DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
1333 ISAAC HULL AVE SE
WASHINGTON NAVY YARD DC 20376-0001

IN REPLY TO

NAVSEAINST 4850.10
Ser 04X2/035

27 JAN 2004

NAVSEA INSTRUCTION 4850.10

From: Commander, Naval Sea Systems Command

Subj: REQUIREMENT FOR SCHEDULING CHIEF OF NAVAL OPERATIONS (CNO) AVAILABILITIES

Ref: (a) NAVSEA 0980-028-5000; Manual for the Control of Testing and Plant Conditions
(b) NAVSEA 0989-018-1000; Manual for the Control of Refueling
(c) NAVSEA 0905-485-6010; Manual for the Control of Testing and Ship Conditions
(d) NAVSEA Instruction 4730.1 Series; Nuclear-Powered Submarines; Shipyard Inspection and Required Conditions
(e) NAVSEA Instruction 4730.2 Series; Nuclear-Powered Surface Ships; Shipyard Inspection and Required Conditions of Propulsion Plant Systems (Non-Nuclear)
(f) Submarine Factory Baseline Project Management Plan (BPMP) [http://157.141.252.20/subhome]
(g) NAVSEA Instruction 9210.4 Series; Changes, Repair, and Maintenance to Nuclear-Powered Ships
(h) Baseline Advanced Industrial Management Process Manual, Version C

Encl: (1) Requirements for Scheduling CNO Availabilities
(2) Naval Shipyard Work Integration Filter
(3) List of definitions

1. Purpose. This instruction baselines current scheduling practices and establishes uniform requirements for scheduling work on naval vessels in Naval Shipyards. At the time of issue, a corporate pilot program, Critical Chain Project Management, was underway. This instruction may be modified based on the result of this pilot program.

2. Cancellation. This instruction supersedes and cancels NAVSEAINST 4850.7 and NAVSEAINST 4850.9.

3. Discussion. The execution of availabilities assigned to Naval Shipyards within acceptable cost, quality, and schedule parameters requires the use of effective integrated, resource-leveled schedules 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 (contractor, Alteration Installation Teams (AITs), etc.), 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 project strategies and clearly reflects discrete timeframes when work items will be accomplished.

The Advanced Industrial Management (AIM) program contains the Project Sequencing & Scheduling (PSS) process which is used to develop and maintain project networks and schedules. Project schedules will be developed and maintained in such a manner to accurately reflect the progress of work and assessment of resource requirements. Shipyard management shall be sufficiently engaged in the scheduling process to identify and correct potential threats to project success. Schedules will be reflective of the Shipyard Workload and Resource Report (WARR) and incorporate the requirements of references (a) through (g). The WARR shall be revised on a monthly basis, and it shall represent a resource commitment to all projects. Codes 300, 900, 1200 and Project Superintendents are jointly responsible to provide input that is reflective of project strategies for WARR and schedule development and execution.

Enclosure (1) establishes the minimum process requirements for scheduling work in Naval Shipyards. Compliance with the minimum schedule requirements of this instruction will:

a. Enable distribution of assigned workload to match available resource capacity.

b. Allow shipyard and project management to accurately assess the project performance to identify where corrective actions or additional resources are required.

c. Enable shipyards, ship's force, Type Commanders, other customers and maintenance activities to plan work, evaluate the

progress of work, manage resources and predict the ability of project to achieve planned objectives.

d. Foster benchmarking of projects' schedule performance and help bring about uniform schedule improvements.

e. Integrate Shipyard, applicable ship's force, and applicable non-shipyard maintenance activities (contractor, Alteration Installation Teams (AITs), etc.), work into one availability schedule that identifies work interfaces between shipyard, ship's force and the other maintenance providers to ensure the most efficient use of resources. A work integration filter is provided as Enclosure (2).

f. Promote standardization of scheduling processes and products. Definitions of standard terms used in the scheduling process are provided within Enclosure (3).

g. Result in effective utilization of personnel, facilities and equipment.

h. Enable shipyards to develop aggressive, but credible executable, project schedules.

4. Action. Shipyard Commanders shall implement the requirements of this instruction and prepare or revise local shipyard instructions within ninety (90) days of the date of this instruction.

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Deputy Commander
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and Industrial Operations

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REQUIREMENTS FOR SCHEDULING CNO AVAILABILITIES

1. Applicability

a. To properly account for resource requirements, all direct work shall be scheduled. This instruction applies to nuclear and non-nuclear work (including testing) performed by Naval Shipyards for ship availabilities assigned by the Chief of Naval Operations (CNO). Portions of this instruction may be combined and/or streamlined when dealing with smaller or short-term non CNO availabilities. The requirements may be extended to other work as determined by the Shipyard Commander.

b. The scheduling of Inactivation and Reactor Compartment Disposal will conform to the guidelines of this instruction. The Recycle portion does not have to comply with requirements of this instruction.

