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DEVELOPMENT OF A PLAN TO ASSIST SHIPS IN PREPARING FOR THE PROP--ETC(U)

FEB 74 E J LUTZ, D PORTER

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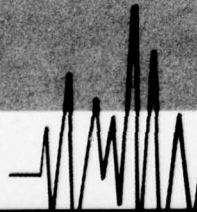
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**FINAL REPORT**  
**DEVELOPMENT OF A PLAN TO ASSIST SHIPS IN**  
**PREPARING FOR THE PROPULSION EXAMINATION**  
**BOARD (PEB) LIGHT-OFF EXAMINATION (LOE)**  
**PHASE I**

**February 1974**

Prepared for  
**PERA (CRUES)**  
**PHILADELPHIA NAVAL SHIPYARD**  
Philadelphia, Pennsylvania  
under Contract N00140-73-D-0074  
Task Order 0010



**ARINC** RESEARCH CORPORATION

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PREPARING FOR THE PROPULSION EXAMINATION  
BOARD (PEB) LIGHT-OFF EXAMINATION (LOE)

PHASE I

February 1974

Prepared for  
PERA (CRUDES)  
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by  
E. J. Lutz, Jr.  
D. Porter

ARINC Research Corporation  
a Subsidiary of Aeronautical Radio, Inc.  
2551 Riva Road  
Annapolis, Maryland 21401  
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ABSTRACT

This is the final report on Phase I of a proposed two-phase program to provide a plan in preparation for the Light-Off Examination (LOE). The tasks performed in order to formulate this plan are described and the plan itself is presented.

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## CHAPTER 1

### INTRODUCTION

#### 1.1 BACKGROUND

In November 1972 two Propulsion Examining Boards (PEB) for 1200-PSI ships were established by the Chief of Naval Operations -- one for the Atlantic Fleet and one for the Pacific Fleet. By February of 1973 the Board, assigned to CINCPACFLT, had been formed and was beginning to conduct Operational Propulsion Plant Examinations (OPPEs) on ships of the Pacific Fleet. The first few examinations resulted in unsatisfactory reports, causing these ships to be placed out of operation until the restrictive deficiencies were corrected. The seriousness of the problem was thus brought immediately to the attention of the Type Commanders. Further impact was made by the first Light-Off Examinations (LOEs), which resulted in delays in Regular Overhauls (ROHs) and a requirement for additional funds to correct discrepancies noted during the examinations.

In March 1973 the PEB was tasked by CINCPACFLT to conduct a 1200-PSI Steam Propulsion Ship Visit Program. The goals set for this program were three-fold:

1. To visit each 1200-PSI ship to brief key shipboard officer and enlisted personnel on the goals of the CNO-sponsored 1200-PSI Improvement Program, discuss the function and examination criteria of the PACFLT 1200-PSI Propulsion Examining Board, and explain the Board's methodology in the conduct of the Operational Propulsion Plant (OPPE) and Light-Off Examination (LOE).
2. To work with shipboard personnel in areas of administration and material management with the purpose of improving onboard evaluation and inspection skills and practices.
3. To report to the Commander-in-Chief, U.S. Pacific Fleet, conditions found on the subject ships to assist staff in formulating policies and procedures to improve overall material readiness.

This task was completed by the PEB in October 1973. By mid-1973, recognizing the need to assist the ships in ROH in preparing for the LOE, COMCRUDESPAC

tasked PERA (CRUDES) to prepare a plan to provide this assistance for consideration by the COMCRUDESPEC staff. It was suggested that this effort produce a single plan, with milestones for ships in overhaul to use as a comprehensive guide for ship's force workload planning and as a means of monitoring shipyard work in preparation for the LOE.

## 1.2 ARINC RESEARCH PARTICIPATION

ARINC Research Corporation, which was already involved in a number of overhaul planning and engineering efforts, was tasked by PERA (CRUDES) to develop a course of action by which the Fleet operating units could successfully plan and monitor certain actions required prior to a PEB/LOE. This was to be a two-phase effort. The purpose of Phase I, consisting of five subtasks, is to develop a management plan for use by ships in preparing for the LOE. Phase II will consist of implementing the actions recommended in Phase I.

## 1.3 PHASE I SUBTASKS

The five subtasks of Phase I are as follows:

- a. Review the Propulsion Examining Board (PEB) charter and procedures.
- b. Define the type and frequency of discrepancies occurring during the PEB/LOE by analyzing an estimated six discrepancy reports of previous inspections.
- c. Review current overhaul planning documents, programs, and procedures, and training programs to assess their relationship to and impact on the PEB/LOE. Examples of documents to be reviewed are as follows:
  - POT&I Plans
  - SARP
  - SFOMS
  - PQS
  - FMP (alterations by class)
  - EOSS/EOCC
  - Shipyard test planning and test memos
  - TRS's
  - Training Programs
  - Shipyard O/H management system



- d. Interview personnel from the following activities for experience and ideas:
  1. PEB personnel (CINCPAC/CINCLANT)
  2. COMCRUDESPAC Staff Personnel
  3. Shipyard Planning Personnel at Long Beach, Pearl Harbor, and Philadelphia Naval Shipyards
  4. Ship's Force personnel from USS GRIDLEY (DLG 21), USS BERKELEY (DDG 15), USS ROBISON (DDG 12), USS COCHRANE (DDG 21), USS HEPBURN (DE 1055), and USS DAVIDSON (DE 1045)
  5. NAVSHIPS PMS 301
  6. COMCRUDESANT Material Office Staff Personnel
- e. Analyze information gathered and develop conclusions and recommendations for plan of action that will lead to a successful and timely LOE for ships in overhaul. Coordinate with cognizant agencies for concurrence or guidance.

#### 1.4 CONTENTS OF THIS REPORT

Chapter 2 presents the Proposed Management Plan, with Milestones, that was developed by ARINC Research as a result of the Phase I effort. This is a preliminary plan that will be refined and updated during implementation in Phase II. Conclusions and recommendations arrived at during the preparation of the proposed plan are presented in Chapter 3.

The Phase I subtasks were accomplished in steps, with separate reports being submitted to PERA (CRUDES) on Subtasks a and b. These are included in this report as Appendixes A and B, respectively. The documents reviewed in Subtask C are discussed briefly in Appendix C. Appendix D presents the results of the interviews of personnel from the seven ships and eleven activities visited in connection with Subtask d.

## CHAPTER TWO

### DESCRIPTION OF THE PROPOSED MANAGEMENT PLAN AND MILESTONES

#### 2.1 PURPOSE AND IMPLEMENTATION OF PLAN

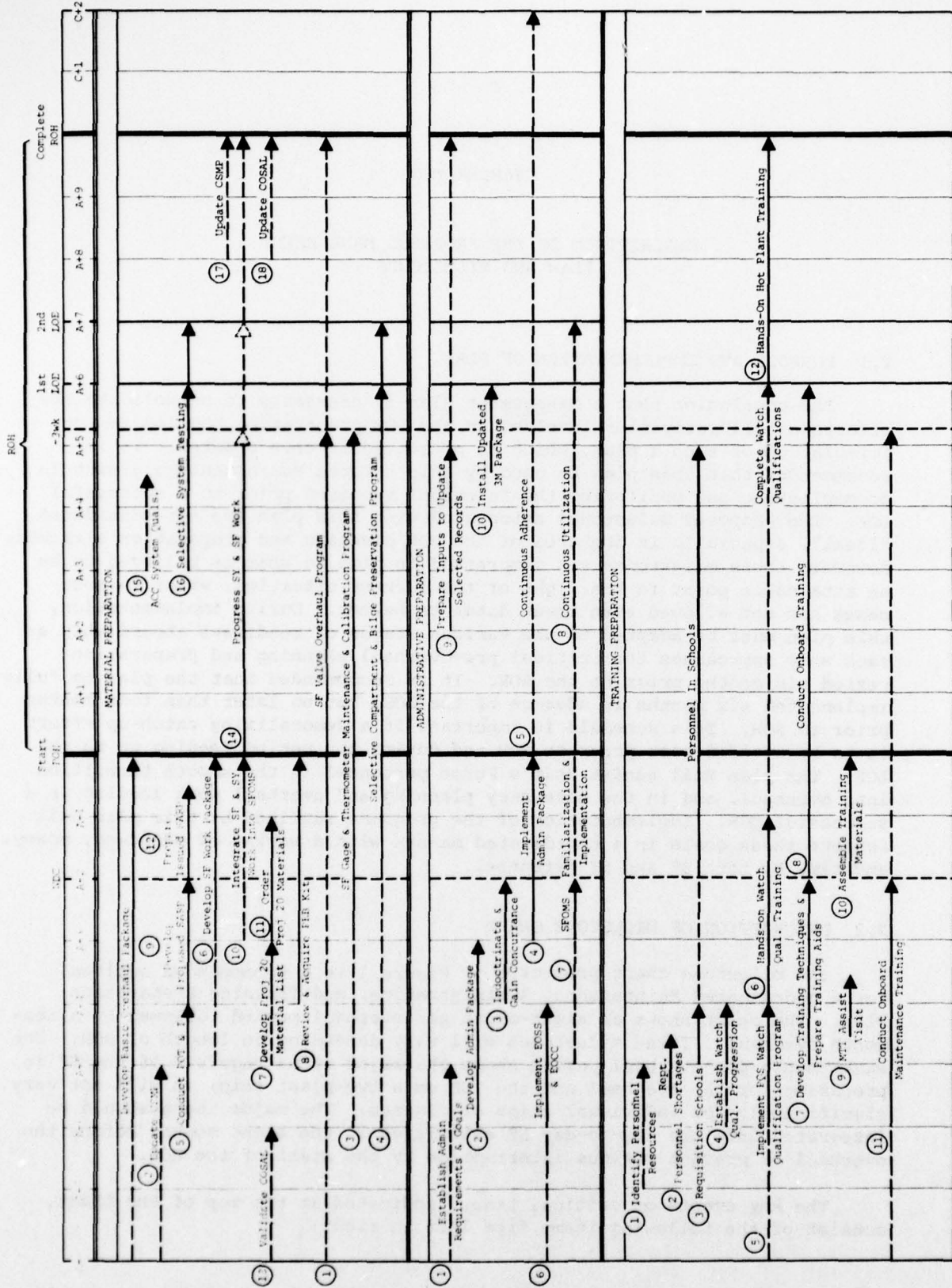
The conclusion that a Management Plan is necessary to consolidate the efforts of all activities involved in the LOE preparation had led to the formulation of such a plan, which is presented in this chapter. It is recommended that this plan be used by Ship's Force Management to assist in accomplishing and monitoring the functions required prior to a successful LOE. The proposed milestones associated with this plan are not considered "ideal", especially in the area of the ROH planning and preparation elements; however, these milestones are compressed in time to what is believed to be an attainable point in the light of the current situation, which in most cases has not allowed even these dates to be met. During implementation, this plan must be adapted to the various stages of readiness aboard ship as each ship approaches the critical pre-overhaul planning and preparation period six months prior to the ROH. It is recommended that the plan be fully implemented six months in advance of the ROH, but no later than four months prior to ROH. This schedule is important if a demoralizing catch-up effort is to be avoided just prior to ROH and during the period leading up to the LOE. The plan will assist Ship's Force personnel in the smooth transition into overhaul, and in the necessary planning and overhaul work leading up a successful LOE. Implementation of the programs outlined by this plan will achieve these goals in a coordinated manner with a saving of manpower, money, and time by both SF and SY personnel.

#### 2.2 DESCRIPTION OF MILESTONE CHART

The milestone chart presented in Figure 1 is a recommended outline for a coordinated Maintenance, Administrative, and Training Preparation Plan. The chart shows an eight-month pre-overhaul period followed by a ten-month overhaul. These milestones will vary depending on length of ROH. The eight-month pre-overhaul period shows the major items required of the SF in preparing for the overhaul and the LOE on a two-plant ship; it will not vary significantly for individual ships or classes. The major items should be integrated into the day-to-day SF activities in the eight months before the overhaul to prevent serious interruption by the start of the ROH.

