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LOGISTICS SUPPORT) AUD.. (U) DAVID W TAYLOR NAVAL SHIP
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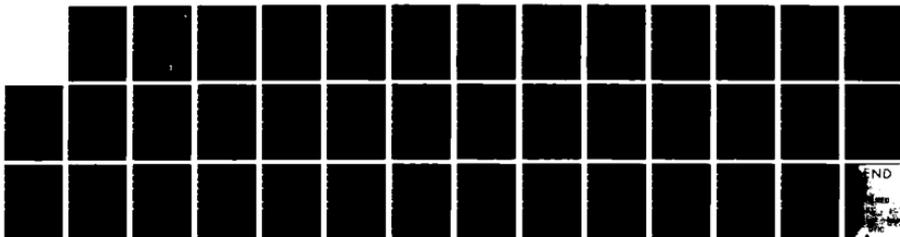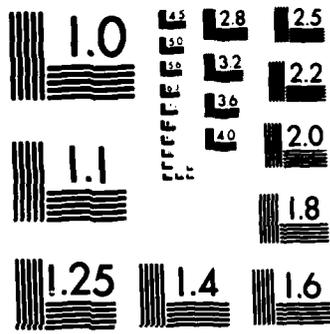
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NAVSEA ILS AUDITS ANALYSES AND LESSONS LEARNED

DAVID W. TAYLOR NAVAL SHIP
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Bethesda, Maryland 20084

NAVSEA ILS AUDITS ANALYSES AND LESSONS LEARNED

by

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COMPUTATION, MATHEMATICS AND LOGISTICS DEPARTMENT

DEPARTMENTAL REPORT

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This report analyzes the findings in 28 program audits conducted by NAVSEA auditors. These audits are part of the NAVSEA Integrated Logistics Support Assessment Program. The purpose of the report is to identify and analyze the impact of various logistic requirements on hardware programs. To do this the findings in the program audits were reviewed to identify deficiencies which were not peculiar to a program and for which positive action can be taken to decrease the likelihood of occurrences in future programs. In this report these findings are identified and discussed, and suggestions for improvements given.

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SECTION 1
INTRODUCTION

This report analyzes the findings in 28 program audits conducted by NAVSEA auditors. These audits are part of the NAVSEA Integrated Logistic Support Assessment Program, which is comparable to the NAVMAT LRG process.

In the 28 audits there were 278 findings. 222 of these findings have been selected as "significant" and worthy of further comment. A significant finding denotes a deficiency that is not peculiar to a program and for which positive action can be taken to decrease the likelihood of recurrences in future programs. A summary of the findings is given in Table 1.

The analysis was done by Logistic Category. The findings in the 14 Logistic Categories were reviewed for significant deficiencies. A report was then prepared in each Logistic Category. Each report is given in three parts:

1) A numerical summary which lists the total number of findings, the total number of findings selected as being significant, and a listing of significant deficient areas with total findings in that area.

2) A discussion of the deficient areas which includes causes of each deficiency and reasons why it is considered significant.

3) A lessons section which makes suggestions for improvements in the management, planning, and execution of logistics tasks.

A general conclusions and recommendations section follows the Logistic Categories review. This section includes a discussion of those significant findings which cut across most of the Logistic Categories and a discussion of possible deficiencies in the audit process.

Note: The Logistic Categories used in this report are logistic areas defined for the purpose of NAVSEA logistics support audits and do not necessarily have a one-to-one correspondence with Integrated Logistic Support elements.

Table 1 — Summary of Findings

Logistic Category	Number of Findings	Number of Significant Findings
1. Supply Support (SS)	43	33
2. Integrated Logistic Support Management (ILSM)	33	32
3. Reliability, Maintainability, and Availability (RMA)	40	28
4. Budget and Funding (BF)	24	23
5. Maintenance Planning (MP)	27	20

6. Manpower, Personnel, and Training Support (MPT)	25	17
7. Computer Resources (CR)	17	15
8. Support and Test Equipment (STE)	16	14
9. Technical Logistics Data (TLD)	17	14
10. Packaging, Handling, Storage and Transportation (PHST)	16	13
11. Safety (S)	8	6
12. Configuration Management (CM)	5	4
13. Planned Maintenance Systems (PMS)	4	2
14. Standardization (STD)	3	1
Totals	278	222
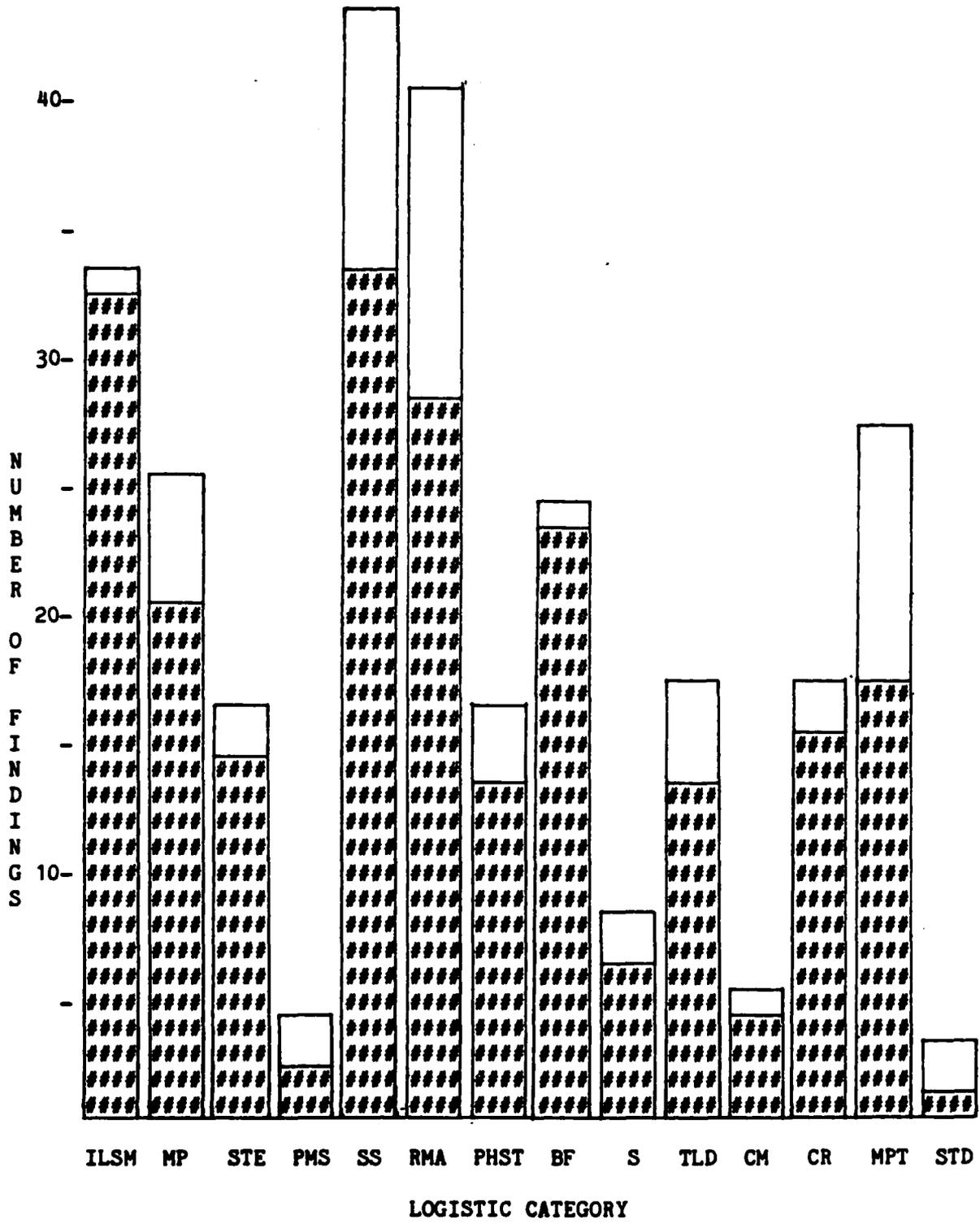
Figure 1 – Distribution of Significant Findings Among All Findings