2. Interface with Testing and Refueling Operations The requirements of this instruction do not supersede or modify the technical requirements for reactor plant testing and refueling operations, which are conducted in accordance with references (a) and (b), or non-nuclear testing operations, which are conducted in accordance with reference (c). Reactor Plant testing, refueling/defueling operations and non-nuclear testing operations schedules shall be consistent with the requirements of these applicable manuals.

3 Sequencing and Scheduling Methodology

a. The sequencing methodology described in this instruction is based on a project network composed of hierarchical strategic and technical sequences that are established via the AIM planning process. During initial stages of the planning process, projects will develop a high level sequence of Key Events, Milestones, tests, and plant conditions. This high level sequence assists in formulating high level strategies for execution and development of appropriate job summaries. Sequencing is the initial step in the scheduling process. Key Event and major test networks provide the technical and strategic plan for accomplishment of a project. Successful development will require the cooperative effort of key Project Managers, including the Nuclear and Non-Nuclear Chief Test Engineers (CTE). The major project networks are:

Key Event Network

Milestone Network

Test Network

Component Unit Phase Network

b. The network provides the framework that allows for the workload to be distributed based on the committed resource pool and time constraints. 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. Until proper network relationships are established, workload cannot be distributed, and a schedule cannot be created. Project schedules will be based on a network reflecting the technical and strategic relationships of all work and testing. Schedules shall support a rigorous work-to-test philosophy for planning, work accomplishment and management of ship availabilities. Initial development of project networks will be based on the following considerations:

Key Events and project milestones

Job summary level work descriptions

System transfers and space turnovers

Testing requirements

Significant ship and plant conditions

Significant work to be performed by ship's force and other maintenance activities

(7 Installation and removal of temporary systems

Accomplishment of hull cuts affecting undocking component shipping and system restoration

Relationships and cross-ties sufficient to convey project strategic and execution decisions

Specific project execution strategies, including risk mitigation

c. An effective Work Breakdown Structure (WBS) is the foundation for a successful network and, hence, schedules. Characteristics of an effective WBS include:

Each activity (CU Phase) should consist of contiguous time related work steps. Changes in ship or plant conditions, extended interruptions (greater than one week) to support other production work or delays created by the mixing of work phases are indicative of the need for additional work breakdown.

(2) Activities should be defined such that no portion of the work crosses the boundaries of an event or acceptance test.

Activities should be defined such that they can be logically tied to a single test or key event.

Activities should be defined in such a manner that they may be logically tied by a finish-to-start constraint.

Work not requiring special plant conditions or system isolation should be segregated from that which does.

For purposes of supporting reactor compartment closeout, work accomplished inside the Reactor Compartment should be segregated from other reactor plant work.

Work requiring retest should be logically constrained to its associated test. In the event retest requirements mandate a change in ship or plant conditions, work will be tied to its appropriate event as defined in references (b) and (c).

d. Key Events and milestones are the backbone and framework of an availability schedule. Key Events are defined as events that cannot slip without seriously jeopardizing an on-time delivery of a project. Selected Key Events are mandatory for all availabilities. Milestones shall be used to aid in tracking and managing major steps and strategies in the conduct of the availability. Key Events and milestones will be used as appropriate based on the nature and relative complexity of the specific availability. These events assist in identifying and monitoring critical paths in the network.

e. A key element in developing a credible, executable schedule is the use of realistic durations for accomplishing work associated with individual Component Unit (CU) phases. Determination of the time-span allocated for each duration should be based on the manner in which the work will be performed and the actual time required. It should reflect the total time in shifts from the beginning of the job until it is turned back as signed off complete by the supervisor. Application of realistic durations, expected performance factors (particularly for first time jobs) 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.

4 Project Resource and Workload Planning

a. An accurate representation of the Project Resource Pool (workforce capacity) must be developed; typically this information will come from the Workload and Resource Report (WARR). To resource level a project schedule, total workforce capacity must exceed (allowing for growth) the resource requirements of the project schedule load. The project resource pool must account for expected growth work. To be truly effective in resource leveling a project, resources for all shipyard productive work must be considered. Development of the available workforce capacity must account for how labor resources will be applied to all projects. Determination of the amount of available workforce capacity 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 workforce capacity is vital to successfully scheduling the project work. To support the timely

development of a Resource Leveled Schedule (RLS), the initial project resource pool data must be available by A-4.

b. To be meaningful, a reasonable expectation must exist that the resources identified as available will actually be provided to the project at the scheduled time and for the scheduled duration. This defines the level of commitment required for the planned 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. It is, rather, a diligent review of resources available (including attention to special skill areas), compared to potential and identified work assignments for these resources (ensure a resource is not "committed" twice or scheduled beyond the capacity of the resource to fulfill the work assignment). Disparities between workforce capacity available and work identified may be mitigated by use of a reasonable amount 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 the mitigation strategy will be successful if completed.

