NUCLEAR RELIABILITY ASSURANCE DATA SOURCE GUIDE

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ENGINEERING DIVISION

NUCLEAR RELIABILITY ASSURANCE

DATA SOURCE GUIDE

Date Published: November 1976

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Oak Ridge, Tennessee 37830
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ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

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CONTENTS

	Page
FOREWORD	v
ABSTRACT	vii
1. INTRODUCTION, SUMMARY, AND CONCLUSIONS	1
1.1 Introduction	1
1.2 Summary	1
1.3 Conclusions	2
2. NUCLEAR PLANT RELIABILITY DATA SYSTEM	4
2.1 Summary	4
2.2 Evaluation - Advantages	6
2.3 Evaluation - Disadvantages	6
2.4 Availability of Information	6
3. FAILURE DATA HANDBOOK FOR NUCLEAR POWER FACILITIES	7
3.1 Summary	7
3.2 Evaluation - Advantages	8
3.3 Evaluation - Disadvantages	8
3.4 Availability of Handbook	9
4. SYSTEMS RELIABILITY SERVICE DATA BANK	10
4.1 Summary	10
4.2 Evaluation - Advantages	12
4.3 Evaluation - Disadvantages	12
4.4 Availability of Data	13
5. REACTOR SAFETY STUDY (WASH-1400) - Appendix III, "FAILURE DATA"	14
5.1 Summary	14
5.2 Evaluation - Advantages	15
5.3 Evaluation - Disadvantages	15
5.4 Availability of WASH-1400	16
6. NAVAL SHIP ENGINEERING CENTER RELIABILITY/MAINTAINABILITY/ AVAILABILITY DESIGN DATA BANK REPORT	17
6.1 Summary	17
6.2 Evaluation - Advantages	19
6.3 Evaluation - Disadvantages	19
6.4 Availability of Data Bank Report	19
7. NON-ELECTRONIC RELIABILITY NOTEBOOK	20
7.1 Summary	20
7.2 Evaluation - Advantages	20
7.3 Evaluation - Disadvantages	20
7.4 Availability of Notebook	21
8. GOVERNMENT/INDUSTRY DATA EXCHANGE PROGRAM FAILURE RATE DATA BANK	22
8.1 Summary	22
8.2 Evaluation - Advantages	23
8.3 Evaluation - Disadvantages	23
8.4 Availability of Summaries	24

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	<u>Page</u>
APPENDIX A. Liquid Metal Engineering Center (LMEC) Data	25
APPENDIX B. Systems Reliability Service Data Bank (SYREL) Data	29
APPENDIX C. WASH-1400 Summary Data	33
APPENDIX D. Naval Ship Engineering Center (NAVSEC) HME Data Bank	49
APPENDIX E. Rome Air Development Center (RADC) Data	65
APPENDIX F. Government/Industry Data Exchange Program (GIDEP) Generic Codes	71

FOREWORD

This document was originally compiled and written by J. R. Lennon of Bradford Computer and Systems, Inc., under Subcontract No. 3942 with Union Carbide Corporation Nuclear Division as an activity of the RDT Standards Program. Technical direction of the subcontract was provided by H. G. Arnold of ORNL Engineering.

The purpose of the document is to provide a quick reference for reliability engineers who need failure and repair data on equipment in nuclear service. When RDT Standard F2-ST, *Reliability Assurance*, was prepared, the authors recognized the need for guidance in the use of that standard to obtain data. It is hoped that this document will provide that guidance.

As a word of caution, no claim is made that the data sources described herein are infallibly applicable to the nuclear industry, even though the titles of some of the sources may imply that. The reader must assess the meaning of the output from his calculations when using the data.

ABSTRACT

Seven sources of reliability and maintainability data are reviewed for their potential for providing nuclear equipment data. Consideration is given to similarity to nuclear application, variety of equipment types reported, availability of data, and obsolescence of data. In addition, discussions of advantages and disadvantages of each data source are presented, and samples of either the data or the character of the data are included as appendixes.

1. INTRODUCTION, SUMMARY, AND CONCLUSIONS

1.1 Introduction

Increased emphasis is being placed on the availability/reliability/maintainability/safety (ARMS) of nuclear reactors. In particular, the need for design evaluation using reliability engineering techniques developed over the past two decades is evident. RDT Standard F2-9T, *Reliability Assurance*, states that "Reliability analysis shall be included as an integral part of design analysis..." and identifies certain quantitative types of analyses including comparative analysis, sensitivity analysis, trade-off studies, and fault-tree analysis.