SECTION 2
SUPPLY SUPPORT

2.1 NUMERICAL SUMMARY

A. Total number of findings: 43
B. Total number of significant findings: 33
C. Deficient areas:

Occurrences

10   Supply support transition plans are not adequate
      or have not been developed.

8   Interim support for equipment is inadequate.

7   Program operational availab'   y (Ao) considerations
      are inadequate.

4   Programs fail to utilize a ... le analytic techniques
      to establish source, mainte. ...e, and recoverability
      (SM&R) codes.

1   Planning for government furnished equipment (GFE) supply
      support is inadequate.

1   Program office failed to coordinate the assignment
      of Designated Overhaul Points (DOPs) with the appropriate
      NAVSEA code.

1   Adequate plans that address the timely procurement
      of Provisioning Technical Documentation (PTD)
      are not included in the ILS plan.

1   A Provisioning Requirements Statement (PRS) and a
      Provisioning Performance Schedule (PPS) are not included
      in the acquisition contract.

2.2 DISCUSSION

Ten findings deal with the development of supply support transition
plans. It is imperative that the program offices within NAVSEA develop
and present to the Ships Parts Control Center (SPCC) a formal transition
plan that links the interim supply support efforts of the contractor
with the follow-on Navy supply support. Among the areas that this
plan must address: are material demand, failure analysis, maintenance
actions, long lead time items, SPCC equipment manager identification,
and the supply support date for the first installation. Additional
guidance can be obtained from the current NAVSEA ILS code.

    Eight significant findings addressed the lack of provision for
support of the equipment after OPEVAL. Frequently, the Type Commander
will retain the equipment on board ship after an OPEVAL has demonstrated

technical superiority over the previously installed equipment. The program office is responsible for the logistic support after OPEVAL.

Seven significant findings involved the operational availability area. First, some programs failed to obtain an operational availability goal from the OPNAV sponsor. Second, Ao calculations are not always done in accordance with NAVMATINST 3000.2. This instruction establishes default values for the mean logistic delay time (MLDT), but when actual data exist, a realistic MLDT can be based on those data. Finally, the program office is required to conduct an Ao analysis for COSAL support. The Ao based COSAL model exists for this purpose.

Determination of the SM&R codes was a problem in four of the programs analyzed. Maintenance level determinations were not developed analytically. One major purpose of a Logistic Support Analysis (LSA) or Level of Repair (LOR) analysis is to determine the appropriate level for the performance of maintenance on an item. Program offices should provide justification or rationale for the level of repair decisions and ensure that SM&R codes are consistent with the maintenance plan.

Planning for the support of GFE must also be accomplished and identified in the program's ILS plan. Program Support Data Sheets start the purchase of material for initial outfitting. However, the supply system support posture for GFE must be analyzed 15 months prior to Fleet introduction to ensure sufficient system stock to support replenishment of allowance spares.

One finding also deals with the assignment of Designated Overhaul Points (DOPs). Program offices are required to coordinate the assignment of DOPs with NAVSEA 07 as per NAVSEA Notice 4710.

ILS plans must also contain a provision for the adequate and timely procurement of PTD. LSA will be utilized as the source of PTD whenever possible. If data cannot be obtained from the LSA, then PTD will be procured through the Contract Data Requirements Lists (CDRLs), DD Form 1423, utilizing specific data item descriptions. Program offices should contact the NAVSEA supply support code for additional guidance.

One finding was that neither a PRS nor a PPS was included in the acquisition contract. These documents, required by MIL-STD-1561, are necessary to ensure that the data to develop Navy Supply Support are provided to SPCC in a timely manner.

2.3 LESSONS

O   Ensure that the program has developed both an interim support plan and a transition plan if the program is not expected to meet its Navy support date. Both plans should be addressed and outlined in the ILS plan. This effort will ensure supply support for the program from test and evaluation to Navy support and also provide SPCC with a link between the contractor's interim supply support efforts and the follow-on Navy supply support effort.

O   Operational availability calculations must be done in accordance with NAVMATINST 3000.2 with an Ao goal obtained from the program's OPNAV sponsor. Analytic techniques are available to determine initial sparing requirements and should be used.