c. The shipyard shall develop a project workload model. The project workload model should be a time-phased resource distribution that establishes a high-level workforce capacity plan for the project. It should include adjustments for new work, rework, and shop/project performance factors. The model should be consistent with overall shipyard priorities and the ability of the workforce to execute the model. The workload model must be consistent with and validated against project Key Event requirements.

d. Development of a Resource Leveled Schedule (RLS) NLT A-2 is key to the successful and timely execution of a major CNO Availability. By definition a RLS can only exist if Code 900 agrees that the workforce is available to support the project execution plan. To establish a RLS at A-2, it is necessary that the project's execution and resource plans be available to the PSS system NLT A-4 to support the resource distribution process.

5. Project Schedule

a. Distributing workload over a time period constrained by required Key Event dates and the committed workforce capacity produces a schedule. This workload distribution process can begin only after a network based on a correct technical sequence that incorporates shipyard and project strategic considerations has been developed. The workload distribution process, which is often referred to as resource leveling, is an iterative process. It involves the judicious application of parameters affecting job priorities, work calendars and manipulation of other resource and scheduling constraints (e.g., front, middle, or back loading based on fleet priorities). These parameters, coupled with the available resource capacity and Key Event dates, determine how the workload is distributed.

b. The project schedule is a tool for planning work, evaluating the rate of schedule progress for completing work, managing resources, and predicting the ability of a project to achieve planned objectives. It is not a work list, but instead provides discrete timeframes when the work items will be accomplished. The schedule should clearly reflect the project's plan for work execution.

c. The development of the project network yields four levels of schedules. The two top levels, Key Event and Milestone, are event schedules. The lower two levels, Test Schedule, and Component Unit Phase Schedule are activity schedules. An activity represents an action that consumes resources and time, and has an associated start and finish date. The levels of schedule hierarchy are:

Key Event Schedule

Milestone Schedule

Test Schedule

(4) Component Unit Phase Schedule

Each lower level schedule shall be supportive of and compatible with higher level schedules. This family of schedules should enable shipyard management to monitor and achieve success for on time completion of availabilities.

d. Shipyard senior management and shipyard customers use the top two levels of schedules, Key Event, and Milestone for

strategic planning and schedule performance assessment. The two lower level schedules, Test Schedule, and Component Unit Phase Schedule, are considered the project production schedules. They are used for detail planning and performance monitoring. These lower level schedules must be maintained, executed, and progressed within the parameters established by Key Event and Milestone schedules. Rescheduling or rearrangement at this lower level will occur; however, cumulative schedule slippage may be indicative of slippage of higher level schedules, and may require adjustment of higher level schedules.

e. Project Management schedules are a sub-set of the above schedules. These are tools used by Project Management in the day-to-day management of the project. Project Management schedules may include:

(1) Short Range Schedule (covers three to six weeks)

(2) Daily Production Schedule (covers two to three days)

3 Task Schedule (below CU-phase level). Developed when the Project Superintendent identifies a critical job that requires more detailed management than is provided at the CU phase level.

6 General Project Schedule Requirements

a. Project schedules will be resource leveled. The resource leveling process compares schedule load (workload) against committed resources capacity and determines how much work can be scheduled at any given time. Excess work is deferred (moved to the right) until various constraints prevent further movement. In the end, the scheduling process will move work within available float in order to match the schedule load (workload) to the committed resources capacity. To prevent an unrealistic front-loaded schedule, careful consideration must be given to incorporate execution strategies and all necessary predecessors to starting productive work (e.g., tag-outs, system transfers, installation of temporary systems, etc).

b. Critical Path Method (CPM) precedence technique (logic network) will be used for developing the project network and analyzing schedule status. CPM is an effective tool for project management when the networks are properly developed, maintained

and progressed, and the analysis data is used to aid management decisions. A CPM network is a project model reflecting project strategic goals (events) and the combination of technical and strategic sequence of all of the identified Component Unit Phases (CU phases). Adding activity durations and calendars allow a mathematical calculation of earliest possible and latest allowable dates and available float. Adding an available workforce capacity profile allows calculation of dates and floats that supports resource availability. Finally, by adding progress data to the network, the impact of change can be analyzed. CPM analysis provides the project managers with earliest predicted and latest allowable dates and float. Project requested reschedules can be compared to these calculated dates to assess schedule impact. Also, current schedule status can be assessed and calculated floats utilized to highlight areas where management attention is required.