The techniques to perform such analyses are in the hands of the engineering community today. Not so readily available are the reliability and maintainability data required to input to such analyses. Both the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission (NRC) are aware of this problem, and an effort is under way to overcome it through development of the Nuclear Plant Reliability Data System (NPRDS). However, the collection and analysis of data on highly reliable equipment such as that found in a reactor and its associated systems requires significant amounts of reactor operating time, hence calendar time. Consequently, there will be a span of several years during which engineers must rely on other data sources to provide input data to ARMS analyses.

The purpose of this guide is to provide an overview of potential sources of reliability and maintainability data that could be used for nuclear application until the time when NPRDS, Institute of Electrical and Electronics Engineers (IEEE), and other industry-sponsored efforts provide nuclear- and utility-generated data.

A large number of potential data sources were reviewed for possible inclusion in this guide. Data from all branches of the Armed Services and the National Aeronautics and Space Administration were reviewed. Inquiries were sent to the appropriate nuclear agencies in the governments of the United Kingdom, France, and Germany. ERDA installations including Oak Ridge National Laboratory, National Reactor Testing Station, and the Liquid Metal Engineering Center were requested to provide inputs. Certain industrial organizations believed to have data banks were invited to contribute.

1.2 Summary

Data-source candidates were reviewed with respect to the following considerations: (1) similarity of equipment to that anticipated in nuclear applications; (2) variety of equipment reported by the data source; (3) availability of such data to the nuclear industry, both suppliers and users; and (4) data obsolescence.

Seven data sources were selected as currently having the greatest potential benefit to the nuclear industry. The seven sources are listed below along with their section number in this report:

- Sect. 2: Nuclear Plant Reliability Data System (NPRDS)
- Sect. 3: Failure Data Handbook for Nuclear Power Facilities (LMEC Handbook)
- Sect. 4: United Kingdom Systems Reliability Service Data Bank (SYREL)
- Sect. 5: WASH-1400 - Reactor Safety Study, Appendix III, Failure Data (Rasmussen Study)
- Sect. 6: Naval Ship Engineering Center (NAVSEC) Reliability/Maintainability/Availability Design Data Bank (RMA)
- Sect. 7: Rome Air Development Center (RADC) Non-Electronic Reliability Notebook
- Sect. 8: Government/Industry Data Exchange Program (GIDEP) Failure Rate Data Bank

(The AVCO Corporation report, Reliability Engineering Data Series, "Failure Rates," published in 1962 was excluded from this guide because data is based on equipment operations during the 1950s and on equipment and systems designed in the late 1940s. In addition, the report is no longer in print, although it does serve as a good reference point to measure reliability growth.)

Five of the seven data sources are readily available to the nuclear industry. SYREL furnishes data on a subscription basis. NPRDS is available to participating utilities and government agencies. Although its availability to industry is not clear at this point; NRC is expected to release data on a need-to-know basis.

1.3 Conclusions

Recent emphasis in nonelectronic reliability analysis has made available much more nonelectronic data than was available a decade ago. These data were collected principally from nonnuclear applications but it can be used for many order-of-magnitude analyses that are likely to be undertaken for nuclear applications, especially for comparative analysis. If the objective of such analyses is to lead to design improvement rather than absolute value prediction, the errors in the data can be tolerated.

Although NPRDS should eventually prove to be the best nuclear data source, it is recommended that those involved in nuclear system ARMS analyses obtain all the reports reviewed herein. The LMEC Handbook (Sect. 3) is the most thorough with respect to completeness of reporting on reliability data, but it does not provide maintainability data nor does it cover a large spectrum of components (84). Maintainability data

can be obtained from WASH-1400 (Sect. 5) and the NAVSEC data bank (Sect. 6). The GIDEP reports contain information on the largest spectrum of equipments, but the potential variability of input data quality would indicate that other reports summarized herein should be examined first for applicability.