SECTION 3
INTEGRATED LOGISTIC SUPPORT MANAGEMENT

3.1 NUMERICAL SUMMARY

A. Total number of findings: 33
B. Total number of significant findings: 32
C. Deficient areas:

Occurrences

11	Integrated Logistic Support (ILS) plans were not done or are incomplete.
4	Planning resources and personnel identified are insufficient to support ILS planning.
4	ILS plans and supporting documents are not accurate and up-to-date.
2	Operational Logistic Support Summary (OLSS) is not planned or is incomplete.
2	There is no formal program to monitor Fleet performance and evaluate planned logistic support.
2	No Operational Availability (Ao) requirement was obtained from OPNAV sponsor.
2	ILS Management Team is not formally organized.
1	No formal procedure has been established for the positive integration of the ILS plan and its interrelated tasks.
1	The acquisition contract contains CDRL timetable conflicts.
1	No ILS Manager has been identified for a transferred program.
1	No interim support plan identifies the support of of an equipment after OPEVAL.
1	No acquisition strategy has been developed to provide for early industry involvement to satisfy DAR requirements for competition in the production contract.

3.2 DISCUSSION

Eleven of the significant findings involved either no ILS plan (3), no approved ILS plan for Full Scale Development (5), or no ILS plan for Production and Deployment (3). NAVMATINST 4000.20B and NAVSEAINST 4105.1 CH-2 require these plans and specify their format. The purpose of ILS plans is to ensure that all ILS elements and related programs are adequately considered, and that there will be a smooth transition from one program phase to the next. Without a plan, elements such as Operational Availability or Maintenance may not be considered in a timely fashion, if at all.

As an illustration of the consequences of lack of ILS planning, consider the following finding: In one program several serious timetable problems for CDRL's in the acquisition contract were found, e.g., the Analysis, Task, and Skill Report, and the Test and Support Equipment list were scheduled to be delivered on the same day that the LSA plan was to be submitted for approval. Since these documents are supposed to be products of the LSA process, it is apparent that these reports will have been done without the required logistic support analysis. Such conflicts can be avoided through the proper preparation of ILS plans.

As important as the preparation of ILS plans is their use. NAVSEAINST 4105.1 CH-2 requires that the ILS plan include a formal procedure to ensure the positive integration of ILS elements. One possible procedure is the critical path method. Without such a procedure it is possible that tasks may be performed out of sequence, resulting in problems similar to the one just described.

A similar problem is the failure to keep ILS plans accurate and up-to-date (4 findings). As milestones, timetables, or policies for portions of a program change, all ILS plans and supporting documents need to be updated to ensure that all tasks are performed sequentially and at the proper time.

Four of the significant findings involved lack of planning resources and personnel to support ILS plan formulation. Two of the findings involved project managers with heavy workloads and limited ILS knowledge. The other two cases involved lack of support personnel in the program office.

In a related area, two findings indicated a failure to formally organize an Integrated Logistic Support Management Team. It is important that the teams be formally organized with a member from each functional area and that the level of participation for the team members be established. In these findings, the team lists included members who didn't know they were members and members assigned functional areas not within their responsibility. In one case no member from SPCC was included. These situations could have had a serious effect on supply support for the program.

NAVMATINST 4000.20B requires that an OLSS be developed and distributed (2 findings). This user document provides summary information and references pertaining to the logistic support of the operational equipment.

One program was to be transferred from NAVSEA to NAVELEX. To ensure a smooth and timely transfer of programs and their ILS planning, it is important that the ILS Manager receiving the program be identified early and listed in the present ILS plans.

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In two significant findings an Ao requirement was not obtained from an OPNAV sponsor. Ao calculations develop the basis for trade-offs between reliability, maintainability, and supply support. The need to obtain an Ao requirement and include it in ILS plans is obvious.

Frequently an equipment successfully completing OPEVAL is left on board the test ship after OPEVAL; therefore the interim support of the equipment should be considered (1 finding). The program manager should anticipate approval and include a plan for interim support in the ILS plan.

The DoD acquisition process also requires, at Program Initiation, the development of an of an acquisition strategy that will satisfy Defense Acquisition Regulations (DAR) for competition and for justification of sole source award of the productions contracts, or the purchase of all technical and manufacturing data and processes for competitive award of the production contract. The essential objective is to obtain, in the production contract, the same performance and supportability evidenced during testing and subsequently approved for service use.

3.3 LESSONS

O   All ILS plans should be prepared in accordance with NAVSEAINST 4105.1 CH-2. A properly prepared ILS document ensures that ILS tasks are performed in the proper order and timeframe. A key part of maintaining a properly prepared ILS plan is updating the entire document whenever changes in milestones, timetables, or policy occur. It is also essential that a formal procedure be established for ILS plan implementation.

O   To develop the ILS plan project managers need ILS planning support, which is provided by the ILS support office at NAVSEA and by the careful formation of the program's ILS Management Team.

O   It is important that the project managers obtain an Ao goal from an OPNAV sponsor. Ao calculations are the basis for several of the program analyses essential in preparation of ILS plans. This goal and related calculations should be included in the ILS plan documentation.

O   Evaluation of the logistic support system after deployment is necessary so that adjustments can be made for differences between actual and predicted performance. To facilitate this evaluation a Fleet performance monitoring system should be identified in the ILS plan, and an Operational Logistic Support Summary should be developed and distributed in accordance with NAVSEA NOTICE 4105.

O   ILS plans should identify the need for an interim support plan for equipment successfully completing OPEVAL. Also when a program is to be transferred, the ILS Manager receiving the program should be identified to ease the transition of the program and its ILS planning.

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o   Finally, to ensure that the same program performance and
         supportability evidenced during testing is obtained in the production
         contract, the acquisition process should have in its development
         a strategy that satisfies the DAR regarding competitive procurement
         and/or sole source justification.