c. Schedules shall be developed and maintained in an executable manner at all times. Periodic re-leveling during project execution shall be accomplished when a "bow wave" of work develops that, on average, exceeds the resource execution capacity by more than 50% for 4 or more weeks. This re-leveling is necessary to ensure the project is accurately predicting its critical work chain as well as identifying the specific, short-range worker skills requirements.

d. The scheduling process shall be of such a nature that schedules can be progressed and updated daily. For shipyard work, this will normally be accomplished by electronic interfaces via Supdesk to AIM to PSS. For ship's force and other non-shipyard work, this will normally be entered manually or electronically transferred.

e. Component Unit Phase Schedule shall show ship's force industrial work and Reactor Plant 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 and in accordance with the Project Planning Timetable to support development and issuance of an integrated Project Schedule. Ship's force should provide sufficient manning during planning and execution to support the integrated schedule development and maintenance.

The project schedules shall also integrate non-shipyard industrial work that has direct impact on Key Events. The responsible non-shipyard maintenance organization (e.g. contractor, Alteration Installation Teams (AITs), etc.) shall be provided a timetable by the Shipyard. The non-shipyard maintenance organization is responsible to provide the work schedule and current status per that timetable 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. The shipyard shall ensure work agreements are established to clarify the functions, responsibilities and actions required by the aforementioned activities and their agents to ensure all contract, TYCOM, NAVSEA and higher directive requirements are met during the performance of the industrial work.

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.

f. Shipyards shall identify Critical and Controlling Path(s) on all schedule products.

g. A single integrated schedule showing all work (nuclear, non-nuclear, shipyard, ship's force, and other maintenance activities) required to complete the availability should be developed and maintained. Nuclear and non-nuclear schedules or other specific schedules may be issued separately, if the schedules are compatible and support the schedule hierarchy.

h. Work breakdown shall support the hierarchical schedule requirements. Work shall be sufficiently broken down so that interfacing work between multiple maintenance providers can be sequenced and so that the work can be scheduled and accomplished without interruption. Guidance on work break down is included in enclosure (2).

i. The development and execution of the schedule is the responsibility of the Project Superintendent and the project management team. It is imperative that project management teams and shipyard shops and codes responsible for management, coordination and execution of the schedule be included in its development to ensure the schedule is challenging and achievable.

j. Schedules may be produced in report, bar chart, or logical sequence formats or any combination thereof.

k. Project schedules will be produced from the Project Sequencing and Scheduling (PSS) database. Detailed work execution schedules below the CU phase level may be produced in the PSS system or, in some cases, in a separate product such as MS Project. When a separate product is used, special attention must be paid to keep those schedules in alignment with PSS schedules which are the official schedule for the availability.

l. The project schedule is owned and controlled by the Project Superintendent. The scheduling process is owned and controlled by the Scheduling Branch Manager.

m. The Project Superintendent will ensure the project team is committed to schedule adherence, schedule maintenance, and accurate progressing for the project. Accurate progressing is the backbone of CPM analysis and accurate Performance Measurement and Control (PMC) information. The Project Superintendent will be responsible for the work sequences, job durations, work progressing and strategic scheduling decisions. The Project Superintendent shall issue the schedule for approval and initiate official changes to the project schedule.

n. The Production Resources Department is responsible for developing the available workforce capacity pool and providing the committed resources. The Operations Department will provide the Resource Department with a priority ranking of project resource requirements.

7. Specific Schedule Requirements

a. 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 that 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 shipyard management as a method of monitoring and reporting progress of a ship availability to NAVSEA, Type Commander (TYCOM) and others as necessary. Project managers will review this schedule on a weekly basis. Projections for completion of up-coming events will be provided to the Shipyard Commander, Operations Officer and Nuclear Production Manager (if applicable) on a regular basis. If projections indicate that the dates for upcoming events will not be met, the Project Superintendent will provide shipyard management with a mitigation strategy for getting the project back on schedule. The Key Event schedule is the highest level in the hierarchy of shipyard schedules. The Key Event schedule:

Is mandatory, and will be issued as specified in the Project Planning Timetable (PPTT) in accordance with reference (h).

(2) Shall be approved by the Project Superintendent and concurred in by the Operations Officer and Nuclear Production Manager as applicable. Subsequent changes require the same level of approval as the original schedule.

b. Milestone Schedule The Milestone Schedule contains all the milestones established for an availability with an approved schedule date for each milestone. A Milestone is an event that supports a Key Event (KE). Milestones provide two basic functions under Project Sequencing and Scheduling. They provide a means of tracking key areas of work or segments of the availability below the KE level and a means of tying many of the Project execution strategies directly to the project schedule in a trackable form. The Milestone Schedule:

Is mandatory for submarines and highly recommended for other ships and may be combined with the Key Event Schedule. Milestones will be added or deleted as required by the scope of work package, or as deemed necessary by the Project Management Team. This schedule will be issued as specified in the Baseline Project Management Plan (BPMP), or the PPTT, as applicable.