2. NUCLEAR PLANT RELIABILITY DATA SYSTEM

2.1 Summary

The Nuclear Plant Reliability Data System (NPRDS) solicits input information from all organizations that operate nuclear reactors used primarily for generating electric power within the United States. The systems and components included in the NPRDS data base are, in general, those classified as Safety Class 1 and Safety Class 2 in ANSI N18.2 and ANSI N21.1 excluding spent fuel storage, passive reactor-vessel structural internals, pressurized water reactor piping 1 in. and below and BWR piping 1-1/4 in. and below. Components are considered to be identifiable devices, instruments, or pieces of equipment, but small parts such as resistors or vacuum tubes are not. The basic input information to the data bank consists of the following four elements:

1. unit identification,
2. engineering data,
3. failure reports,
4. measure of exposures to failure (e.g., service hours, cycles, or tests).

Six different output reports are provided by the NPRDS. Three of these reports are provided only to the reporting organization and three reports are available to other industry participants. This summary is concerned only with the latter three reports.

NPRD Report A03, *Annual Summary Report of System Reliability*, provides a summary of safety-related system reliability statistics for generic protection systems of all similar nuclear steam-supply systems that are reported. Reporting organizations are not identified in this summary, but the total number of generating units and safety-related systems is indicated. Statistics are provided for the latest or current year and for the total experience recorded in the data bank. Specific data included in this report are as follows:

- The nuclear plant operating mode that normally applies; the three possible modes are operating, standby, and shutdown;
- The period for which specific reliability statistics apply, which includes statistics accumulated for the current specified period and statistics accumulated from the start date for the particular nuclear plant system through the end of the past calendar year;
- The total population of nuclear unit systems having the same NPRDS code on which reliability data are being reported;
- The calculated system in-service hours categorized as critical hours, reactor standby hours, and reactor shutdown hours;

- Total in-service hours, which is the sum of the three previous categories;
- The total calculated in-service hours for the particular system type divided by the total population of that system type;
- The summation of hours that the systems were out of service due to system or component failure;
- The number of failures of the corresponding nuclear plant systems for the designated period;
- The average system outage hours per failure for the specified nuclear plant systems for the designated period;
- Number of failures per million in-service hours;
- The total number of system tests;
- The sum of all the nuclear generating units reporting;
- The summation of the reactor critical hours (current and cumulative);
- The summation of the standby condition hours (current and cumulative);
- The summation of the reactor shutdown hours (current and cumulative);
- The specific date of the beginning of the designated period for which the nuclear plant system reliability data are accumulated and reported in the subject report;
- The specific end date of the designated period for which nuclear plant system reliability data are accumulated and reported in the subject report;
- The total hours for which reliability data had been accumulated in the corresponding period.

NPRD Report A04, *Summary Report of Component Reliability*, reports similar information at the component level. The NPRDS provides a breakdown of nuclear plant components by subcategories. Components may be reported as major subcategories or divided into as many as two or three subcategories. Statistics for any one component are included in only one subcategory. The subcategories do not overlap but are extremely useful in providing engineering and descriptive information to identify a particular component. The report provides the total number of nuclear plant components on which statistics are based. The grand total represents the total components within the NPRD data base.

NPRD Report Q02, *Quarterly Component Failure Listing*, is provided on a quarterly basis to industry and contains failure data for the same type of components included in the NPRDS file. The objective of this report

is to provide information on a quarterly basis that will keep industry informed of all significant component failures. Information contained in this report includes a description of the component, the date of failure, the sequential number for the reported component failure for the specified failure date (necessary in case more than one failure occurs on a particular component on a single date), failure outage duration, description of the component failure, and cause and corrective action.

2.2 Evaluation - Advantages

NPRDS data reflects the environment and application factors that will be the most similar to those anticipated in future nuclear system designs. The report of engineering data required to be supplied by each program participant will provide the data system with accurate descriptions of components and accurate estimations of component exposure time. The component engineering data breakdown systems and codes appear to be in significant detail. The quarterly Q02 report appears to give sufficient detail on individual part failures to assist the designer in overcoming component weaknesses.

2.3 Evaluation - Disadvantages

The major disadvantage to NPRDS at this time is that because the system is new, few component failures have been reported. At the current rate of component failures and reporting, it is expected to take from 4 to 5 years from this date for the system to collect sufficient data on enough components, particularly those with low failure rates, for the program to be useful for across-the-board nuclear application. The annual reports or component listings do not provide statistics on failure modes and failure mechanisms.