SECTION 4
RELIABILITY, MAINTAINABILITY, AND AVAILABILITY

4.1 NUMERICAL SUMMARY

A. Total number of findings: 40
B. Total number of significant findings: 28
C. Deficient areas:

Occurrences

14	Various reliability and engineering tests as required by NAVMATINST 3000.1A and NAVMAT P-9492 have not been planned and/or performed.
9	The RM&A programs have overall deficiencies.
2	Adequate manpower support to the program office is not provided in the RM&A area.
2	Derating requirements, as required by NAVMATINST 3000.1A, are not included in the contract specification, equipment specification, and the acquisition plan.
1	Proper supply and administrative delay factors are not included in the operational availability (Ao) calculation.

4.2 DISCUSSION

The first major deficient area (11 out of 14 significant findings) deals with failure to comply with NAVMAT P-9492, which requires random vibration and failure-free tests. These tests were either not planned or had been planned and were not executed for some reason. The three other findings in this area concern non-compliance with NAVMATINST 3000.1A regarding stress and sneak circuit analysis. Sneak circuit analysis is conducted to preclude undesirable combinations of circuit and operating conditions. In this case it was required to prevent an inadvertent missile launch.

The second major deficient area addresses multiple shortfalls in the overall RM&A programs. These shortfalls are in the following areas:

> a) development of R & M plans
> b) development of quality assurance plans
> c) development of quality control plans
> d) R & M predictions
> e) failure reporting analyses
> f) R & M demonstrations/qualifications per MIL-STD-781C and MIL-STD-471A.

Two findings indicated that adequate R & M manpower support had not been provided from within the project offices or within NAVSEA.

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Another deficient area is derating. Derating is a well known and commonly practiced procedure frequently used to reduce the stresses on a part and therefore prolong its life. Derating requirements, as specified in NAVMATINST 3000.1A and NAVSEAINST 3900.2A, must be included in contract specifications, equipment specifications, and acquisition plans.

Only one operational availability finding appeared in this logistic category. The MLDT and other administrative delay times were not included in the Ao calculation. Several other Ao findings are included in the supply support and maintenance plan categories.

4.3 LESSONS

O   In the RM&A area, program offices generally are not aware of all the tests that are required. A total list of all required RM&A tests needs to be made available to the program offices.

O   Better RM&A planning, done early in the acquisition cycle, is essential.

O   Program offices must ensure that all derating requirements are included in the contract and equipment specifications.

SECTION 5
BUDGET AND FUNDING

5.1 NUMERICAL SUMMARY

A. Total number of findings: 24
B. Total number of significant findings: 23
C. Deficient areas:

Occurrences

17   Life Cycle Cost (LCC) planning is incomplete.

4   Funds are insufficient or erroneously assigned.

1   LCC planning was performed 7 years late.

1   Missing documentation resulted in an insufficient audit trail.

5.2 DISCUSSION

Two-thirds of the Budget and Funding findings involve failure to follow the requirements in NAVSEAINST 4105.1 and NAVMAT 4000.20B. These documents provide funding documentation that shows actual and budgeted costs for each logistic element and sub-element by fiscal year appropriation, displays projected life cycle costs from program initiation through the first ten years of operational life, and identifies the activity responsible for logistic support funding as well as the activity scheduled to receive funds.

The second deficient area deals with errors in the funding matrix for programs with LCC plans. In two programs, funds were incorrectly specified. Two other programs lacked sufficient funds to cover planned support.

Deficient area number three illustrates dramatically that, even when a complete LCC plan is provided at time of audit, it may not fulfill its role in Integrated Logistic Support. This particular LCC plan was developed 7 years after program inception. The logistic support LCC plan contains estimates, broken down by logistic element and program phase, which should be subject to continuous review and routine updates. The financial plan is a working document which should be developed shortly after program initiation. The plan can then be used to compare actual funds authorized with actual program requirements so that any shortfalls can be detected and resolved.

The fourth deficient area illustrates the importance of a proper budgeting and funding reporting system. One program had severe problems in that for approximately 1 year no modules were being repaired even though O&MN funds had been provided by NAVSEA. OPN funds for spares procurement is a related concern. It is essential that funds for procurement and repair work are tracked to ensure that they are spent as budgeted.

5.3 LESSONS

O   LCC planning, when properly administered, provides the Program
Manager with a valuable tool capable of helping him identify future
problems in time to implement viable solutions. PMs must ensure
an LCC plan is developed that identifies budget and funding requirements
for the life cycle of the equipment.

O   The acquisition manager must ensure that funds are properly
assigned to support the program's various requirements. This
planning must be started immediately after program initiation as
required by NAVMATINST 4000.20B. A funding matrix format is available
from NAVSEA 904.

SECTION 6
MAINTENANCE PLANNING

6.1 NUMERICAL SUMMARY

A. Total number of findings: 27
B. Total number of significant findings: 20
C. Deficient areas:

Occurrences

8	No LSA, LOR, RMA, and/or LCC analyses were completed.
5	Maintenance plan does not consider LSA, LOR, RMA, and/or LCC.
3	Operational Requirement(OR) documents are lacking or inadequate.
2	There is no maintenance plan.
2	Depot level repairables are not identified.

6.2 Discussion

The following analyses are an important part of any program: LSA, LOR, RMA, and LCC. Seven of the 28 programs were found to be lacking one or more of these analyses. MIL-STD-1388, MIL-STD-1390B, DODD 5000.39, NAVMATINST's 3000.2, and 4000.20B, and NAVSEAINST 4105.1 CH-2 require that these analyses be performed. Program deficiencies will result when these analyses are not done or are incomplete. For example, no Ao threshold can be realistically established without the RMA analysis.

Just as serious as not performing the analyses is the problem of not using them in constructing the maintenance plan. This problem occurred in five programs, usually because the analyses were not done in a timely fashion. These analyses produce certain results, such as SM&R codes, FMEA, Ao, APL and others, which must be considered when establishing the maintenance plan. These analytic techniques must be used to generate the necessary inputs to the maintenance plan.

The audits also revealed that two of the programs had no formal maintenance plan. The maintenance plan is the key document, identifying how the end item will be maintained throughout its life cycle. It has an impact on areas such as supply support and manpower, personnel, and training.