The key events or critical times, indicated at the top of the chart, consist of the following items from left to right:

Figure 1. PROPOSED MANAGEMENT PLAN WITH MILESTONES FOR LOE PREPARATION



- WDC - For discussion purposes, WDC indicates the estimated time of the Work Definition Conference at two months prior to Overhaul. To provide proper planning time, the WDC should be conducted 3 months prior to ROH.
- Start ROH - Indicates the start of Regular Overhaul.
- Minus Three Weeks - This point designates the start of the time required by SF for final grooming and indicates Machinery Cut Off point for the shipyard. It occurs on the chart three weeks prior to LOE.
- 1st LOE - At approximately four months prior to completion of ROH, this is the estimated point of the first LOE during a 10-month ROH. This will be the only LOE on a single-plant ship.
- 2nd LOE - At three months prior to completion of ROH, this becomes the estimated time of the second LOE for two-plant ships.
- Complete ROH - Indicates completion of the 10-month ROH.

### 2.3 DESCRIPTION OF KEY TASKS AND MILESTONES

The key tasks with milestones shown horizontally on the chart are described below; they are grouped vertically on the chart in the order of Material Preparation, Administrative Preparation, and Training Preparation.

#### 2.3.1 Material Preparation

(The development of a Basic Overhaul Work Package starting 6 to 8 months prior to the WDC will have a significant impact on the success of the LOE and thus will directly affect the timely completion of ROH. The basic overhaul work package comprises Tasks 1 through 6.)

##### Task 1 - SF Valve Overhaul Program

The overhaul of valves by Ship's Force is one of the most time-consuming and difficult jobs to complete during ROH because of the deteriorated condition and great number of valves in the engineering spaces. For these reasons, it is imperative that a well defined valve maintenance program be implemented in the day-to-day maintenance 10 to 12 months before overhaul.

Although very little valve overhaul work can be accomplished while ship's systems are operating, the basic requirements of a valve program can be drawn up and implemented. This will help to eliminate a last-minute effort by SF to complete valve overhaul before LOE.

Because of the extremely large number and different types of valves, the following key points must be part of developing and implementing any valve program:

- Complete inventory of all valves, their location, and condition.

- Designate overhaul or repair responsibility as to SF Tender or SY. This should be accomplished in conjunction with the development of the proposed SARP, and it becomes an important item at the WDC.
- Review ship's 3M requirements for valve maintenance for use on this valve maintenance program.
- Establish priorities for valve work for both SF and for the SY once ROH starts. Priorities should start with those compartments, systems, and equipments that will be involved in the First LOE.
- Before overhaul starts, begin work on valves in any system or equipment that may be put out of commission.
- Use protection such as plastic bags on valves that are reinstalled after the system has been put out of commission for overhaul. Valves should be reinstalled where physical damage is not a major factor.
- Utilize a comprehensive tag-out procedure such as that being developed by CINCPACFLT, and adhere to the procedure, especially during ROH. The use of a well planned tag-out procedure will serve as a good safety and a management tool. This item has received considerable attention by the PEB.

#### Task 2 - Update Pre-Overhaul CSMP

Task 2 is a continuing effort by the SF, with special attention being given to updating the CSMP during the period from eight to five months before ROH. It is at this time that a concerted effort must be made to input into the CSMP all known discrepancies for the forthcoming overhaul in complete work-request format (4790.2K Form). This is of particular importance when an Automatic Data Processing Summary of the work requests is made prior to the POT&I. The forms will be in complete and accurate format and require only integration with the POT&I work items to make a complete Work Package for preparation of the SARP. If properly performed, this task will result in significant time savings in developing a firm work package by the SY and Type Commander.

#### Task 3 - SF Gage and Thermometer Maintenance and Calibration Program

Starting this program six months prior to ROH will greatly assist in preparation of the overhaul package before the WDC. The program must closely parallel the valve program in both method and goals. The same inventory, condition, identification, tag-out, and protection system can be used in a selective way before overhaul and can be used fully after overhaul starts. The preparation of a complete inventory and specific condition status will assist in developing a complete and accurate proposed SARP and Ship's Force work list. It will also assist in developing the Project 20 Material List, since many gages and thermometers will have to be replaced. The "PEB kit"\* also lists such items as gage glasses and calibration labels. This will require a complete inventory of gages and thermometers as a prerequisite to any submission of Project 20 or PEB kit requirements.

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\*The PEB kit is described in Task 8.

#### Task 4 - Selective Compartment and Bilge Preservation Program

Many ships leave the bilges and compartments untouched until a short period before the LOE so that compartments will be free of SY personnel. This is unsatisfactory and unrealistic and requires more time than is available. It becomes necessary, therefore, to implement a plan of selective compartment and bilge preservation at least six months prior to ROH. A well-coordinated program that considers the following points will allow final grooming to be accomplished in the minimum time:

- Selectively preserve those spaces (or sections of spaces) that will not be unduly disturbed by overhaul activities.
- Start the actual bilge cleaning and preservation two months ahead of the ROH. Accomplish bilge preservation to a point where the final grooming period is required only to remove foreign matter left by SY, wipe clean, and apply a final coat of paint where necessary.
- Use cleaning aids such as a hand-held device of the type used in car washes; this will facilitate cleaning inaccessible areas. Small "sandblasting" type machines can be used to remove paint and corrosion from small objects, which can be removed from the spaces and later reinstalled.

The short period before the LOE will require the presence of many SF personnel attempting to accomplish last minute details. Any program, such as Task 4, that accomplishes the bulk of the work ahead of this critical period will definitely enhance the passing of the LOE and help complete the ROH in a timely manner.

#### Task 5 - Conduct POT&I

A total POT&I plan must be made available to the SF six to eight months ahead of overhaul. The POT&I duration is shown from the sixth to fourth month before ROH. This span of two months was provided to allow the SF to conduct their portion of the POT&I in advance and have sufficient time to request assistance from other sources in the inspections where SF skills or manning are inadequate.

The detailed attention to maintenance logs and historical records, the performance of in-depth inspections, and the testing of systems and equipments to design specifications will provide a good determination of plant condition. Supplementing the POT&I with accurate and well kept system and equipment records will assist in achieving a firm determination of the plant condition and will aid in the timely and accurate preparation of the overhaul package. This task requires some initial attention from the eighth to sixth month before overhaul, followed by full attention to the POT&I from the sixth month until the completion of both the SF and SY inspection items.

The extreme importance of the thoroughness and accuracy of the POT&I must be stressed because of their direct impact on the completeness of the overhaul package and the basis for an effective WDC. Only by the dedicated efforts of the SF and Industrial Activity in conducting the POT&I will the means be available at the WDS to make the required funding and work-assignment decisions.

#### Task 6 - Develop SF Work Package

Task 6 is shown starting with a dotted line indicating that it can and should be started as early as six months prior to overhaul and will be finalized during the three months preceding the start of overhaul. The SF portion of the work package will be developed from the CSMP, results of the POT&I, and screening actions taken at the WDC, as well as the other SF programs such as the valve, gage and thermometer, and preservation programs. Many tasks are known early in the pre-overhaul period, and the preparation of accurate work requests at this time will aid in the development of a more realistic manpower budget for SFOMS and a stronger bargaining position at the Work Definition Conference.

#### Task 7 - Develop Project 20 Material List

The material list for Project 20 material should be developed during the fifth to the third months prior to ROH. The list should be carefully planned to cover materials actually required, and consideration should be given to those items listed in the "PEB Kit".\*

#### Task 8 - Review PEB Kit List and Acquire Kit

The Project 20 material list and the "PEB Kit" should be correlated to ensure that all required items are listed, ordered, received, and safely stored until ready for use. The list should be reviewed with the Type Commander to prevent ordering those items already being stockpiled for the ships going into ROH. Adequate amounts of such items as flange shields, deck screws, and miscellaneous nuts and bolts will help prevent delays during the final grooming period before LOE.

#### Task 9 - Develop Proposed SARP

The proposed SARP will be developed by using SF inputs, ORDALTS, NAVSHIPS and Type Commander ALTERATIONS, SY and Type Commander Routines, and the results of the POT&I. For the reasons cited in Task 5, it is important to ensure that the POT&I is as complete as possible and that the ship has provided complete information on all known work items. Following the personnel-resources inventory, conducted from the seventh to the fifth month prior to ROH, the SF must have documented those jobs they cannot accomplish because of skill and manpower limitations. Making the proposed SARP a definitive package is important because it will permit the quicker and firmer decisions at the WDC concerning work responsibility and will minimize last-minute additions.

\*The PEB Kit is a list of small items required in large quantity in the final grooming period prior to the LOE. A sample list is shown in Table 1.

Table 1. KEY ELEMENTS OF "PEB KIT"

Deck Plate Screws, Drills, Taps
Valve Wheels, ID. Tags, Engraving Tools
Gages and Thermometers
Stencil Stickers
Warning Plates
Safety and Operating Instructions
Flange Covers
Assorted Bolts and Nuts
Caps and Chains
Relief Valve Lifting Levers
Light Shields, Reflectors, and Light Bulbs
DC Equipment
Gage Face Plates, Snap Rings, Rubber Grommets, Mounting Rings and Screws, Calibration Tags

Task 10 - Integrate SF and Key SY Work into SFOMS (Ship's Force Overhaul Management System)

Task 10 will start as soon as the SF is familiar with SFOMS, and normally before the WDC, shown here at two months prior to the start of overhaul. At this time, the majority of SF work is known, so that it can be entered into the SFOMS. As soon as the proposed start and completion dates are known, for SY jobs, SF can integrate the key SY jobs and SF portion of SY jobs into the SFOMS. This must be done at the earliest possible date to ensure proper planning for this work and to plan the schedules of the many other required SF activities, such as training, schools, and leave.

Task 11 - Order Project 20 Material

Project 20 material should be ordered as soon as funds become available, but not later than two months prior to ROH. A sound program of receiving, storing, and following up on delayed items is required to prevent any work delays, particularly during the period just prior to LOE.

Task 12 - Prepare Issued SARP

The Issued SARP will incorporate the changes made at the WDC to the proposed SARP and will act as a contractual document between the Type Commander and the overhauling activity for repairs, Type Commander and Shipyard routine work items, and Type Commander authorized title "D" SHIP



ALTERATIONS. It will be the responsibility of the Ship's Force to complete their portion of the work package as identified in the Issued SARP. The Issued SARP will be published prior to the start of the overhaul, and the overhauling activity will maintain it as a live, working document by promulgating changes.

Task 13 - Validate COSAL

The COSAL must be validated by Ship's Force or other activity such as SECAS at least six months prior to overhaul. This validation will have a direct bearing on the proper support of equipment to be overhauled by Ship's Force and, if thoroughly executed, will prevent unnecessary delays in supplying parts during the ROH.

Task 14 - Progress Key SY and SF Work

Task 14 will start at the beginning of the overhaul and continue throughout the entire overhaul, with major milestones at the first and second LOE. SFOMS will be the primary tool used to monitor the progress of the SF overhaul jobs and key SF jobs, with particular attention given to those jobs which will affect the ship's readiness for the LOEs. The Ship's Superintendent will also be a key figure in the progression of the SY work and will be the primary go-between in solving problems between SF and SY as they arise.

Task 15 - ACC System Qualifications

Task 15 may start as soon as components of the ACC system are repaired and ready to be reinstalled. The estimated time on the chart for this task to start is three months before the first LOE. The qualifications must be completed at least six weeks prior to LOE, to allow for the proper scheduling and completion of the system test program and the necessary SF training.

Task 16 - Selective System Testing

Selective system testing must start three months before LOE. It must be a concentrated effort to test these systems for the LOE, and it should be accomplished as quickly as reinstallation and qualification will permit. This testing program provides valuable familiarization and hands-on training for the crew and also allows the early discovery of system/component problems. The use of a formalized method of testing is a requirement to ensure timely performance of this task.

Task 17 - Post ROH CSMP Update

Particular attention should be paid to updating the CSMP before the ship leaves the SY. Work not completed during overhaul will then appear on ADP work requests (readily available from the CSMP) to the next activity capable of accomplishing the work.

### Task 18 - Update COSAL

Detailed attention must be given to the updating of the COSAL 2 months before the end of overhaul to ensure that new equipments installed during ROH are correctly identified and adequately supported. To discover little or no support of equipments installed during ROH after the ship has left the yard creates unnecessary operational problems that are more easily solved while the ship is in ROH.

