAM
      2) Pre-availability and availability training programs
      3) System Expert Program
      4) Crew Requalification Program
   b) Possesses the names, email addresses, and phone numbers of other DMP/ERO/EOH Coordinators to have another knowledge source/network for future problems and issues.
   c) Understand predecessors' problems/pitfalls and how to avoid them.
   d) Understand Shipyard processes and their difference from Fleet or Intermediate-level repair facilities' procedures.