Two other programs did not have an initial Operational Requirement (OR) type document as required by NAVMATINST 4000.20B. In one of these programs the OR document lacked any type of guidance for establishing the maintenance concept.

A requirement of NAVSEAINST 4790.11A is that acquisition managers identify all depot level repairables to NAVSEA 07 as possible intra/inter-servicing maintenance candidates. This was not done in two of the programs.

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6.3 LESSONS

O   Ensure that program offices take advantage of the available
analytic techniques to quantify and define program maintenance
requirements. These include LSA, LOR, RCM, and LCC. These analyses
are all iterative in nature and must be updated as new and additional
data become available. They must also begin as early in the acquisition
cycle as possible to really be able to influence any design and/or
logistic decisions.

O   Ensure that maintenance plans are prepared in accordance with
NAVMATINST 4000.20B and included in the ILS plan.

O   Identify all depot level repairables to NAVSEA 07 for use
as possible intra/interservicing maintenance candidates.

SECTION 7
MANPOWER, PERSONNEL, AND TRAINING SUPPORT

7.1 NUMERICAL SUMMARY

A. Total number of findings: 25
B. Total number of significant findings: 17
C. Deficient areas:

Occurrences

8   Navy Training Plans (NTP's) do not reflect current
     program requirements, scheduling, and funding.

5   Funding requirements for the Manpower, Personnel,
     and Training Support area are usually deficient and
     often are not programmed in the appropriate funding
     categories.

4   Technical documentation specifications are not adequately
     defined in the NTP to ensure the development of a
     comprehensive technical manual.

7.2 DISCUSSION

Of major concern in the MPTS area is the development of the Navy
Training Plan. Two aspects of the NTP warrant attention. First,
NTPs generally do a poor job of defining program requirements, milestones,
schedules, and funding. Second, funding categories for MPTS do not
always comply with NAVCOMPT funding requirements. A specific example
is that O&MN (vice SCN and OPN) funds must be used to develop and implement
factory training requirements.

More definitive technical documentation specifications must be developed
in the NTP to ensure that the technical data products will be comprehensive
and usable.

Also, NTP's are not updated to correspond with the ILS plan updates.
This shortfall can lead to inadequate requirements and outdated specifications.

7.3 LESSONS

O   Ensure that NTPs are specific, current, and properly interface
     with the ILS plan.

SECTION 8
COMPUTER RESOURCES

8.1 NUMERICAL SUMMARY

A. Total number of findings: 17
B. Total number of significant findings: 15
C. Deficient areas:

Occurrences

10 The program office failed to obtain a waiver
from NAVMAT 08Y for the use of non-standard
computer resources.

4 The software configuration management and life cycle
planning are not done in accordance with DoDD 5000.20
and NAVMATINST's 4130.2A and 5200.27A.

1 Software documentation requirements levied in contracts
are not in accordance with MIL-STD-1679.

8.2 DISCUSSION

Ten of the fifteen significant findings were a result of the program
office's failure to obtain an appropriate waiver from NAVMAT 08Y for
the use of non-standard microprocessors and programming languages. One
program utilized "firmware". Tactical Data Standards (TADSTANDS) 1,
4, C, and B referenced in the aforementioned audit do not draw clear
distinctions between software and firmware requirements. This area requires
further clarification within the appropriate TADSTANDS.

Software configuration management and life cycle planning must be
done in accordance with DoDD 5000.20 and NAVMATINST's 4130.2A and 5200.27A.

The third deficient area deals with software documentation requirements
levied on contracts. All such requirements must be accomplished in
accordance with MIL-STD-1679. This document should be called out in
the Contract Data Requirements List (CDRL).

8.3 LESSONS

O Ensure that the program offices are aware of the NAVMAT 08Y
waiver requirements for non-standard computer resources. More attention
must be given to software configuration management and life cycle
planning. When questions arise regarding the application of TADSTANDS,
contact the MAT 08Y office for clarification.

SECTION 9
SUPPORT AND TEST EQUIPMENT

9.1 NUMERICAL SUMMARY

A. Total number of findings: 16

B. Total number of significant findings: 14

C. Deficient areas:

Occurrences

7   The requirements and procedures for calibration of general and special test equipment should have been established and/or documented in the ILS plans by NAVMATINST 4855.6 and NAVSEA OP 45845.

4   The ILS plan is inadequate or incomplete with respect to Support and Test Equipment.

3   The General Purpose Electronic Test Equipment requirements in the ILS plan are not in accordance with MIL-STD-1364 and MIL-STD-1387.

9.2 DISCUSSION

The first major deficient area (7 of 14 significant findings) deals with calibration. As already stated, the requirements and procedures for calibration of general and special test equipment are given in NAVMATINST 4855.6 and NAVSEA OP 45845. In 6 of 7 findings calibration requirements for the support test equipment had not been addressed at all. One of the programs in this group uses two pieces of test equipment unique to the program; no approved Navy Calibration Procedures have been established for them. In the seventh case the test equipment used did not require calibration. However, this fact was not indicated in the ILS plan. Without such information it is impossible to distinguish between those programs without calibration requirements and those in which the requirement has not been addressed.

Four of the fourteen significant findings are in the more general area of inadequate or incomplete ILS plans for Support and Test Equipment. These findings include failure to identify needed Support and Test Equipment because there was no maintenance plan, and failure to indicate that the equipment is repaired by the manufacturer and therefore no test equipment is needed. Finally for one program the GPETE required for installation and checkout is in limited supply, and therefore the ILS plan should indicate that the installation team should have their own.

The last deficient area involves test equipment lists in technical manuals. The list should be made in accordance with MIL-STD-1364. In these cases the lists either omitted GPETE given in MIL-STD-1364 or included items not on the approved lists. If non-approved equipment must be included, special approval should be sought as outlined in MIL-STD-1387.

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9.3 LESSONS

O   Calibration requirements and procedures should be established
and documented in the ILSP. NAVMATINST 4855.6 and NAVSEA OD 45845
should be used when establishing these requirements and procedures.
When no Navy Calibration Procedure exists for new test equipment,
the Metrology Engineering Center, Pomona, CA should be contacted
for help in establishing such procedures.