(2) Shall be supportive of and compatible with the Key Event Schedule.

The work shall be appropriately networked to the milestone and the milestones shall be appropriately tied to the key event or tests they support.

Shall be approved by the Project Superintendent. Subsequent changes require the same level of approval as the original schedule.

Shall have the notional critical and controlling path(s) identified as appropriate.

c. Test Schedule The Test Schedule contains all the tests established for an availability with the interrelationships among the tests as well as their associated milestones and key events.

d. Component Unit Phase Schedule The Component Unit Phase Schedule is the overall schedule of production work, testing, ship's force work and other maintenance activities' work. General production service and non-production CU phases shall be time-phased, event-phased, and scheduled for practical manageability. (i.e. Level of Effort (LOE) CU phases with zero duration) 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, tied to, and compatible with upper level schedules.

Development shall be the responsibility of the Project Superintendent with support from the project management team.

(4) Will match the scheduled workload to the available workforce capacity. This schedule will be a product of the workload distribution process. Workload mismatches will be discussed with the Production Resources Department and mitigation strategies developed. Adjustments to the schedule will reflect committed resources at the shop level and mitigation strategies.

Identify the Project's Critical and Controlling Paths.

e. Task Schedule Developed when project management determines that a CU-phase level schedule does not provide sufficient detail to properly manage the selected job or when the job requires finer control or monitoring. Task Schedules:

Are mandatory for certain critical and controlling path jobs unless the CU Phase schedule provide sufficient detail to properly manage the job.

May be developed in PSS or may be developed in another software package.

Shall be supportive of and compatible with upper level schedules.

(4) Approval of this schedule shall be by the cognizant Project Superintendent

8. Project Management Schedules

a. Short Range Schedules Issued by the project team on a weekly basis. They will be used to continuously refine the project plan and will be the tools used to adjust the availability schedule to reflect resources available, (i.e. labor, material, etc). Short Range Schedules:

Are mandatory

Shall cover a three to six week window

Reside in AIM, PSS scheduling database, and are updated weekly.

(4) Shall be sorted such that the type of work (nuclear or non-nuclear) on a system or compartment/tank/void (outside the plant) is grouped or sorted together to aid in coordination of that work.

Shall provide the responsible production shop code(s).

Approval of this schedule shall be by the cognizant Project Superintendent

b. Daily Production Schedules Issued by the project team on a daily or less frequently as the workload demands, but at least two times weekly. These schedules are working documents for the project and shall show, as a minimum, the critical and controlling path work scheduled to be accomplished at the Component Unit Phase level during the period covered. Task-level breakdowns of the daily production schedules may be performed, as appropriate, to provide more detailed tracking of work. Daily Production Schedules:

Are mandatory

Shall cover a two to three day work window and shall break down the work in sufficient detail so that shift by shift progress can be determined.

(3 Are required to be approved by the cognizant Assistant Project Superintendent.

(4 Must be concurred in by the cognizant shop, engineering, quality control and support supervisors. Concurrence in the daily schedule indicates their agreement with and commitment to the schedule.

Shall reside in AIM, PSS schedule database and reflect actual project priorities and may be supplemented by with task schedules.

Must take critical and controlling paths analysis to upcoming Key Events and Milestones into consideration. Every attempt should be made to ensure critical and controlling path work is addressed.

Shall provide the responsible production shop code(s).

9. Schedule Maintenance

a. Schedules are to be developed and maintained such that they are credible and executable. One of the primary issues in maintaining a project schedule is the accurate reporting of status and progress of the work being accomplished. As time moves forward and work that is scheduled to start does not start on time, a "bow wave" of work scheduled to start will begin to build. When scheduled work does not start 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 to re-evaluate 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 or non-controlling path work should be moved downstream if necessary.

During the execution of a project, many changes are made to the scheduled network. Changes in the scope of work and 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, and the resources, technical work instructions, and material are available to support it, it should be left in the current work window. If not, selective dating can be used to place the new work at an appropriate time frame for accomplishment. New work should not be scheduled before it is reasonable to expect the paperwork, resources and material to be ready to support the job. Daily updating of the status of work in progress has a direct effect on the calculation of remaining time and resources required. As the project moves forward it will be necessary for the project team to re-evaluate the workload profile and available workforce capacity to ensure required resources are available to execute the scheduled work. In some cases, the project may be required to re-distribute the remaining workload to eliminate any difference between the work and available workforce capacity. This shall be accomplished using the resource leveling process should the "bow wave" of work develops that, on average, exceeds the resource execution capacity by more than 50% for 4 or more weeks.

b. Some of the characteristics of a credible and executable project schedule include:

(1 Scheduled workload is consistent with the project workload model.