### 2.3.2 Administrative Preparation

#### Task 1 - Establish Administrative Requirements and Goals

Task 1 will be a continuing effort on most ships; however, for the purpose of preparing for the LOE, it should start approximately six months prior to overhaul and be completed five months before overhaul. The need for streamlining and standardizing the shipboard Manuals, Instructions, and Procedures (such as the SORM, EDORM, Safety Manual, Security Instruction, etc.) as they pertain to and overlap the Engineering Department has been cited repeatedly by the PEB. To accomplish this high degree of standardization and prevent duplication of duties and functions, it is necessary to define clearly what is required versus what is in use. Development of the administrative package should then be a joint effort among all levels of management and departments on the ship and should include a method of monitoring the ship's progress to obtain specific milestones. This total involvement will facilitate gaining the concurrence of all levels of SF personnel and speed up the implementation of the new regulations and procedures.

#### Task 2 - Develop Administrative Package

Task 2 should start as soon as specific administrative requirements and goals are identified. This effort consists of developing new Manuals, Instructions, and Procedures, and revising old ones if applicable. It should start six months prior to overhaul and must be completed three months prior to overhaul to ensure that all new procedures are part of the shipboard routine at the start of the overhaul. Because of the change of pace caused by ROH, it is important that as few new procedures as possible be implemented during this period.

#### Task 3 - Indoctrinate and Gain Concurrence

Task 3 starts as soon as the Administrative Package is prepared and reviewed by Command. In any event, the indoctrination of key personnel must be completed and their concurrence obtained approximately two months prior to ROH in order for the new procedures to become part of the shipboard routine by the start of Overhaul. Involvement of all levels of management in the development of the new procedures will avert any major resistance to the new package before it starts.

Tasks 4 and 5 - Implement Administrative Package and Continuous Adherence

Portions of the new Administrative Package can be implemented as soon as key personnel are indoctrinated and concurrence has been obtained. However, implementation of the administrative package must start at least three months before ROH and be completed by the start of Overhaul since many duties and functions will be governed by the newly established instructions.

Continued adherence to the Administration package during ROH will be required to achieve the necessary well administered functions, duties, and drills required in day-to-day operation of the Engineering Department, which is a requirement of the PEB and will be checked during the LOE.

Task 6 - Implement Engineering Operational Sequencing System (EOSS) and Engineering Operational Casualty Control (EOCC)

Task 6 should already be at least partially accomplished on most ships; if it is not complete, a concerted effort must be made to implement both systems no later than four months prior to overhaul. This is the minimum period that will permit indoctrination and hands-on hot-plant training of qualified watch standers and personnel under instruction to ensure training readiness at the LOE.

Tasks 7 and 8 - SFOMS (Ship's Force Overhaul Management System) Familiarization and Implementation - Continuous Utilization

These tasks can start earlier than three months before overhaul, but no later than this if the full benefit of the SFOMS program is to be properly demonstrated. It involves inputting known Ship's Force work items into the program and developing a preliminary manpower budget for the Overhaul period, and it should allow for several computer printouts to be made for indoctrination purposes. These printouts can be used to start the refinement process of the SFOMS by continuing to input items such as training, leave, parts requisitions, key tasks to be monitored for LOE, and any other items that require proper management during the ROH. It should be available for use by the SF at the WDC.

From approximately three months prior to overhaul and through the entire ROH, the SFOMS must be used and updated in order to identify, as early as possible, those areas or items that are not being accomplished as scheduled. This will allow prompt management attention to lessen or eliminate the effect of problems as they arise. It is critical to the SFOMS program that the SY schedule of job start and completion dates be received early so that SF can properly schedule their work and the required assistance to SY jobs, and can properly monitor these efforts.

Task 9 - Prepare Inputs to Update Selected Records

Task 9 involves updating plans, manuals, and records to reflect the change due to alterations or equipment substitutions that have taken place

during the yard period. To the extent possible, those manuals, prints, and records which are required for the safe operation of the Auxiliary Plant must be updated one month prior to the LOE so that all hands can be familiarized with the changes.

#### Task 10 - Install Updated 3M Package

Task 10 must be completed prior to the LOE, but it may start as soon as the spaces are sufficiently groomed to ensure that the 3M materials will not be lost or damaged. The 3M materials, such as new MRCs and revised scheduling charts or manuals, should reflect any changes made to equipment or system configuration during the ROH.

### 2.3.3 Training Preparation

#### Task 1 - Identify Personnel Resources

The requirement to identify personnel resources, at the earliest possible data but not later than five to six months prior to ROH, is of extreme importance. This identification and inventory of personnel must be complete and must cover the following areas:

- Gains and losses
- Skill levels and school requirements
- Special skills available and required

The gains and losses in personnel will not only have direct bearing on the training required but will also impact on the SF ability to perform all the other necessary functions required during the ROH. Personnel must be identified by skill level before any plans are made for requisitioning schools or establishing any type of training to be conducted on-board ship, e.g., qualifying watchstanders prior to the LOE. The identification of special skills is important in a training plan to assure the proper utilization of the SF personnel in an "in house" training assistance program. Personnel possessing special skills who will be lost at the start of ROH should be fully utilized to train replacements or assist in developing and implementing special programs that require their expertise.

#### Task 2 - Report Personnel Shortages

Task 2 should start during Task 1 and be complete not later than four and one-half months prior to ROH. The determination and reporting of personnel shortages cannot be a firm and definite task; however, since SF work and training during ROH are governed by manpower availability, the initial shortage list must be accurate and any changes must be implemented immediately.

#### Task 3 - Requisition Schools

Task 3 may start before the completion of Task 1; however, it must be completed four months prior to ROH. The early requisitioning of schools

and the receipt of school dates will permit the management of personnel resources toward positive goals and will prevent programs and training from being jeopardized.

#### Task 4 - Establish Watch Qualification Progression

The establishment of Watch Qualification Progression must be started six months prior to ROH and be completed by the fifth month prior to ROH. The identification of losses during Task 1 and the pinpointing of special skills will allow the development of a Watch Qualification Program, indicate areas in which training is needed, and identify personnel who are available to perform or assist in the training. This task can be accomplished while the ship is still in a steaming condition. Watch qualification training must start five months prior to ROH and be an integral part of the Personnel Qualification Standards (PQS) Watch Qualification Program.

#### Task 5 - Implement PQS Watch Qualification Program

The PQS program should be fully implemented by the eighth month prior to ROH; however, if this has not been accomplished, full implementation must take place by the sixth month prior to ROH. This program is in sequence with Task 1 (Identify Personnel Resources) and Task 4 (Establish a Watch Qualification Progression), and it must be considered concurrently with these tasks. The establishment of realistic personnel training goals and a progression-monitoring system for the PQS program are essential to insure that valuable training time is not wasted and that the required personnel will achieve the necessary qualifications for LOE.

#### Task 6 - Hands-On Watch Qualification Training

The importance of hands-on training as a part of watch qualification cannot be overemphasized. There are virtually no operating systems available during ROH; therefore, Watch Qualification Progression (Task 4) should be established and PQS (Task 5) implemented as early as possible so that valuable hands-on hot-plant training can be performed before ROH begins. Tasks 4 and 5 must be implemented early enough so that Task 6 can begin the fourth month prior to ROH and continue until equipments are shut down for overhaul.

#### Task 7 - Develop Training Techniques and Prepare Training Aids

The development of an on-board training program must be started at the conclusion of the Personnel Resources Inventory. The goal of this program must be to continue effective training of personnel on board during the ROH and to accomplish this task efficiently, since manpower becomes a precious commodity during this period.

Requesting assistance from the Mobile Training Team (MTT) at the beginning of program development will save time for the SF personnel by making

them aware of the courses, lesson plans, training aids and techniques that are available through the MTT. The MTT should be made available to take an active role in the development of this program. It should lend assistance as long as necessary to insure that the program is complete and fulfills SF needs.

#### Task 8 - Conduct On-Board Training

On-board training, using the training aids and techniques developed in Task 7, should start the second month prior to ROH and continue through the overhaul. The goal must be to complete the maximum training in the minimum time. Films, seminars, lectures, technical manuals, and system tracing are but a few of the tools and techniques that will improve skill levels and produce operators who will require a minimum of hands-on training to complete their knowledge.

#### Task 9 - MTT Assistance Visits

The assistance of the MTT must be utilized in developing all training programs. This is especially true for on-board classroom-type training, in which techniques differ from those of hands-on training. The use of training aids available through the MTT, such as films, slides, and flip charts, will prove invaluable in on-board training. The MTT assistance visits should be long enough to allow development and implementation of programs, and follow-on visits should be made to assist in solving any peculiar problems that may arise.

#### Task 10 - Assemble Training Aids

Developing a comprehensive on-board training program well before ROH (fifth to second month prior) will make it possible to determine in advance the type of training that will be conducted, the people who will conduct the training, and the training aids that are needed.

The assembling of these aids must start two months prior to ROH and be completed at the start of ROH so that on-board training can continue uninterrupted during the ROH. The implementation of on-board training prior to the start of overhaul will prevent a relaxing of goals and will permit development of the routines necessary to ensure smooth integration of all SF activities during the transition into ROH.

#### Task 11 - Conduct On-Board Maintenance Training

Although on-board maintenance training is an on-going process, as indicated by the maintenance plan (eighth month prior to ROH), specialized and concentrated maintenance training takes on added emphasis at the completion of the personnel resources inventory (sixth month prior to ROH). This is necessary for full utilization of those personnel with special skills who will be lost prior to ROH and for most advantageous use of the short time left for hands-on training before overhaul. The bulk of this training must be accomplished before ROH since very little time will be available for hands-on training before the LOE.

## Task 12 - Hands-On Hot-Plant Training

Hands-on hot-plant training will resume after the successful accomplishment of the LOE. This period is important in providing the opportunity to complete last-minute training and allowing operators to become fully trained on new and different types of equipments that may have been installed during ROH.

### 2.4 SUMMARY

Although the success or failure of an LOE or ROH cannot be guaranteed, it is believed that attention to the key actions presented in this management plan will provide a well coordinated SF and SY effort that will culminate in a successful LOE and ROH. The following elements of the plan are considered to be of major significance:

- The participation of DATC and Tender personnel at the WDC, to permit early determination of their involvement in the ROH and reduce the number of last-minute additions to the SF or SY work packages
- The scheduling of the MTT visit to coincide with the development of the SF training programs so that unnecessary duplication of efforts in the preparation of training aids and materials can be prevented
- A thoroughly planned and actively conducted valve maintenance program implemented prior to overhaul
- A thoroughly planned and executed gage and thermometer maintenance and calibration program
- Performance of selective bilge and compartment preservation prior to and during the early stages of overhaul
- The early establishment of administrative requirements and goals
- Full and enthusiastic implementation of PQS at the earliest date
- The early identification of personnel resources and requirements
- The establishment of an effective internal-progress monitoring system so that all levels of management know the status of LOE preparations

All of these actions will require the continuous and coordinated efforts of all involved if success is to be achieved.

## CHAPTER 3

### CONCLUSIONS AND RECOMMENDATIONS

The primary conclusion reached as a result of the Phase I effort is that a management plan that organizes the key events culminating in the LOE is necessary for use by Ship's Force management. The proposed management plan presented in Chapter 2 is recommended for this purpose. Phase I also produced a number of conclusions not specifically mentioned in the plan but pertinent to the plan's objectives. These conclusions and recommended courses of action are presented as follows:

- Interviews with the various activities showed that there is generally poor understanding of the LOE requirements in the Navy community. It is therefore recommended that the description of the "Light-Off Examination (LOE) Material Readiness Requirements", previously sent to shipyard personnel by the senior member of the PEB and published for the Pearl Harbor units by the Pearl Harbor MTT (Mobile Training Team), be promulgated by COMCRUDESPEC to all involved personnel as a restatement of LOE requirements. A copy of this statement is presented in Appendix E.
- To establish a more realistic work schedule for both SY and SF during the ROH, a plan that allows more flexibility in establishing the LOE date is desirable. This can be achieved within the time frame of the Work Definition Conference (approximately two to three months prior to ROH) and the actual date of the LOE. It is recommended that the following steps be considered in the establishment of the LOE date:
  - Set a tentative LOE date at the WDC.
  - Confirm or revise the tentative LOE date at the start of ROH.
  - Firmly fix the LOE date no later than midway between the start of overhaul and the tentative LOE date.