O   It is important that all ILS plan sections involving maintenance
planning and support and test equipment be complete. Problems arise
when special test equipment is needed for maintenance and none has been
scheduled for use. Also, when support and test equipment
is in limited supply, careful planning will avoid the problem of
not having equipment available to do the job.

O   When GPETE lists are established, it is important that MIL-STD-1364
be used so that all required equipment is listed, and when possible,
only approved equipment is included. When there is no approved
equipment substitute for a proposed item, special approval for the
inclusion of the item must be sought as outlined in MIL-STD-1387.

SECTION 10
TECHNICAL LOGISTICS DATA

10.1 NUMERICAL SUMMARY

A. Total number of findings: 17
B. Total number of significant findings: 14
C. Deficient areas:

Occurrences

7   Planning for quality assurance, validation, and verification of technical manuals is inadequate.

4   Technical Manual Plans lack complete documentation.

2   The technical logistics data section of the ILSP fails to adequately address Technical Repair Standards.

1   The contract did not incorporate Technical Logistic Data (TLD) requirements specified in the acquisition plan.

10.2 DISCUSSION

The quality assurance requirements of NAVSEAINST 4160.3 include procedures for in-process review, validation, verification, and acceptance of technical manuals. The ILSP should give in-depth coverage of the technical manual Quality Assurance Program Planning including how the planning will be executed.

In the first deficient area, six of the seven findings cite inadequate or missing plans for the verification and validation of technical manuals. In the seventh finding, the responsibility for performing quality assurance procedures had not been fully assigned. In this program, the project office had inadequate support for technical manual quality assurance. When this occurs, the acquisition manager must task a technical activity to perform quality assurance functions.

The second deficient area deals with the failure to develop a life cycle plan for technical manuals. The applicable guidance for the Program Manager in this area is NAVSEAINST 4160.3 and NAVSEAINST 4105.1.

The ILSP for two programs did not adequately address Technical Repair Standards (TRSs). NAVSEAINST 4160.2 covers the planning requirements for TRS.

In the final deficient area, Technical Manual Contract Requirements (TMCRs) were developed by the program office in accordance with NAVSEAINSTs 5600.7 and 5600.8 but were not incorporated into the contractual documentation processed by the field activity contracting support office.

10.3 LESSONS

O   Program offices must ensure that an adequate Technical Manual Plan is prepared in accordance with NAVSEAINST 4160.3.

O   PMs must ensure that technical and maintenance, overhaul, and repair standards are developed in accordance with NAVSEAINST 4160.2 and included in the ILS plan.

o   PMs must ensure that the quality assurance program for technical
manuals, as outlined in NAVSEAINST 4160.3, is followed. These procedures
require in-process reviews, validation, verification, and acceptance
of technical manuals. The instruction requires that, when the
project office does not have adequate support, the Acquisition Manager
task a technical activity for Technical Manual management and support
to perform these quality assurance functions.

o   PMs must also ensure that mandated technical data requirements
are included in the procurement documentation.

SECTION 11
PACKAGING, HANDLING, STORAGE, AND TRANSPORTATION

11.1 NUMERICAL SUMMARY

A. Total number of findings: 16

B. Total number of significant findings: 13

C. Deficient areas:

Occurrences

8   PHS&T plans are either missing or incomplete.

5   Preservation, packaging, and packing requirements
are not in accordance with MIL-STD-794 and MIL-E-17555.
Marking requirements are not in accordance with
MIL-STD-129.

11.2 DISCUSSION

The largest deficiency in the PHS&T area is the failure to develop
a complete plan for this element. Eight of the thirteen significant
findings deal with this deficiency. In the second deficient area programs
fail to comply with the preservation, packaging, and packing requirements
stated in MIL-STD-794 and MIL-E-17555. Marking requirements must be
in accordance with MIL-STD-129. Another area which did not appear in
any of the audit findings but which must be considered is transportability.
The relevant instruction in this area is OPNAVINST 4600.22A.

11.3 LESSONS

O   Since a significant amount of work in this area is done under
contract, it becomes imperative that contractors, as well as program
managers, be aware of the relevant military standards and instructions
and that they comply with the requirements.

12.1 NUMERICAL SUMMARY

A. Total number of findings: 8
B. Total number of significant findings: 6
C. Deficient areas:

Occurrences

6   The System Safety Program Plan (SSPP) is either missing
    or incomplete.

12.2 DISCUSSION

A complete SSPP is designed to cover a program from its inception
through the entire life cycle. Four of the programs audited had
no formal SSPP. Two other programs documented system safety program
plans for the development phases but failed to project their safety
planning into the deployment phase. NAVSEAINST 5100.12 requires that
an SSPP be developed for all NAVSEA acquisitions, and MIL-STD-882 provides
the elements to be included in the SSPP.

12.3 LESSONS

0   The acquisition managers should consult NAVSEAINST 5100.12
    and MIL-STD-882 for aid in developing their system safety plans.
    The system safety plan should also be included and/or referenced
    in the program's ILS plan.

SECTION 13
CONFIGURATION MANAGEMENT

13.1 NUMERICAL SUMMARY

    A. Total number of findings: 5

    B. Total number of significant findings: 4

    C. Deficient areas:

        Occurrences

        3   The plan failed to comply with the NAVMATINST 4130.1A and NAVSEAINST 4130.10 requirements for Configuration Management.

        1   Provisions were not included in the CM plan for the transfer of the hardware program between SYSCOMS.

13.2 DISCUSSION

The major problem area is a failure to develop adequate CM plans which comply with appropriate NAVMAT and NAVSEA instructions. The CM plan identification must be included as part of the program's ILS plan. Also, as part of CM planning, provisions must be made to address the monitoring, tracking, and status of Engineering Change Proposals (ECPs).

CM planning should also include, when appropriate, the identification of a program's transition from one SYSCOM to another.

13.3 LESSONS

0   The program office must develop a configuration management plan in accordance with NAVMATINST 4130.1A and NAVSEAINST 4130.10.