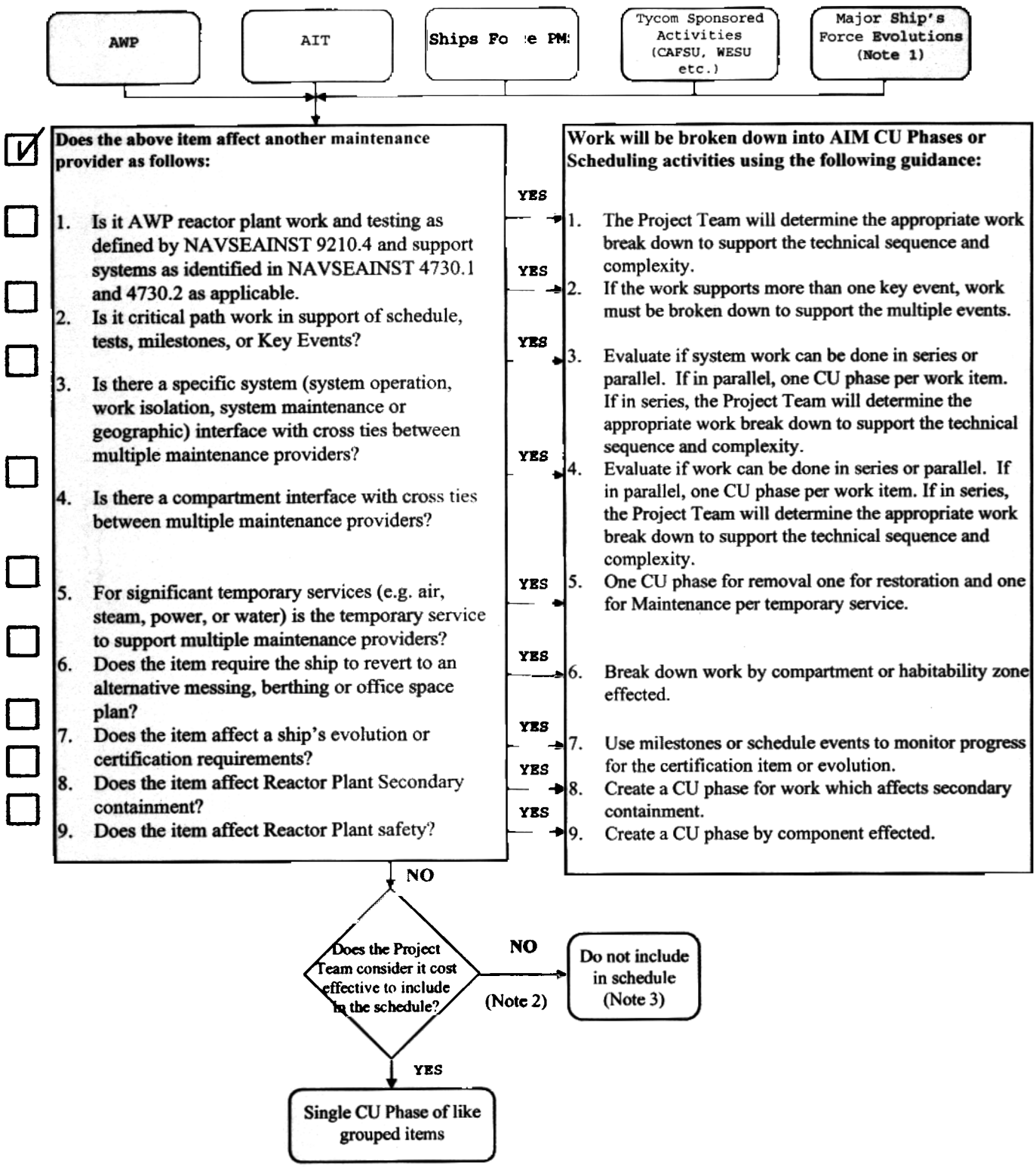
(2) Code 900 supports the indicated resource requirements for the workload scheduled.

The rate of scheduled testing is leveled to eliminate severe or abnormally high peaks and is consistent with the project's ability to execute

Resource and material problems are identified and mitigated to the maximum extent practicable.