The designer of nuclear systems may have to go elsewhere for maintainability data. Reports on failure-outage duration or system outage are given, but statistics on mean-time-to-repair and the reasons for the length of time have been omitted from this program.

2.4 Availability of Information

The NPRDS is under the auspices of Edison Electric Institute (90 Park Avenue, New York, New York 10016). The program itself is handled under contract by Southwest Research Institute, San Antonio, Texas, under the direction of the ANSI Subcommittee N18-20. Southwest Research has prepared a Reporting Procedures Manual for the NPRDS which includes input format, output format, and necessary codes and categories in order to interpret the resulting reports. There is some indication that nonparticipants may, in the future, be allowed to receive reports on a subscription basis; however, information relating to specifics is not available at this time.

3. FAILURE DATA HANDBOOK FOR NUCLEAR POWER FACILITIES

3.1 Summary

The Liquid Metal Engineering Center (LMEC) published the *Failure Data Handbook for Nuclear Power Facilities* in August 1969 and released a revised edition in June 1970. The handbook is subtitled *A Guide for the Design, Construction and Maintenance of Nuclear Power Plants from a Reliability Improvement Standpoint*.

Data included in the handbook were taken from operating experience on the Experimental Breeder Reactor II (EBR-II) at the National Reactor Testing Station, the Sodium Components Test Installation at LMEC, the Large Components Test Loop at LMEC, the Sodium Reactor Experiment, the Hallam Nuclear Power Facility in Nebraska, and the Enrico Fermi I Atomic Power Plant in Michigan. The latter three facilities contributed data only on sodium and related system component failure events. The handbook was developed in support of the Liquid-Metal Fast Breeder Reactor (LMFBR) Program, but the data should be of significant value on other nuclear projects.

Failure data were obtained from a variety of sources including (1) facility publications (i.e., progress reports, failure reports, incident reports, etc.), (2) maintenance work orders, (3) component history records (4) verbal communications, and (5) other miscellaneous documents.

During the period covered by the data, 1188 malfunctions were recorded over a population of 84 components and subcomponents. The 84 components, for which at least one malfunction was recorded, are given in Table A.1 (Appendix A). Of the 84 components that experienced failures, 30% of the components experienced three failures or less while 25% experienced 16 or more failures.

Each of the 1188 failures is itemized in the handbook with the following information: component/part, system/subsystem, facility, component location, operating conditions, source document, failure cause, failure mode, failure effect, operating hours, method of failure detection, failure description, corrective action, and recommendations.

A summary of failures ("Failure Distribution Functions") for each component type (e.g., valves, such as condensate valve and feedwater valve) is presented. Percentage of failures by (1) plant type, (2) system, (3) component part, (4) cause, (5) mode, and (6) effect is given for each component type. Percent of failures, by cause, mode, and effect is also given for the component class (e.g., valves). Total failures, operating hours, and failure rates are also tabulated by each component/subcomponent type.

A narrative precedes each component data section and summary. This narrative discusses design features, critical characteristics, modes of failure, failure description, control methods, and recommendations.

When necessary, a diagram of the component and its constituent parts is provided.

The handbook also contains a section entitled "System-Oriented Component Failures." One hundred two of the 1188 failures were placed in this category because the cause of failure was more properly described as a source external to the component. Forty six of these were designated as failures due to existing system action. Corrective action for these types of failure would necessitate design changes or modification to systems or components. The remaining 56 failures were caused by (1) improper design of a component which results in the failure of a related component; (2) use of inadequate operating or maintenance procedures; or (3) lack of the necessary protective device or system to assure proper component or system operation. Each type of failure is summarized together with operating hours, number of failures, failure description, corrective action, and recommendations.

Section III of the handbook summarizes sodium leak information which identifies the failed component, the line size associated with the component, the leakage incident, the amount of sodium lost during the leak, the hours of component operation prior to failure, the means by which the leak was detected, and the sources from which the information was gathered. Eighty sodium leaks are covered in this section.

The handbook also contains tutorial sections covering reliability/availability analysis and maintainability. Of particular interest is an extensive and complete bibliography on reliability, maintainability, system effectiveness, statistics, testing, and specifications and standards in reliability, quality assurance, maintainability, safety, human factors, and value engineering.