These actions will provide good utilization of all work forces while they are working toward the interim goals; then, by close progress monitoring of all efforts for the LOE and by use of the most current inputs of both SF and SY, it will be possible to establish a realistic LOE date that both can meet.



- Too much time is lost in determining who will perform tasks that are not specifically assigned at the WDC. The DATC and TENDER forces are approached on these tasks following the WDC, and six weeks or more can go by before it is determined where the work will be accomplished. Many times the jobs are finally resubmitted to the shipyard. It is recommended that the DATC and TENDER personnel participate in the WDC to allow early determination of their involvement in the ROH and reduce the number of last-minute additions to the SF or SY work packages.
- The WDC is not determining exactly what condition the ships' engineering compartments and equipment should be in prior to LOE and who will be performing the tasks necessary to assure that the required condition is achieved. It is recommended that this determination be made at the WDC. This will allow the SY and SF to better establish priorities and schedule work toward a well defined goal.
- The assist visit by the MTT is now scheduled too late in the preparation period for the LOE to give SF the maximum benefit of the team's experience in planning their training programs. The MTT visit should be scheduled to coincide with the development of the SF training programs so that duplication of effort in the preparation of training aids and materials can be prevented.
- Because of the magnitude of the effort required to bring the Fleet up to the standards required for the LOE, there is a pressing need for the authorization, procurement, and use of labor-saving devices. It is recommended that CRUDESPEC solicit information from Fleet units and industrial activities as to new equipments or adaptations of old equipments that are in use and may be helpful to all units. These could include devices such as bilge-cleaning equipment, small sand-blasting equipment (for use on valve handwheels and bodies on small pump casings), and label-making machines.
- A "Mock LOE" conducted by a team of SF, SY, and Type Commander personnel prior to the actual LOE has been beneficial in pinpointing last-minute problems and in bringing all parties together for quick resolution of discrepancies found. It is recommended that an attempt be made to gain the concurrence of all shipyards in adopting the "Mock LOE" as a routine procedure in the ROH approximately three weeks prior to the actual LOE.
- The proposed management plan necessarily touches many aspects of the ROH pre-overhaul planning functions. To meet an immediate need within a relatively short time frame, it has not been possible to incorporate the details many of these pre-overhaul planning efforts require in conjunction with the LOE preparation. It is recommended that an attempt be made to combine the PEB/LOE preparation efforts with other elements of the overhaul planning and preparation such as CSMP review, work-package preparation assistance, SFOMS implementation and training, POT&I Plan development and accomplishment, overhaul-standards development, test-plan development, and long-range overhaul planning coordination.

APPENDIX A

EXPANDED BIBLIOGRAPHY OF PROPULSION  
EXAMING BOARD (PEB) CHARTER  
AND PROCEDURAL DOCUMENTS

[Reproduced from an ARINC Research letter report  
submitted 7 January 1974 to PERA (CRUDES)]

1. INTRODUCTION

The first item in the Phase I task of providing a plan for ships to use to prepare for the PEB/LOE was to gather all charter and procedural documents related to the PEB's. The following sets of instructions and letters were published by the various Naval Commanders and the PEB direct the establishment of the Boards; describe their authority, responsibility and membership; and prescribe the procedures by which the Boards will conduct the Light-Off Examinations (LOE) and Operational Propulsion Plant Examinations (OPPE). These documents are arranged by Pacific and Atlantic Fleet applicability and from the highest ranking organization down. The documents listed comprise the total charter and procedural documents pertaining to both Fleets and are those official documents by which the PEB/LOE's are presently conducted.

2. PACIFIC FLEET DOCUMENTS

<u>Document/Number</u>	<u>Originator</u>	<u>Date</u>
OPNAVINST 3540.4	Chief of Naval Operation	11/19/72

Subj: Establishment of 1200 PSI Propulsion Examining Boards

This instruction is the charter document which directed the establishment of 1200 PSI Propulsion Examining Boards, describes their authority and responsibility, designates membership and prescribes administrative procedures to be used by the boards. A copy of this instruction is attached for reference.

<u>Document/Number</u>	<u>Originator</u>	<u>Date</u>
CINCPACFLTINST 3540.2	Commander Pacific Fleet Code 012	3/19/73

Subj: 1200 PSI Propulsion Plant Examinations of Pacific Fleet Ships

This document was issued by the Commander of the Pacific Fleet to announce the establishment of the PEB and direct the actions necessary to implement the OPNAV INSTRUCTION 3540.4 and

to amplify the procedures for scheduling of examinations, re-examination, corrective action reporting, and conduct of all propulsion plant drills and operational and casualty control evolutions.

<u>Document/Number</u>	<u>Originator</u>	<u>Date</u>
Pacific Fleet 1200 PSI Propulsion Examining Board (Letter to Ship Commanding Officers) (No Number)	Senior Member PEB	As Scheduled

Subj: 1200 PSI Light-Off Examination

This document is a form letter from the Senior Member of the PEB to the Commanding Officers of ships within a few months of the date they are scheduled to have a Light-Off Examination. This letter is intended to familiarize the ship with the conduct of the examination and the exact extent to which the ship and crew will be involved. The following are provided as enclosures to the letter:

- (1) Sample Schedule for the LOE
- (2) Records to be Reviewed During the LOE
- (3) Sample Interview Schedule for the LOE
- (4) Sample Personnel Information Sheet

<u>Document/Number</u>	<u>Originator</u>	<u>Date</u>
Pacific Fleet 1200 PSI Propulsion Examining Board (Letter to Ship Commanding Officers) (No Number)	Senior Member PEB	As Scheduled

Subj: 1200 PSI Propulsion Plant Examination

This document is similar to the form letter sent to the ships prior to an OPPE and is intended to familiarize the ship with the conduct of the examination and contains the same enclosures as the letter for the LOE.

### 3. ATLANTIC FLEET DOCUMENTS

<u>Document/Number</u>	<u>Originator</u>	<u>Date</u>
OPNAVINST 3540.4	Chief of Naval Operations Code OP-04P	11/19/72

Subj: Establishment of 1200 PSI Propulsion Examining Boards

This is the chartering document of the PEB's as described in paragraph 2, first document.

<u>Document/Number</u>	<u>Originator</u>	<u>Date</u>
CINCLANTFLTINST 3540.2	Commander Atlantic Fleet Code (N3P)	2/1/73

Subj: 1200 PSI Propulsion Examinations, Evaluation of Atlantic Fleet units.

This document promulgates detailed procedures for the operation of the PEB in the Atlantic Fleet and describes the objectives, types of exams, and scheduling of Atlantic Fleet 1200 PSI propulsion examinations.

<u>Document/Number</u>	<u>Originator</u>	<u>Date</u>
COMCRUDESANTINST 3540.2	COMCRUDESANT Code 412D	5/29/73

Subj: 1200 PSI Propulsion Plant Exams Administered by CINCLANTFLT Propulsion Examining Board

This document was promulgated after initial operations of the PEB had indicated a need to provide further guidance to CRUDESANT units as to the scheduling, standards, and procedures of the PEB. Enclosures to the instruction included for guidance are:

- (1) Sample List of Recurring Deficiencies
- (2) Sample Questions Asked by the PEB
- (3) List of Restrictive Deficiencies

<u>Document/Number</u>	<u>Originator</u>	<u>Date</u>
CINCLANTFLT Letter 3540	Senior Member PEB	As Required

Subj: 1200 PSI Initial Light-Off Examination

This document is a letter sent by the Senior Member of the PEB to the Commanding Officer of a ship scheduled for an

LOE and provides a number of enclosures as guidance; they are:

- (1) Guideline Schedule for Initial Light-Off Examination
- (2) List of Publications and Record Review to be Conducted
- (3) Officer/Enlisted Personnel Status Forms
- (4) Equipment/System Repair-Maintenance Format
- (5) Initial Light-Off Examination Requirements
- (6) List of Restrictive Deficiencies

<u>Document/Number</u>	<u>Originator</u>	<u>Date</u>
CINCLANTFLT MSG 021702Z (CONFIDENTIAL)	Commander Atlantic Fleet	5/2/73

Subj: LANTFLT 1200 PSI Propulsion Examining Board (PEB) -  
Lessons Learned to Date (U)

(U) This message describes several areas noted during the first four months of the PEB operation which are urgently in need of immediate improvement in all 1200 PSI ships.

<u>Document/Number</u>	<u>Originator</u>	<u>Date</u>
Commander, Naval Air Force, U.S. Atlantic Fleet (Letter Ser. 1354)	COMNAVAIRLANT Code CNAL 51	3/2/73

Subj: 1200 PSI Propulsion Examining Board

This letter was sent to AIRLANT Forces for information and appropriate action. It contains five (5) enclosures which reflect the experience gained from the series of examinations given an AIRLANT carrier by the Propulsion Examining Board. The enclosures are:

- (1) Synopsis of PEB Goals and Operational Experience
- (2) Results of First PEB Initial Light-Off Examination
- (3) Recommended Ship's Training Plan

- (4) Representative Examination Questions
- (5) Questions Asked by Capt. Lathan During PEB  
Re-Examination
- (6) CINCLANTFLT Form Ltr., Subj: 1200 PSI Initial  
Light-Off Examination

ATTACHMENT

OPNAVINST 3540.4

Establishment of 1200 PSI Propulsion  
Examining Boards



DEPARTMENT OF THE NAVY  
Office of the Chief of Naval Operations  
Washington, D.C. 20350

In Reply Refer to:  
OPNAVINST 3540.4  
OP-04P  
Ser 94PO4P  
19 Nov. 1972

OPNAV INSTRUCTION 3540.4

From: Chief of Naval Operations

Subj: Establishment of 1200 PSI Propulsion Examining Boards

Ref: (a) CNO message 102139Z Jul 72 (NOTAL)

1. Purpose. To direct the establishment of 1200 PSI Propulsion Examining Boards, describe their authority and responsibility, designate membership and prescribe administrative procedures to be used by the boards.

2. Discussion. During recent years, the material readiness of 1200 PSI steam propulsion plants has been significantly reduced and these plants have suffered an inordinate number of serious casualties. Of the numerous contributing factors, personnel error, attributable to insufficient training in plant operation and maintenance, and a lack of properly trained and qualified personnel have been identified as major causes of 1200 psi propulsion plant personnel and material casualties. Recent Fleet, INSURV and Navy Safety Center inspections have revealed improper engineering practices and unsatisfactory material conditions existing in many 1200 psi ships. As a result, the need for a formal means of examining 1200 psi ships to ascertain the state of training and qualification of propulsion plant personnel and to determine the true material condition of their propulsion plants became apparent. To satisfy this need, the establishment of 1200 PSI Propulsion Examining Boards was approved by reference (a) to insure that strict adherence to 1200 psi propulsion plant readiness standards is maintained and that these plants are operated properly and safely. In view of the possibility of ships being declared unsatisfactory for operation and the potential impact on Fleet commitments, it is necessary that the examining boards

be maintained within the organization of the Fleet Commander in Chief. The Commander, Naval Ship Systems Command will provide technical assistance to the boards regarding resolution of examination criteria and procedures on a continuing basis.