NAVSEAINST 4850.10

NAVAL SHIPYARD WORK INTERGRATION FILTER



NOTE 1. SHIP'S FORCE EVOLUTION (e.g. CERTIFICATIONS, CHANGE OF COMMAND, CREW TRAINING, 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

CHECK LIST - MULTIPLE CHECKS RESULT IN BREAKING DOWN WORK TO MEET ALL INTERFACE CONCERNS

Enclosure (2)

List of Definitions

NAME	ABRV	DETERMINED BY	DESCRIPTION
BOW WAVE			Excessive cumulative buildup of incomplete and/or unstarted work during the current day timeframe.
COMPONENT UNIT PHASE	CU Phase	Job Planning (JPL)	The most common work definition element of the work breakdown structure used as the basis for defining, scheduling and monitoring work. The combination of a Component Unit Identifier and a standard phase. The CU Phase describes a definitive segment of work performed on a specific component.
CONTROLLING PATH		PSS System Generated	Those paths through a network where more than small amounts of activity slippage/delay will lengthen the network duration.
CRITICAL PATH		PSS System Generated	Critical paths are logically connected sequences of work in a schedule network to an event date with the maximum predicted duration. Alternatively, it is also the work sequence to an event with the least total float (or most negative float).
CRITICAL PATH ACTIVITIES			Work, testing or other activities that are in a schedule network critical path.
CRITICAL PATH ANALYSIS			The process of CPM network analysis and the identification of network critical path by the selection of those activities with the least amount of total float through the network to any activity with a forced date or planned finish.
CRITICAL PATH METHOD	CPM		The methodology/management technique which makes analytic use of information regarding the critical path and other controlling paths through a network.

List of definitions

NAME	ABRV	DETERMINED BY	DESCRIPTION
EVENT		CTE role in AIM Scheduler in PSS	A progress measurement point in time that consumes neither resources nor time. (e.g. Key Events and Milestones are events that mark a point in time and do not use resources or time)
FLOAT			Float is defined as the amount of time reserve available to complete a series of activities without impacting the planned finish or forced date of the remaining work in the sequence. One of the principal benefits of Critical Path Method is the ability to measure, and monitor the use of float.
JOB SUMMARY		PPM	A strategic grouping of work within a specific SWLIN that the Project Team establishes to plan work.
KEY EVENT	KE		A Key Event is an event within the schedule which cannot slip without seriously impacting the overall schedule and possibly delaying the completion of that or other projects. Key Events are part of the Strategic Project Plan.
LEVEL OF EFFORT ACTIVITIES	LOE		Level of effort work (LOE) is work required to complete an availability, but for which there is not a specific product. LOE's have a duration of zero and are sequenced between Key Events Milestones and Monthly Events. Examples include project management, planning services, standard rigging services. etc.

List of Definitions

NAME	ABRV	DETERMINED BY	DESCRIPTION
MILESTONE	MS		A Milestone is an event that supports a Key Event. Milestones provided two basic functions under Project Scheduling and Sequencing. 1.They provide a means of tracking key areas of work or segments of the availability below the KE level and aid in identifying these sequences to senior management for attention and action. 2. They provide a means of tying many of the Project execution strategies directly to the project schedule in a trackable form.
PMC			The Naval Shipyard Performance Measurement and Control System integrates existing production and financial data into a single graphic program. The existing versions are PMC- Legacy and PMC-NG (next generation). User manuals are available from the Workload Performance Measurement Groups (within code 1200) at each shipyard.
PROJECT RESOURCE POOL		RSC	The time phased availability of labor resources, by shop, across the duration of the project. It is used in the scheduling workload distribution process.
PROJECT NETWORK			The project network defines the relationships between Key Events, Milestones, tests, and CU Phases, (i.e., sequence and type dependencies: start-start, finish-finish, finish-start) among Key Events, tests, other schedule activities and Milestones. The project network is used to produce the project schedule.

List of definitions

NAME	ABRV	DETERMINED BY	DESCRIPTION
PROJECT NETWORK DATABASE			The database residing in the ADP scheduling system, necessary to perform CPM network analysis and scheduling.
PROJECT RESOURCE STRATEGY			Establishes high-level project standards for identifying, acquiring, and allocating project labor and non-labor resources.
PROJECT SCHEDULE			The project schedule is the project's plan for executing the availability. The project schedule is derived using the Critical Path Method analysis of the project network planned sequence of Key Events, tests, other CU Phases and Milestones. The project schedule is the depiction of the start and completion dates for Events, Milestones, tests and other schedule activities.
PROJECT SEQUENCING AND SCHEDULING	PSS		PSS provides the project network and computes and maintains the project schedule for an availability. PSS provides the strategic level scheduling function.
RESOURCE CONTROL	RSC		RSC creates the shipyard resource plan, coordinates resources for individual projects and allocates resources among the shipyard projects.
RESOURCE LEVELING			The iterative process by which optimization of resource use is achieved and adjustment of schedule dates for the availability of a given resource. Resource leveling is a process by which activities are scheduled based upon the availability of resources. Resource leveling will consume float in the network by "scheduling" activities when the resources, time and priority are available.