SECTION 14
PLANNED MAINTENANCE SYSTEMS

14.1 NUMERICAL SUMMARY

A. Total number of findings: 4
B. Total number of significant findings: 2
C. Deficient areas:

Occurrences

1   Planned Maintenance Systems (PMS) documentation
     requirements are not invoked as required by NAVSEAINST
     4790.8 of 19 May 1976.

1   Reliability Centered Maintenance (RCM) logic was
     not used to develop the PMS.

14.2 DISCUSSION

The major deficiency in the PMS area is the lack of documentation
planning. Instructions from NAVSEA, NAVMAT, and OPNAV require that
PMS documentation be developed, tested, and evaluated concurrently with
the development of equipment during the RDT&E phase. The PMS documentation
must be delivered and implemented concurrently with the installation
of the equipment at the organizational site.

RCM is the sole analytic technique to be used in the development
of the scheduled maintenance requirements. The RCM logic is presented
in Appendix F to MIL-P-24534 and should be used in the development
of Maintenance Requirement Cards (MRCs) and Maintenance Index Pages (MIPs).
MIL-P-24534 has been revised to incorporate Appendix F and will be issued
shortly as MIL-P-24534A(Navy).

14.3 LESSONS

O   Ensure that PMS documentation is developed in accordance with
     NAVSEAINST 4790.8.

O   Utilize RCM logic to develop equipment scheduled maintenance
     requirements including Maintenance Requirement Cards and Maintenance
     Index Pages.

SECTION 15
STANDARDIZATION

15.1 NUMERICAL SUMMARY

A. Total number of findings: 3
B. Total number of significant findings: 1
C. Deficient Areas:

Occurrences

1   Interchangeability of components from different
manufacturers is not ensured.

15.2 DISCUSSION

In the standardization area two non-significant findings resulted
because MIL-STD-965 (Parts Control Program) was not yet an approved
document and therefore could not be levied in the development contracts.
The one significant finding resulted from an apparent deficiency
in MIL-E-24572(SH) that precluded a maximized standardization of components.

15.3 LESSONS

O   The program office must ensure that standardized components
are utilized in a system or equipment whenever possible. Failure to
ensure interchangeability of components will have a significant life
cycle cost impact.

SECTION 16
CONCLUSIONS AND RECOMMENDATIONS

This report was written for acquisition managers, ILS managers, and logistic element managers. Lessons learned from the analysis are not necessarily unique to any one type of logistic manager but will benefit all those involved in the acquisition logistics area.

The NAVSEA ILS Assessment Program is comparable to the NAVMAT LRG process, and the assessments are intended to serve as an aid to the ILS and acquisition managers. A program is not allowed to enter the production phase until its ILS planning is approved by specified Logistic Element Managers and related program managers. The ILS assessment program reviews the planning so that deficiencies can be identified and addressed and delays avoided when the production request is made.

The list of programs which will undergo ILS program assessment is currently developed from the OPEVAL schedule. Since this assessment is late in the Full Scale Development Phase, ILS problem solutions can not be effectively addressed.

Recall that a significant finding denotes a deficiency that is not peculiar to a program and for which positive action can be taken to decrease the likelihood of occurrences in future programs. A significant finding does not necessarily correlate to a finding that must be completed for a program's logistic certification. Of the 278 total findings, 222 are deemed significant. This part of the report examines some overall conclusions and recommendations resulting from the analysis of the 222 significant findings.

The largest number of significant findings, 95 of 222, or 43%, occurred because the program office failed to provide a complete ILS plan or provided no plan whatsoever.

The second largest number of deficiencies occurred because the program office failed to comply with the required directives and instructions. Forty-six significant findings, 21% of the total, occurred in this area. Figure 2 provides a graphic illustration of these two important areas. It is apparent from the analysis that the program offices are either not aware of all the required directives and instructions in the ILS area, or the instructions are inadequate.

Four of the logistic categories had over 23 significant findings each. These included Supply Support (33), ILS Management (32), RM & A (28), and Budget & Funding (23). Most, if not all, of the programs were audited in these areas. The auditors in these areas made a conscientious effort to identify findings and produce a viable list of recommended actions.

A widespread ILS planning deficiency is that programs audited have not planned for life cycle logistic support funds immediately after program initiation as required by NAVMATINST 4000.20B. Most funding matrices have been developed just prior to a Full Scale Development or Production Deployment audit, which is far too late in the acquisition cycle to ensure that life cycle logistic support resource funds can be identified and budgeted for in an acquisition program. Acquisition Managers must identify their logistic life cycle support requirements early for incorporation into the PPBS process. Further, they must make sure that the life cycle costing includes both the acquisition and operational life cycle phases.

Another conclusion is that existing analytic techniques, which have been established to assist the ILS community in identifying and quantifying their requirements, are not being utilized by the program offices. Why? In some cases, these analytic techniques are still evolving or have not been kept current; in other cases, however, the program offices do not initiate work in these areas until it is too late in the acquisition cycle for results to be used to make logistic decisions and/or influence the hardware design. In any event, the program offices should identify their needs in this area and contact the ILS office so that resources can be identified to solve these problems.