3. Establishment and Membership. A 1200 PSI Propulsion Examining Board will be established of the staff of the Commander in Chief, U.S. Atlantic Fleet and on the staff of the Commander in Chief, U.S. Pacific Fleet as follows:

a. Each board will consist of a minimum of five commissioned officers with 1200 psi engineering experience and preferably to have been graduated from a 1200 psi steam propulsion engineering course and an automatic combustion control course. Officers who have the experience requisities, but lack the schooling requisites, may be ordered to the Propulsion Examining Board via these schools.

b. The senior member of the board will be an officer of the rank of Captain (1110) who has served as commanding officer of a 1200 psi steam powered ship and as engineer officer of a 1200 psi steam powered ship as well. The remaining members of the board shall consist of one Commander (1110) with the same qualifications as the senior member to serve as deputy, two Lieutenant Commanders (one 1110, and one 1400) and one Lieutenant (6300/1110), each to have served for a minimum of one year and preferably for 18 months as engineer officer and/or main propulsion assistant of a 1200 psi steam powered ship. At least one of the board members shall be a certified boiler inspector.

c. Each board will be a permanently established examining board reporting to the Fleet Commander in Chief. The CINCPACFLT board will be located at San Diego, California with administrative support provided by the Commander, Cruiser-Destroyer Force, U.S. Pacific Fleet. The CINCLANTFLT board will be located at Norfolk, Virginia.

d. As the frequency of examinations eventually increases to annually, the Fleet Commanders in Chief shall request the assignment of additional 1200 psi steam propulsion plant qualified officers as circumstances require. Additional officers ordered to duty with the 1200 PSI Propulsion Examining Boards shall have the same qualifications as specified in paragraphs 3a and 3b above.

e. All examinations will be conducted by members of the 1200 PSI Propulsion Examining Board headed by the senior member of his deputy. Normally, a minimum of four members of the examining

board will conduct each examination. Boards may be augmented as determined by the Fleet Commanders in Chief in order to conduct examinations of 1200 psi CVA propulsion plants.

4. Responsibilities. Each 1200 PSI Propulsion Examining Board shall have the following responsibilities when examining 1200 psi propulsion plants:

a. Examine propulsion engineering personnel to determine their state of training and qualification. The appropriate 1200 psi engineering Personnel Qualification Standards shall be used to evaluate the level of qualification of all propulsion plant personnel.

b. Witness and evaluate the conduct of propulsion plant drills employing the installed Engineering Operational Sequencing System as the basic guide.

c. Inspect the material condition of the propulsion plant to ascertain its state of operational readiness, preservation and cleanliness.

d. Review and evaluate the administration of the ship's engineering department and the completeness and accuracy of all ship's records relating to the propulsion plant.

5. Types of Examinations. The following types of examinations of 1200 psi steam powered ships will be conducted by the 1200 PSI Propulsion Examining Boards:

a. Initial Light-Off Examination - to be conducted prior to lighting the first fire in any boiler during a regular overhaul, major conversion, or fitting out availability. In fulfilling the responsibilities of paragraph 4 above, the boards will ascertain the state of training of propulsion plant personnel, the frequency of administrative procedures and the material readiness of the propulsion plant and machinery spaces as they affect impending propulsion plant operations. Propulsion plant drills are not required to be conducted as part of this examination. However, simple evaluations such as boiler water and feed water sampling and analysis and casualty control walk-thru drills may be conducted at the discretion of the senior member (or his deputy) and the ship's commanding officer.

b. Operational Propulsion Plant Examination - to be conducted no more than six months after the last Initial Light-Off Examination and at intervals specified in paragraph 6a below.

## 6. Administration

a. On each 1200 psi steam powered ship, the 1200 PSI Propulsion Examining Board shall conduct an Initial Light-Off Examination in accordance with paragraph 5a as arranged with the type commander. An Operational Propulsion Plant Examination of each 1200 psi steam powered ship shall be conducted by the 1200 PSI Propulsion Examining Board no more than six months after the last Initial Light-Off Examination. The interval between subsequent Operational Propulsion Plant Examinations shall be approximately 18 months, with the ultimate goal being annual examinations. Any ship may be examined prior to the 18 month interval if the Fleet Commander in Chief considers such examination warranted.

b. Following completion of an examination, each Examining Board will submit an official written report of its findings to the Fleet Commander in Chief with copies to the type commander, appropriate administrative commanders and the inspected ship. A copy of the report of findings will be forwarded by the Fleet Commander in Chief to the Chief of Naval Operations, the Commander, Naval Ship Systems Command and the Naval Safety Center (when appropriate) as such as practicable, and in any case, within 30 days of the date of the examination.

c. Reports of corrective action subsequent to an examination will be submitted to the type commander or the Fleet Commander in Chief as specified by the Fleet Commander in Chief and copies forwarded to the Chief of Naval Operations and the Commander, Naval Ship Systems Command.

d. In the event the Examining Board finds some aspect of a 1200 psi engineering plant unsatisfactory for further operations, the senior member or his deputy shall immediately notify the commanding officer and, by classified naval message, the Fleet Commander in Chief, the type commander, appropriate intermediate commanders, the operational commander, and the inspected ship with the Chief of Naval Operations, the Chief of Naval Personnel and the Commander, Naval Ship Systems Command as information addresses. The report shall be sufficiently detailed so that the Operational Commander can determine, if the ship is at sea, whether to return the ship to port immediately. If the unsatisfactory conditions are not applicable to all propulsion plants in a multiple plant ship, the message shall contain the recommendations of the senior member or his deputy regarding continued operation of the remaining propulsion plant(s). In the interval between completion of the examination and plant shutdown, one or more members of the

examining board shall remain on board, observe propulsion plant operation and bring any unsafe practice to the immediate attention of the commanding officer.

e. A 1200 psi steam powered ship found unsatisfactory during an Initial Light-Off Examination must pass satisfactorily a re-examination by the Examining Board before commencing operation of the plant. The procedure will be as follows: After the type commander has determined that propulsion personnel have achieved a satisfactory state of knowledge of propulsion plant principles and operations and that all material and administrative discrepancies affecting plant safety have been corrected, he shall recommend to the Fleet Commander in Chief that a re-examination be conducted by the 1200 PSI Propulsion Examining Board. In his recommendation, the type commander shall indicate the additional training and instruction propulsion plant personnel have undergone, the steps taken to correct material and administrative deficiencies, that he and the commanding officer consider that propulsion personnel are adequately prepared from the standpoint of plant safety and that the propulsion plant material and administrative conditions are satisfactory to conduct initial propulsion plant operations.

f. A 1200 psi steam powered ship found unsatisfactory on an Operational Propulsion Plant Examination must obtain the following approvals before lighting off the plant again and must pass satisfactorily a re-examination by the Examining Board before returning to an operational status.

(1) After the type commander determines that propulsion personnel have received sufficient training with the plant secured and have achieved a satisfactory state of knowledge of propulsion plant principles and operation and that all material and administrative discrepancies affecting plant safety have been corrected, he shall request permission from the Fleet Commander in Chief to proceed with the lighting off operation. The request should state the additional training and instruction propulsion personnel have undergone and the steps taken to correct material and administrative deficiencies. The request should also state that the ship's commanding officer and the type commander consider that propulsion personnel are adequately prepared from the standpoint of plant safety and that the propulsion plant's material and administrative conditions are satisfactory to conduct plant operations.

(2) When the type commander has determined that propulsion personnel have received sufficient additional training in order to resume normal underway propulsion plant operations and that the material and administrative discrepancies affecting safety of the ship and its propulsion plant have been corrected, he shall recommend to the Fleet Commander in Chief that a re-examination be conducted by the 1200 PSI Propulsion Examining Board. In his recommendation, the type commander shall indicate the additional training given propulsion personnel since being granted approval to proceed with lighting off the plant, summarize the status of corrective action taken to correct material and administrative deficiencies and state that he and the commanding officer consider the ship adequately prepared to resume normal propulsion plant operations.

g. Re-examination required by paragraphs 6e and 6f will be scheduled on a priority basis by the type commander with the concurrence of the Fleet Commander in Chief. Upon completion of any re-examination, the Examining Board will submit a message report of its findings to the same addresses specified in paragraph 6d for an unsatisfactory report. An official written report will follow in accordance with paragraph 6b.

7. Report Symbol. The following report symbols should be used for the reports delineated in this instruction:

a. For the letter or message report required by paragraphs 6b, 6d, or 6g, use report symbol 3540-5. Electrical transmission of the message report is authorized during minimize. (MIN:ETAUTH)

b. For the reports required by paragraph 6c, use report symbol OPNAV 3540-5A.

M.F. WEISNER  
VICE CHIEF OF NAVAL OPERATIONS

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see Page 7

OPNAVINST 3540.4  
19 Nov 1972

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28M (Destroyer Development Group)  
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29L (Guided Missile Frigate (DLG), DLGN)) (less DLGN)  
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APPENDIX B

CATEGORIZATION OF  
MATERIAL, ADMINISTRATIVE AND TRAINING DISCREPANCIES  
NOTED DURING (PEB) LIGHT-OFF EXAMINATIONS

[Reproduced from an ARINC Research letter report  
submitted 28 January 1974 to PERA (CRUDES)]



## 1. INTRODUCTION

This report documents the results of ARINC Research Corporation's work on the second task of the program authorized by Contract NO0140-73-D-0074. The purpose of the general program is to provide a plan incorporating such tools and milestones as are needed to ensure that 1200 PSI propulsion plant ships going into Regular Overhaul (ROH) will pass the Propulsion Examination Board (PEB) Light-Off Examination (LOE). The second task in the program - the subject of this report - had the purpose of screening and categorizing the discrepancies noted during LOEs that have been conducted on COMCRUDESPEC ships.

Discrepancy reports from six LOEs, concerned with six ships of three types - one DLG, three DDGs, and two DEs - were selected for review. The discrepancies have been grouped into three categories corresponding to those used by the PEB: Material, Administration, and Training. The discrepancy lists are attached as Appendix A. Figure 1 summarizes the LOE discrepancies listed in Appendix A by the total number of discrepancies against each sub-heading of the three categories.

## 2. DISCUSSION

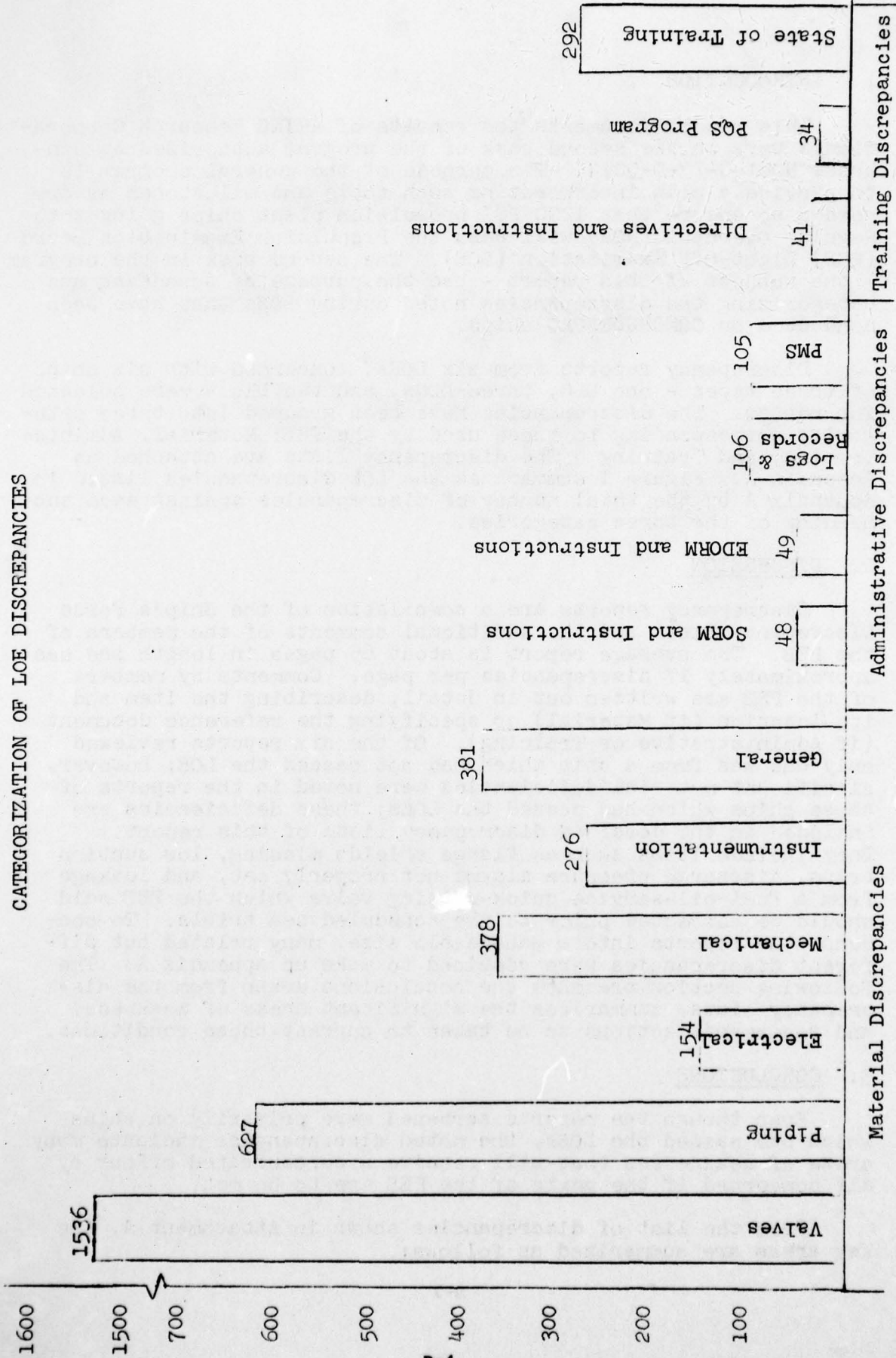
Discrepancy reports are a compilation of the Ship's Force Discrepancy Lists and the additional comments of the members of the PEB. The average report is about 65 pages in length and has approximately 17 discrepancies per page. Comments by members of the PEB are written out in detail, describing the item and its location (if Material) or specifying the reference document (if Administrative or Training). Of the six reports reviewed, only one was from a ship which had not passed the LOE; however, significant material deficiencies were noted in the reports of those ships which had passed the LOEs; these deficiencies are included in the detailed discrepancy lists of this report. They include items such as flange shields missing, low suction trips, discharge pressure alarms not properly set, and leakage from a fuel-oil-service quick-closing valve which the PEB said should be corrected prior to the scheduled sea trials. To condense the reports into a manageable size, many related but different discrepancies were combined to make up Appendix A. The following section presents the conclusions drawn from the discrepancy lists, summarizes the significant areas of weakness, and recommends actions to be taken to correct these conditions.