List of Definitions

NAME	ABRV	DETERMINED BY	DESCRIPTION
Resource Leveled Schedule	RLS		Resource Leveled Schedule (RLS) is the Shipyard's plan for the execution of the project. The RLS is a fully developed schedule reflecting KE's, MS's, Test networks, System turnovers and turnbacks, SY work CU phases, SF work, and contractor work that is fully tied and cross tied and has accurate durations, that has been adjusted/leveled to synchronize the project work plan with the availability of production resources. It is fully supported by the project as being executable and by c/900 as being supported with production resources.
RESOURCE LOAD			The quantity of resources as measured by the number of resources required over time.
RESOURCE POOL			The time phased distribution of available resources over the duration of the project.
RESOURCE SCHEDULING			Same as Resource Leveling.
RESOURCES			Resources are whatever is required to complete a work item or task. It includes manpower (trade skills), material, special tools, facilities and equipment. In this instruction, the term resources refers to people requirements to execute the work.
SCHEDULE			A schedule is a portrayal of sequenced work with dated goals.
SCHEDULE ANALYSIS			The Critical Path Method (CPM) process by which a schedule is reviewed for progress against the approved scheduled dates. The schedule analysis provides projected activity and event dates.

List of definitions

NAME	ABRV	DETERMINED BY	DESCRIPTION
SCHEDULE LOAD			The quantity of work as measured by either the number of CU Phases, the number of man-hours, or the number of resources required over time. This term is sometimes used in place of Resource Load.
SCHEDULE NETWORK			A schedule network is a sequence of activities in a logical order showing visually all functional interdependencies among the activities. The schedule network is the technical sequence of work activities (including constraints) that logically displays the work.
SCHEDULE REVISION			The process by which schedule activities or events in a schedule are changed. These changes can be a result of added, deleted or unplanned new work, test failures, strategy changes, resource shortages (manning, material, facilities, etc.) or other causes. The end result will be a new schedule approved by the cognizant level of project management.
SHIP'S FORCE	SF		Ship's Force is the officers and crew of a ship/boat undergoing availability.
SHIP'S FORCE INTERFACE FUNCTIONS			Ship's Force interface functions are any Ship's Force functions that may impact the project schedule and are directly related to productive work. Ship's Force interface functions include training and preventive maintenance.

List of Definitions

NAME	ABRV	DETERMINED BY	DESCRIPTION
TASK			A task is a unit of work, identified and estimated by Process Job Planning, accomplished by a single trade skill on a single component or in support of work on a single component. Task level information may be used to develop schedules below the normal CU phase level when more detailed management is required of key or critical jobs. Task level schedules may be developed in PSS or other software.
TASK GROUP INSTRUCTION	TGI		The document used to provide the detailed work instructions and other necessary technical information (drawings, technical references, etc.) for accomplishment of the specific work within a Component Unit Phase. A task group instruction consists of selected information produced in the job summary for a specific Component Unit Phase, plus the necessary detailed technical information, and is the actual hard copy document utilized by execution for performance of work.
TECHNICAL SEQUENCES			The sequence of work based solely on technical requirements.
TEST			A test is a system operation within a test boundary, that demonstrates system attributes (such as strength, tightness or cleanliness) or system operability for components within the test boundary. Each test is represented in the project network by a specific test CU phase

List of definitions

NAME	ABRV	DETERMINED BY	DESCRIPTION
TEST BASED SCHEDULING			Test based scheduling is the scheduling method that interrelates the productive work to completion of testing required to certify systems for the next level of test (e.g. strength and tightness tests required to support system operational tests) or the next major event (e.g. hot operational testing required to support criticality).
TEST BOUNDARY			A test boundary is a test specific system or subsystem drawing containing the complete scope of components (e.g. piping, valves, electrical, etc.) encompassed in the boundary. This boundary will constitute a natural line up for the conduct of the specific test on that system or subsystem.
TEST SEQUENCES			Test sequence is the technically based, ordered plan of tests required by the approved work in the work definition document and within the guidelines of the approved Project Execution Strategy.
TOTAL FLOAT	TF		Total float is the amount of time an activity duration may be lengthened or the activity rescheduled without affecting the related key event date or the total duration time of the network. Total float is shared with preceding and following activities in the network. Consuming float on one activity decreased the float on all subsequent activities. It is important to remember that the float does not belong to the activity but to the entire sequence of activities

List of Definitions

NAME	ABRV	DETERMINED BY	DESCRIPTION
WORK BREAKDOWN STRUCTURE	WBS		WBS is a work hierarchy pertinent to the overhaul and repair of ships in a shipyard. At each level of the hierarchy, the increment of work has clearly defined technical start and completion requirements. Each lower level off the WBS requires progressively more detail, and for each level to be supportive of and compatible with the higher levels. An example of the WBS is. 1. Key Event 2. Milestone 3. Test 4. CU Phase
WORK/TEST RELATIONSHIP	WTR		A number assigned to a Component Unit Phase establishing a relationship between the type of work accomplished and the type of test required.