One final conclusion is that often the acquisition contracts do not contain the necessary logistic requirements established in the ILS and acquisition plans. Contractors are then not aware of their role in generating these requirements until too far along in the acquisition cycle.
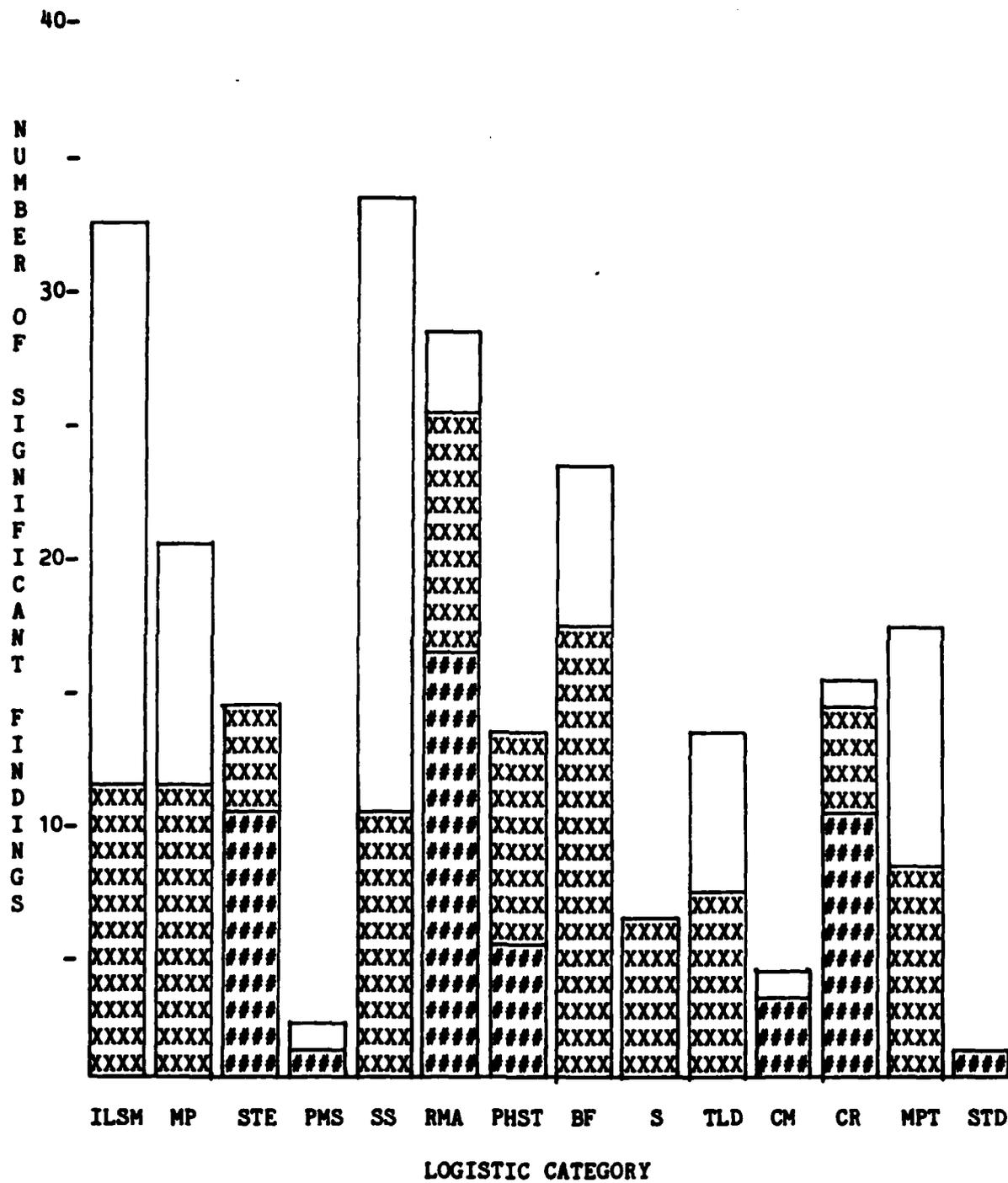
Figure 2 - Distribution of Major Overall Significant Findings

SEA	05R	SEA	56G	SEA	61X11	SEA	62Y
	05C		56L		61X12		62YC
	05L		56W		61X13		62YG
	05L1		56W1		61X2		62Y1
	05L2		56W2		61X21		62Y11
	05L3		56W3		61X22		62Y12
	05L4		56W4		61X23		62Y13
	05M		56X		61X24		62Y2
	05N		56XF		61X3		62Y21
	05R		56X1		61X31		62Y22
	05RC		56X2		61X32		62Y3
	05R1		56X3		61X33		62Z
	05R2		56X4		61X34		62Z1
	05R3		56X5		61X35		62Z2
	05R4		56Y		61Y		62Z21
	05V		56YF		61Y1		62Z22
	05X		56Y1		61Y11		62Z23
	50		56Y2		61Y12		62Z3
	50X		56Y3		61Y13		62Z31
	501		56Y4		61Y2		62Z32
	5011		56Z		61Z		62Z4
	5012		56ZF		61Z1		62Z41
	5013		56Z1		61Z2		62Z42
	5014		56Z2		61Z21		63
	502		56Z3		61Z22		63D
	503		06		61Z4		63E
	504		06A		61Z41		63E1
	505		06B		61Z42		63E2
	55		06C		61Z43		63E3
	55D		06C1		61Z5		63J
	55N		06C11		61Z51		63R
	55W		06C12		61Z52		63R1
	55W1		06C13		62		63R3
	55W2		06C2		62C		63X1
	55W3		06C3		62C1		63X11
	55W4		06F		62C2		63X12
	55X		06H		62C3		63X13
	55X1		06P		62H		63X14
	55X2		06R		62R		63X2
	55Y		61		62W		63X21
	55Y1		61D		62X		63X22
	55Y2		61R		62X1		63X23
	55Y3		61V		62X2		63X24
	55Z		61V1		62X21		63X4
	55Z1		61V2		62X22		63X41
	55Z2		61V3		62X23		63X42
	55Z3		61W		62X3		63X43
	56		61X		62X31		63X46
	56D		61X1		62X32		63X5

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63Y2	073	913T	
63Y21	074	92	
63Y22	075	92B	
63Y23	90	92C	
63Y3	90A	92D	
63Y31	90L	92F	
63Y32	90C	92L	
63Y4	90E	92N	
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63Y42	90A	921	
63Y43	90L	921A2	
63Y44	90C	921A4	
63Z	90E	921A5	
63ZB	90F	921E	
63ZT	90M	921L	
63Z1	90R	921N	
63Z2	901	921P	
63Z21	903	921R	
63Z22	904	921T	
63Z23	9041	PMS 300	
63Z24	9042 (10)	301	
63Z3	905	303	
63Z31	9051	306	
63Z32	9052	307	
63Z33	9053	309	
63Z34	9054	376	
63Z4	906	377	
63Z41	91	378	
63Z42	91A	383	
64	91B	389	
641	91CL	392	
6411	91D	393	
6412	911	395	
6413	911P	396	
642	9111	399	
6421	9112	400	
6423	9113	402	
643	9114	405	
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6432	9116	407	
644	912	408	
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		411	

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