## 3. CONCLUSIONS

Even though the reports screened were primarily on ships which had passed the LOEs, the noted discrepancies indicate many areas of weaknesses that will require a concentrated effort by all concerned if the goals of the PEB are to be met.

From the list of discrepancies shown in Attachment A, the key areas are summarized as follows:

FIGURE 1  
 CATEGORIZATION OF LOE DISCREPANCIES



(a) Material

- (1) Lack of a comprehensive and continuous valve maintenance program has resulted in the deterioration of many valves to an unsafe level and now presents a major overhaul problem from a monetary and manpower standpoint.
- (2) The lack of day-to-day maintenance on piping, lagging, vent and drain lines, and missing fuel and lube oil flange shields has resulted in a crash maintenance program during ROH.
- (3) Lack of attention to the maintenance of lighting fixtures, shields, bulbs, and switches has resulted in poorly lit and unsafe work spaces. Missing and unserviceable battle lanterns indicate the possible absence of emergency lighting in some areas.
- (4) Lack of attention to the condition of items - evidenced by dirty vent and suction screens, deteriorated, missing, broken, dirty, or unreadable sight glasses and gages, and broken or missing locking devices - increases the danger to operators and equipment. The use of short studs and dissimilar metals is an unsatisfactory maintenance practice that has increased to a point now requiring a major effort to correct the problem.
- (5) The use of uncalibrated or unserviceable gages and thermometers precludes an accurate determination of the condition of ships machinery and systems and presents a major maintenance calibration problem during ROH.
- (6) Improper operation of indicating and alarm systems places personnel and machinery in danger.
- (7) Lack of day-to-day grooming and preservation of bilges and equipments in the engineering compartments has resulted in deterioration which will require a maximum effort by Ship's Force personnel to accomplish all work necessary to ensure PEB approval.
- (8) Loose, warped, unsecured, and unauthorized aluminum deck plates and hand rails present a safety hazard to personnel and require last-minute corrective action before the LOE.

- (9) Erroneous, outdated, and illegible Equipment Operating Instructions and Safety Precautions preclude the safe and efficient operation of the equipments.
- (10) Incomplete and unserviceable or missing fire-fighting and damage-control equipment presents a definite safety hazard and jeopardizes the Ship's Force's ability to control fires.

(b) Administration

- (1) Safety programs are inadequate due to: incomplete and duplicated instructions; absence of, or non-adherence to, gas-free and electrical safety procedures; and absence or inactivity of the ship's safety council.
- (2) Nonstandardization and obsolescence of shipboard regulations, manuals, and instructions have allowed overlapping and duplication of some duties while leaving other important areas without procedures or guidance.
- (3) The physical security programs contain conflicting or incomplete instructions, with resulting duplications of duties and deficiencies in provision of security to equipments and materials during day-to-day operation or during ROH.
- (4) Non-receipt or failure to implement EOSS and EOCC has resulted in the qualification of poorly trained operators and has lengthened the required time for training on-board prior to LOE.
- (5) Lack of a comprehensive and well-executed tag-out program has resulted in wasted man-hours, duplication of effort, and unsafe space conditions. Tag-out procedures are rarely observed in use during ROH.
- (6) Operating logs and records show lack of attention to detail, failure to take corrective action where necessary, and a lack of proper review for the purpose of discovering problem areas.

(c) Training

- (1) The incompleteness of the long-range training program and failure to cover the 18-month competitive cycle indicate a lack of necessary training at the required frequency.

- (2) Lesson plans have not been developed for all required areas of training. In the areas where they have been prepared, they are generally incomplete and, in many cases, have not been reviewed by command.
- (3) PQS has not been fully implemented in some areas. Realistic goals in general have not been established and the monitoring of individual progress is often sporadic or entirely lacking.

#### 4. RECOMMENDATIONS

The following recommendations, even though general in scope, are presented to assist the Ship's Force in achieving those goals considered necessary to meet the minimum criteria established by the PEB for the LOE. The recommendations are grouped in the three basic categories of Material, Administration, and Training.

##### (a) Material

- (1) A comprehensive valve maintenance program should be established and implemented. This program must include:
  - (a) The listing of type, condition, and location of all valves in the Main and Auxiliary Engineering Spaces
  - (b) Establishing the priority of work accomplishment
  - (c) Identifying the required work activity
- (2) A diligent effort is required to identify and correct missing fuel and lube oil flange shields, deteriorated drain and vent piping, and missing or deteriorated lagging.
- (3) A program for correction of space lighting deficiencies must be established and implemented. Such a program must include:
  - (a) Installation of new or replacement fluorescent fixtures
  - (b) Installation of light shields on existing incandescent fixtures
  - (c) A continuing effort to ensure the serviceability of battle lanterns

- (4) Attention must be devoted to the often overlooked details of machinery, such as items of the following types that are missing, deteriorated, or dirty:
  - (a) Vent screens, suction screens, strainers, and filters
  - (b) Locking devices
  - (c) Sight glasses and gages
  - (d) Foundations

Also, the use of short studs or dissimilar metals in the makeup of casings, flanges, valve bonnets, or packing glands must be prevented.

- (5) A comprehensive maintenance and calibration program for gages and thermometers must be established and implemented. This program must include:
  - (a) The listing of the type, condition, and location of all gages and thermometers
  - (b) The priority of work accomplishment
  - (c) The required work activity
- (6) Emphasis must be placed on the importance of strict adherence to the test procedures in the PMS program pertaining to indicating and alarm systems as well as on the need for immediate corrective action if the systems are defective.
- (7) A systematic program of preservation must be established for all engineering compartments, bilges, and equipments in advance of the ROH, in order to lessen the work needed to achieve the final grooming required by the PEB prior to LOE.
- (8) Deck plates and handrails must be maintained in serviceable condition and must be of the proper material; also, sufficient hardware must be available for proper securing of the deck plates and handrails in the final grooming phase before LOE.
- (9) Equipment Operating Instructions and Safety Precautions must be current, pertinent, and readable, and kept in the proper places.
- (10) All Firefighting and Damage Control equipments must be in place, serviceable, and complete.

(b) Administration

- (1) A coordinated shipwide effort must be made to update all safety instructions, indoctrinate personnel, and ensure strict adherence to safety programs and procedures, with particular emphasis on the Electrical and Gas Free Safety Programs.
- (2) A concentrated effort must be made to update and standardize Shipboard Regulations, Manuals, and Instructions in order to: reduce overlapping of functions and duties, reduce duplication of effort, and provide the most efficient procedures across a ship class. (Type Commander assistance is required in standardizing the Regulations, Manuals, and Instructions across a ship class).
- (3) A complete review of the Physical Security Program must be made to clearly define the duties and responsibilities of affected personnel and provide the maximum security of equipment and material during normal day-to-day operation and during the ROH period.
- (4) Full implementation of the EOSS and EOCC at the earliest possible date prior to ROH must be ensured, to allow the required training and proper qualification of watch standers in conjunction with PQS.
- (5) A full review of the Ship Tag-Out Procedures must be made to ensure they are well-defined, implemented, and adhered to, particularly during overhaul.
- (6) A review must be made of the log and record-keeping procedures to ensure they are clearly defined and adhered to at all levels.

(c) Training

- (1) The Master Long-Range Training Program must be reviewed and updated to ensure completeness and required frequency of training for the full 18-month competitive cycle.
- (2) Complete Lesson Plans must be developed, together with training records and a progress monitoring procedure for all indicated training. Command review should be ensured.
- (3) PQS should be fully implemented, with realistic goals and an effective monitoring system.

ATTACHMENT A

MATERIAL DISCREPANCIES

AVG. NO. OF DISCREPANCIES  
(1) DLG (3) DDG (2) DE

Valves

1. Valve handwheels, nuts, lifting levers, or position indicators missing, damaged, or of improper material.
2. Valve label plates, tags, or identification missing or unreadable.
3. Valves require cleaning, preservation, or lubrication.
4. Valve packing gland or packing damaged, missing and/or leaking.
5. Valve leaking through.
6. Valve settings wrong or unknown.
7. Valves missing, damaged, inoperative, or inaccessible.
8. Valve extensions, reach rods, or remote operating gear disconnected, inoperative, or missing.

Piping

1. Flange and lube oil strainer shields missing, damaged, oil soaked, or the wrong type.
2. Funnels, covers or caps missing from drain lines or firemans.
3. Identification and direction of flow stenciling missing.
4. Pipe hangers, braces, or supports broken or missing.
5. Vent lines, drain lines, or tail pipes loose, missing, or need preservation.
6. Lagging damaged, deteriorated, or missing.
7. Piping or flex hoses loose, damaged, or deteriorated.
8. Flanges leaking.

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MATERIAL DISCREPANCIES (Cont'd.)

AVG. NO. OF DISCREPANCIES

(1) DLG (3) DDG (2) DE

Electrical

1. Lights, switches, lighting fixtures, or shields missing, inoperative, dirty, loose or wrong type.	33	4	15
2. Battle lanterns damaged, missing, loose, or need repairs.	10	5	2
3. I.C. telephones or amplifiers inoperative or need repairs.	2	2	1
4. Batteries dirty; battery rack dirty or needs preservation.	2	1	0
5. Electrical wiring or ground strap frayed, broken, not secured, or dead and not removed.	8	0	13
6. Terminal box loose.	0	0	2
7. Switchboards dirty or need preservation.	2	2	2
8. Rubber matting in front of SWBD worn or missing.	0	1	1
9. ABT not operating properly.	0	1	1
10. Battery charger inoperative.	0	0	1
11. Generator slipping grooved.	0	0	1
12. Volt/ammeter damaged, inoperative, out of calibration, or wrong type.	2	1	2
13. Jack box or cover plates missing.	3	1	4
15. Cable tags missing.	14	4	11

Mechanical

1. Suction screens and strainers dirty, damaged, or missing.	7	3	5
2. Miscellaneous plugs and chains missing.	12	2	1
3. Miscellaneous nuts and bolts loose or missing.	24	7	8
4. Vent screens and filters damaged, dirty, or missing.	20	9	13
5. Equipment casing lube oil leaks.	6	5	2
6. Locks, locking devices, safety wires, and lead seals missing or broken.	36	15	10

MATERIAL DISCREPANCIES (Cont'd.)

Mechanical (Cont'd.)

7. Dissimilar metals used on equipments, valves, and line flanges.
8. Coupling guards missing, damaged, wrong type, or require preservation.
9. Foundations and supports greasy, dirty, and deteriorated.
10. Equipment not connected or missing and not tagged out.
11. Rubber shock mounts need cleaning, need paint removed, or are out of date.
12. Sight glasses and gage glasses broken, dirty, normal level not marked, guards missing, or not properly lighted.
13. Equipment rotor position indicator not zeroed, damaged, or missing.
14. Oil in sumps contaminated.
15. Pumps require repacking.
16. Pumps damaged.
17. Lubrication seals leaking.
18. Automatic shutdown (over speed or high pressure) inoperative or slow.
19. Couplings rusty or missing.
20. Dipstick or vent pipe loose, damaged, missing, or not IAW NAVSHIPS directives.
21. Low lube oil pressure from hand operated LO pump and electric LO pump.
22. Fuel oil leaks.
23. Gland seal regulator leaking.

Instrumentation

1. Instruments, indicating devices, gages or thermometers broken, loose, deteriorated or missing.
2. Instrument, indicating device, gage, or thermometer wrong type, out of calibration, not identified, or unreadable.

AVG. NO. OF DISCREPANCIES  
(1) DLG (3) DDG (2) DE

17	8	11
10	2	5
21	16	23
2	3	3
3	1	5
4	5	9
2	0	2
3	0	1
4	2	3
2	0	0
1	1	3
0	3	2
0	2	1
3	1	3
0	1	1
0	1	1
0	1	1
42	29	25
50	40	48

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MATERIAL DISCREPANCIES (Cont'd.)

AVG. NO. OF DISCREPANCIES  
(1) DLG (3) DDG (2) DE

Instrumentation (Cont'd.)

- 3. Alarm systems inoperative, set incorrectly, or not marked.
- 4. Flow indicators damaged, disconnected, or missing.
- 5. Salinity-indicating system inoperative or not calibrated.
- 6. ACC system set wrong or inoperative.

4 9 10  
1 0 0  
0 1 4  
0 5 8

General

- 1. Spaces dirty and gear adrift.
- 2. Dirt, oil, water, and foreign objects in bilges.
- 3. Bulkheads, overheads, and cableways need cleaning and preservation.
- 4. Manifolds need cleaning, preservation, and/or painting.
- 5. Instruments require preservation.
- 6. Unused equipments should be removed.
- 7. Operating instructions and safety precautions erroneous, obsolete, or missing.
- 8. CO<sub>2</sub> Battle tags, seals, brackets, and nozzles broken, missing, not up to date, or not secure.
- 9. Warning signs missing.
- 10. Hand rails broken or missing.
- 11. Caps and chains missing
- 12. Valve glands and bonnets, pipe flanges, and equipment casings short studded.
- 13. Deck plates, gratings, or non-skids damaged, worn, missing screws, or wrong material.
- 14. Insulation damaged or missing.
- 15. Special tools missing
- 16. Dissimilar metals used on equipments, valves, and line flanges.

9 7 6  
17 12 20  
4 2 4  
6 2 2  
3 4 21  
2 2 2  
2 3 7  
10 5 5  
0 7 4  
1 2 3  
19 6 9  
43 28 26  
17 4 11  
5 4 4  
1 2 1  
17 8 11

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ADMINISTRATIVE DISCREPANCIES

Ship Organization and Regulation Manual  
(SORM) and Instructions

AVG. NO. OF DISCREPANCIES

(1) DLG (3) DDG (2) DE

1. Watchstanding instructions overlap in SORM, EDORM and Engineering Officer Night Orders. Should be consolidated in SORM.	1	1	1	1
2. Watch Bills should include only qualified watchstanders and should be dated and filed.	2	2	2	0
3. Physical Security Program instructions are conflicting, incomplete, unrealistic, and use the wrong personnel or duplicate duties.	2	1	1	4
4. Physical security lax during ROH.	1	1	1	1
5. PQS has not been formally implemented by ship's directive.	0	0	0	1
6. Equipment Tag-Out Procedures inadequate, unclear, and limited to Engineering Department only.	1	1	1	0
7. Tag Out System not in effect during ROH.	0	0	1	0
8. Ship Information Book not being updated with changes such as ND conversion and AFFF firefighting procedures.	0	1	1	1
9. Ship's instruction does not incorporate the manual "Navy Safety Precautions Afloat", nor has it been in effect long enough to evaluate.	0	0	1	1
10. Safety instruction contains incomplete procedures for the electrical safety, tag-out, gas-free testing, and combustible materials programs.	1	2	2	4
11. Safety instruction has no provision for a ship's safety council or safety reading file.	1	1	1	3
12. Safety instruction procedures not being followed.	7	3	3	1

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ADMINISTRATIVE DISCREPANCIES

AVG. NO. OF DISCREPANCIES  
(1) DLG (3) DDG (2) DE

Engineering Department Organization and  
Regulation Manual (EDORM) and Instructions

1. Duties not well planned, overlapping, and wasting manpower.	0	2	1
2. Duties and responsibilities of various watchstanders and watch stations incomplete.	1	2	3
3. EDORM watch stations do not agree with PQS watch station qualifications.	1	1	2
4. Engineering Casualty Control Manuals are missing, lack some procedures, or contain incomplete or outdated procedures.	-	3	2
5. Engineering Standing Orders duplicate other instructions and are not understood or properly carried out.	1	1	2
6. Repair Party Manuals contain incomplete and outdated procedures.	2	1	2
7. Blueprint and Technical Manual Indexes not up to date.	1	1	2
8. EDORM is vague and inadequate in its guidance to the oil and water king.	0	0	3
9. Refueling and fuel transfer directives are inadequate or incomplete.	0	0	3
10. Pollution Control Program is incomplete.	0	0	4
11. The packing list is incomplete or nonexistent.	0	0	1
12. No program exists for Heat stress analysis or noise control.	0	0	1
13. EOSS and EOCC incomplete or not adequately implemented.	0	1	0
<u>Logs and Records</u>			
1. Engineering Night Orders missing from files.	0	1	0
2. Tag-Out Procedures and Instructions Control Log incomplete or improperly maintained.	1	2	4

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ADMINISTRATIVE DISCREPANCIES (Cont'd.)

AVG. NO. OF DISCREPANCIES  
(1) DLG (3) DDG (2) DE

Logs and Records (Cont'd.)

3. No sample logs for watch supervisors.	1	1	1
4. Logs and records not properly maintained due to lack of instruction and review.	2	2	2
5. Log Room not using standard filing system.	1	1	1
6. Boiler Feedwater Records not maintained through ROH and show violation of required treatment and reporting procedures.	9	6	4
7. Equipment Operating Logs improperly maintained due to missing entries, signatures, or dates and the lack of review and approval.	1	3	10
8. Logs missing from file.	1	1	1
9. Corrective action not indicated on logs.	2	4	9
10. Boiler Tube Renewal Sheets not complete or missing.	0	0	2
11. Log entries indicate operational procedures or equipment limits not adhered to.	1	5	8
12. Logs and records entries incomplete or missing.	0	2	13
13. Daily logs on oil and water disagree with monthly logs.	1	1	2
<u>PMS</u>			
1. 3M spot inspections not incorporated into zone inspection.	1	1	1
2. PMS semiannual, quarterly, monthly and weekly schedules are not being accomplished or followed as to deferred work or corrective action.	1	4	5

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ADMINISTRATIVE DISCREPANCIES (Cont'd.)

AVG. NO. OF DISCREPANCIES  
(1) DLG (3) DDG (2) DE

PMS (Cont'd.)

- |  |    |   |   |
|--|----|---|---|
| 3. PMS semiannual, quarterly, monthly and weekly records are incomplete, inaccurate or not maintained. | 5  | 3 | 3 |
| 4. 3M coordinator is not a PMS graduate.   | 1  | 1 | 2 |
| 5. EGLs missing, outdated, incomplete.   | 33 | 7 | 2 |
| 6. MRCs missing, outdated, incomplete, duplicated, out of sequence.                                    | 2  | 4 | 1 |
| 7. MRC control in space manual MIP page not current, missing pages and entries.                        | 1  | 1 | 1 |
| 8. Space manuals do not have QFRs entered, or entries are erroneous.                                   | 1  | 1 | 2 |
| 9. Space manuals have no changes recorded.   | 5  | 1 | 2 |
| 10. DCPO PMS quarterly records incomplete or missing.  | 1  | 1 | 0 |
| 11. Work Center Codes differ from Type Commander designations.   | 1  | 1 | 1 |
| 12. MRC Cards not laminated.   | 2  | 1 | 0 |
| 13. PMS training not being conducted, training inadequate, poorly planned.                             | 1  | 1 | 1 |

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TRAINING DISCREPANCIES

AVG. NO. OF DISCREPANCIES  
(1) DLG (3) DDG (2) DE

Directives & Instructions

	(1) DLG	(3) DDG	(2) DE
1. Engineering Department goals are not delineated in Command Training Program.	0	1	1
2. Long Range Training Program is incomplete in required training, frequency of training, and does not cover the 18-month competitive cycle.	1	3	1
3. Off-ship training requirements not identified on long-range training program.	0	0	1
4. Lesson plans were incomplete, not reviewed by command, and not developed for all indicated training.	1	4	5
5. A feedback system for identifying whether or not training was accomplished has not been established or maintained.	1	2	4
6. No program is provided for selecting or qualifying instructors.	0	1	2
7. Training subjects and requirements overlap in various programs, e.g., General Military Training and Safety.	0	1	1
8. Training records or progress reports not established or maintained.	0	2	1
9. Ship's Training Instruction should establish Casualty Control Drill Teams and minimum frequency for Casualty Control Drills.	1	2	2
10. Training Instruction should include minimum off-ship training requirements.	1	1	1
<u>PCS Program</u>			
1. PCS is not being properly established or monitored.	7	3	3
2. PCS goals both in rate and cross rate are not properly set nor is a weekly point attainment required.	3	3	1

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TRAINING DISCREPANCIES (Cont'd.)

	AVG. NO. OF DISCREPANCIES			
	(1) DLG	(3) DDG	(2) DE	
	5	5	2	
	0	0	1	
	0	1	0	
	29	21	15	
	51	46	61	
	13	17	17	
	0	10	12	

PQS Program (Cont'd.)

3. Requirements, goals and standards are not being met or understood.
4. SORM and EDORM do not properly reflect the watchstanding duties and responsibilities as outlined in the various PQS qualifications.
5. Reference material not centrally located.

State of Training and Qualifications of Personnel

1. Weakness or lack of knowledge or training in system configuration and operation.
2. Not sufficiently familiar with equipment operation or safety devices and precautions.
3. Not knowledgeable in Casualty Control Procedures.
4. Weak in the duties and responsibilities of watches.

## APPENDIX C

### REVIEW OF DOCUMENTS

Several current planning documents, programs and procedures, and training programs were reviewed to assess their impact on, and relationship to, the PEB Light-Off Examination. This review consisted of screening documents and programs now in effect to determine if they are providing all the necessary elements to achieve a successful LOE and, at the same time, to determine the amount of duplication in both SF and SY efforts.

A number of documents and programs were reviewed; their relationship to and impact on the LOE are summarized as follows:

- a. Pre-Overhaul Test and Inspection Plans (POT&I). The POT&I plans are designed to determine the condition of the engineering plant by testing and detailed inspection. The timely and accurate completion of these inspections will have a direct bearing on the LOE by allowing early development of a thorough Proposed Ship Alteration and Repair Package (SARP) and reducing the time-consuming and costly work of determining equipment status well into ROH. The POT&I inspection is the single basic program necessary to provide the accurate information required for making intelligent decisions at the Work Definition Conference (WDC), and it should be completed at least one month before the WDC.
- b. Ship Alteration and Repair Package (SARP) - Proposed and Issued. The Proposed SARP refined into the Issued SARP remains the basic work document throughout the overhaul for accomplishment of all SY work, and some SF work, and therefore affects the LOE significantly in the area of material readiness.

The initial development of the SARP from the POT&I, Current Ship's Maintenance Project (CSMP), and machinery history obtained from accurately kept logs and records must be accomplished well before the WDC, and all tasks must be clearly defined. This will allow the SF to start the planning of their work on the basis of available manpower resources.

c. CSMP. The CSMP is an account, kept by the ships, of all the known work items to be accomplished that are beyond the ability of SF to complete within 30 days. CSMP must be an ongoing program. Accurate inputs from the CSMP to the SARPs will reduce the extra work required to determine total jobs for both SF and SY. A concentrated effort to update the CSMP 12 months ideally, but no later than 6 months, before the overhaul will assist in the timely development of the overhaul package.

d. Coordinated Ship's Allowance List (COSAL). The COSAL is a list of the spare parts allowed to be carried onboard by the ships. It is a vital document that must be considered 6 to 8 months prior to overhaul and immediately after overhaul. The pre-overhaul screening of the COSAL will allow purging of those equipments and spares no longer applicable to the ship and help ensure that material required for on-board equipment is supported during ROH. This added assurance of support is a necessary pre-planning tool if untimely delays are to be avoided, especially during the critical pre-LOE period.

Post overhaul updating of the COSAL will cover those new equipments installed during ROH.

The COSAL should also be screened for the proper quantity and types of tools and repair equipment necessary to help reduce the SF work load, especially during the ROH. This updating of repair functions through the use of more modern tools and equipments will allow SF to divert scarce manpower to other critical areas.

e. Technical Repair Standards (TRS). The TRSs are detailed repair documents used by the SY in the repair of individual items of equipment. The development and use of good TRSs on those equipments overhauled by the SY is necessary if the required degree of standardization and quality work is to be achieved. This standardization and zero-defect work goal saves valuable time for both SY and SF.

The implementation of recently revised TRSs is underway and must be continued on all items repaired.

f. Shipyard Overhaul Management Systems. The various aspects of methods used by the shipyard to manage the ROH were reviewed. The methods used most seemed to control SY work adequately but left coordination gaps between SY and SF jobs. Use of the SFOMS program appears to offer the greatest possibility of coordinating the SF and SY work to provide a smooth work flow up to the LOE and throughout ROH.

The present duties of the Ship's Superintendent that involve solving SF and SY difficulties after the problem has reached major proportion must be reduced or eliminated entirely. These solutions always occur after-the-fact, and too much valuable manpower and time is wasted.

- g. Shipyard Test Planning and Test Memos. The review of this type document was restricted to only one test memo since only one has been developed for the class of ships covered in this program.

It is apparent that test memos would be valuable in testing systems and components, particularly during the period of system qualifications before the LOE. A well-coordinated testing plan implemented to qualify systems quickly and pinpoint any rework that must be done will allow the efficient utilization of both manpower and machinery. This is especially true in the training area and during the period immediately preceding the LOE.

- h. Ship's Force Overhaul Management System (SFOMS). A computerized management system, the SFOMS is one program that must be fully implemented and adhered to well before overhaul starts. The automation of the system and its capacity to serve as a management tool will not only allow the incorporation of the SF work requirements but will provide a means of managing the training requirement and times. The scheduling of tasks required to accomplish the administrative review and update can also be put under the SFOMS program, resulting in a single program that controls all SF activities required to accomplish the successful LOE.

APPENDIX D

PERSONNEL INTERVIEWS

1. INTRODUCTION

Interviews were conducted to determine from the experiences of personnel in a wide variety of activities what could be done to improve the planning and execution of the required actions leading up to the PEB/LOE. Persons from the following activities were interviewed during the period 21 November 1973 through 18 January 1974:

<u>Activity</u>	<u>Title of Persons Interviewed</u>
USS TALBOT (DEG-4)	CO, XO, and EO
USS DAVIDSON (DE-1045)	CO, XO, EO, MPA, DCA, and Ship Superintendent
USS REEVES (DLG-24)	XO, EO
USS GRIDLEY (DLG-21)	CO, XO, EO, BTC
USS HEPBURN (DE-1055)	CO, EO
USS BERKLEY (DDG-15)	XO, EO, EMO, DCA
USS FARRAGUT (FLG-6)	EO, DCA, MPA
Boston Naval Shipyard	Assistant to the Planning Officer
Pearl Harbor Naval Shipyard	Planning Officer/Assistant Planning Officer/ Assistant Type Desk Officer
Puget Sound Naval Shipyard	Planning Department Personnel/Scheduling Group/Type Desk Personnel
Long Beach Naval Shipyard	Type Desk Officer/Planning Department Personnel/Scheduling Group Personnel
PERA (CRUDES)	Heads of the Overhaul Planning and Engineering Support Branches
COMCRUDES PAC Staff	Material & Training Officers and Assistants
PEB (CINCPAC)	Senior Member and Staff
CURDESPAC REP, Pearl Harbor	Material Officer and SFOMS Officer

MTT (Mobile Training Team)  
San Diego

Officer-in-Charge

NAVSHIPS PMS-301

Director of Maintenance and Reliability

PQS Implementation Team

Senior Officer

## 2. APPROACH TO INTERVIEWS

It was decided to conduct the first interviews with a large number of ship's force personnel and shipyard planning personnel. It was believed that the information gained in these interviews could be used to compile a full outline of basic problems and ideas, which could be expanded by subsequent interviews with supporting and associated activities. This method proved to be very satisfactory. All supporting and associated activities were able to provide an insight into their specific contributions and the problems encountered in attempting to assist in the LOE.

## 3. RESULTS

Many major and minor items of information on preparing for the LOE were obtained during the interviews. The following are considered to be major items mentioned by most if not all of the ship personnel interviewed:

- All experienced a 10- to 14-hour (plus) work day, six days a week, for engineering department personnel during the ROH.
- All reported that a major effort was required to rewrite shipboard manuals, instructions, and procedures that had become obsolete. All believed that a majority of these manuals, instructions, and procedures could have been standardized, making the task much easier.
- All indicated that a major effort was involved in developing a training program and training aids during the ROH and that many of these training aids are similar and could be standardized.
- All reported that their PQS training is mandatory and that goals are set for the training associated with the watch-standing qualification required for the LOE.
- Ships that had an assist visit from the Mobile Training Team (MTT) reported that this was the best information and assistance they had received prior to the LOE. They also indicated that a visit earlier in the preparation phase of their training program would have saved a great deal of time in developing adequate training programs and aids.
- Most ships experienced a personnel turnover in excess of 50-percent during the ROH. This creates a double burden on the remaining crew members, who, in addition to accomplishing SF work, must train the new personnel.

- All ships reported that there was a major problem in the final days before LOE in providing time to check out equipment and conduct last-minute hands-on-training. A critical step in accomplishing this was to develop a spirit of cooperation and mutual assistance between SF and SY personnel.
- Coupled with the development of a spirit of cooperation between SF and SY personnel was the need to monitor very closely jobs that involved dual responsibility. This usually necessitated insuring that the SF working hours were the same as, or overlapped, those of the SY workers.
- Ships with a formal test program reported that this procedure was very beneficial to the timely checkout of all required systems and equipments. Another related procedure was the staging of a mock PEB by the SY, SF, and Type Command personnel. This allowed for quick resolution of the last-minute discrepancies found and brought attention to any unfinished work prior to the LOE. It also aided the ship in preparing a complete discrepancy list for its own use and for presentation to the PEB.
- On all ships that had undergone a successful LOE, it was emphasized that the ships critical assets, man-hours and skills, had to be managed very closely. Those who used a formal SFOMS (Ship's Force Overhaul Management System) indicated that it was invaluable during the ROH, and some believed that it would be beneficial throughout the entire year if available.
- On all ships it was believed necessary for the Ship's Force to have a three-week period prior to the LOE for final grooming of the spaces and equipments. It was agreed that it is not entirely feasible to exclude SY personnel from the spaces during this period, but it was stressed that Ship's Force must have priority during this period.
- A major point made repeatedly was the necessity for making the successful passing of the LOE the primary goal of the ship during the ROH, and the need to reemphasize this goal periodically for the entire Ship's Force.

Other points made in the interviews by shipyard personnel or those of other activities involved in the preparation for LOEs are as follows:

- It is extremely important to determine early in the ROH preparation period the extent of repairs required on main turbines and reduction gears. This may involve contract assistance, which should be obtained as soon as possible if required.

- To plan and schedule work properly under fully loaded conditions, it is important to determine all work to be handled by the shipyard as early as possible. The number of work orders, determined after the WDC as SY-accomplished items, must be kept to the absolute minimum.
- On systems and equipments not within the capability of the shipyard personnel to repair or test fully, it is very important to see that this work is contracted for soon as possible and closely monitored for completion.
- The early completion of the POT&I is important for the proper planning of all activities leading up to the LOE for both the shipyard and Ship's Force jobs.
- The success of shipyard efforts in completing all jobs by machinery cut-off prior to the LOE requires the same close attention of all levels of management that is required by the SF.
- It was noted that the LOE date is fixed by the SY schedulers three to four weeks prior to the start of the ROH. It was also noted that in the past all concerned were reluctant to alter this date until just prior to the LOE even though it was obvious that the LOE date would not be met.
- All interviewees agree on the need for early identification of the work to be accomplished and early decisions on the responsibility for work accomplishment.



APPENDIX E

1200 PSI PROPULSION EXAMINING BOARD (PEB)  
LIGHT-OFF EXAMINATION (LOE) MATERIAL READINESS REQUIREMENTS

1200 PSI PROPULSION EXAMINING BOARD (PEB)

LIGHT-OFF EXAMINATION (LOE) MATERIAL READINESS REQUIREMENTS:

Currently, Naval and Commercial Shipyards are not programmed to reach complete propulsion plant readiness incidental to the conduct of the LOE as chartered in OPNAVINST 3540.4. Until such time that the "Complete Overhaul" concept, as provided for in the 1200 PSI Improvement Program can be achieved and programmed in our yards the following procedures will be utilized by the 1200 PSI PEB:

a. The preparation of the propulsion plants to be examined should be along the line of the TYCOM Naval Distillate Conversion Certification or other comparable ship yard developed test program. The goal of the test program is to insure that the propulsion plants to be examined are complete and that the necessary tests and certifications have been performed prior to examination by the Board. Recognizing the type of overhaul planning currently in effect and the necessity to permit an orderly program for attainment of the total plant examination envisioned in the OPNAV Charter the following procedures will be used by the Board for Light-off Examinations. (LOE's).

(1) On multiple plant ships the board will make repeat visits so that each complete propulsion plant can be examined separately. Each plant to be examined should be complete and ready for light-off. The goal of the Board is to certify the plant/ship for auxiliary steaming, however, the examination covers all equipment associated with steaming auxiliary and main propulsion equipment. To this end, the spaces housing equipment in direct support of auxiliary plant operations must be complete with the exception of those devices, such as safety devices and overspeed trips, which require main steam for test. Example: Ships will have one main

machinery space with its associated Boiler area/space, emergency diesel room and one auxiliary machinery room (if auxiliary machinery such as evaporators, fire pumps, etc. are remote to the main machinery spaces) ready for examination. On single plant destroyers, main propulsion and auxiliary spaces should be ready and a single examination is envisioned.

(2) Sufficient shipboard machinery and equipment must be serviceable to provide independent normal combustion air, fuel oil transfer and stowage capability, reserve feedwater, low/high pressure control air, firemain pressure, auxiliary cooling water, electrical and control sources together with normal emergency sources. On all machinery, equipment and systems which are to be used in providing services, all safety devices and equipment must be in a tested condition prior to light-off with the exception of those devices requiring main steam. All damage control equipment and other standard safety features within the propulsion spaces must be intact and in a satisfactory condition. By definition this will include, secured deck plates, bilges clean and oil free, hot surfaces lagged/insulated and valve labels together with posted operating and safety precautions in place.

(3) Ship's Force work lists should be completed in support of the material readiness cited above. Every effort should be expended by the industrial activity to integrate ship's force work into their over-haul program to insure a joint effort in attaining the required readiness.

(4) On multiple plant ships the Board will monitor the material condition progress and operating practices during each successive plant examination. Unsafe or unsatisfactory conditions noted on previously certified plants could be cause for withdrawal of the certification.

(5) Exceptions to "complete plant readiness: for an individual plant due to material deficiencies with specific equipments must be addressed on a case by case basis and approved by the Board.