3.2 Evaluation - Advantages

The in-depth coverage given in this handbook, particularly in areas of failure cause, mode, and effect, is far more comprehensive than any other summary currently available. The user is provided information related to method of failure detection, failure description, corrective action, and recommendations. The recommendations will be particularly helpful in future LMFBR designs. The bibliography is one of the most extensive available, particularly in the area of standards and specifications.

3.3 Evaluation - Disadvantages

The major deficiency of this handbook is the small number of failures from which conclusions must be drawn. With only 1188 failures reported on 84 components, the confidence in failure rates relating to several specific components is low. Table A.1 lists the number of failures reported for each component.

Insufficient data were available on operating hours for 13 classes of subcomponents; therefore, valid calculations of failure rates or mean time between failures are not possible. Mean time between failures for the remaining 71 components/subcomponents have been calculated and, together with the 90% confidence intervals, are listed in Table A.1.

Although the handbook contains tutorial information on maintainability, no quantitative data are available.

3.4 Availability of Handbook

The handbook is distributed by the National Technical Information Service (NTIS), U.S. Department of Commerce (5285 Port Royal Road, Springfield, Virginia 22151). The full title is

*Failure Data Handbook for Nuclear Power Facilities
A Guide for the Design, Construction, and Maintenance
of Nuclear Power Plants from a Reliability Improvement
Standpoint*

Vol. 1: "Failure Data and Applications Technology"
Issued August 15, 1969, revised June 30, 1970

Vol. 2: "Failure Category Identification and Glossary"
June 20, 1969

LMEC - Memo - 67-7

Contract AT (04-3) - 700

Liquid Metal Engineering Center, operated for the USAEC
by Atomic International, A Division of North
American Rockwell Corporation

In requesting the two volumes from NTIS, refer to LMEC - Memo - 67-7.

The handbook also contains tutorial sections covering reliability/availability analysis and maintainability. Of particular interest is an extensive and complete bibliography on reliability, maintainability, system effectiveness, statistics, testing, and specifications and standards in reliability, quality assurance, maintainability, safety, human factors, and value engineering.

4. SYSTEMS RELIABILITY SERVICE DATA BANK

4.1 Summary

The Systems Reliability Service Data Bank (SYREL) is the comprehensive reliability data bank that forms an integral part of the United Kingdom Atomic Energy Authority (UKAEA) Systems Reliability Service. By October 1973 the SYREL Reliability Data Store contained in excess of 3500 reliability data entries on some 900 plant items collected from a wide range of industrial and nuclear plant operating experience and from test procedures carried out by manufacturers and research organizations.

The data bank serves two main purposes: It provides information to its contributors on the performance, availability, and reliability of their own plants; and it provides the generic reliability data required by the design and reliability engineers of associate members of the Systems Reliability Service (SRS). The data bank does not publish periodic summary reports as do other banks summarized herein; however, it does provide data in special reports available to associate members for a fee. The types of data stored in the bank are best described by Fig. 4.1. These data may then be recalled, analyzed, and sorted in a variety of combinations at the request of an associate member. Table 4.1 lists some of the headings under which it is possible to retrieve data. Table B.1 (Appendix B) shows a selection of typical items of reliability data which have been supplied in response to requests from associate members. The categories of component types which may be found currently in the data bank are identified in Table B.2. The number in the parentheses following each category indicates the number of subcategories under each category for which there is data.

There are several ways to obtain generic reliability data from SYREL.

1. An associate member of SRS who is contributing data to SYREL from his plant or who can offer a suitable exchange service is normally entitled to receive generic reliability data at no cost.
2. In the absence of some suitable exchange agreement, associate members may purchase generic reliability data from SYREL at a nominal charge. The actual charge made will depend on the nature of the information required. In general, the direct purchase of data is not encouraged because it departs from the principle of mutuality which is fostered in the club atmosphere of the SRS.
3. All the data used by SRS in the course of a reliability assessment carried out under contract are made available to the customer as a part of the assessment report.

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Please fill-in or tick where applicable where information is known (in RED)
 Calculated data is not necessarily required. (See back for notes)

FAULT MODE (see note 1)			
MANUFACTURER			
ITEM SIZES/DESIGN RATINGS 1 • • / • • 2			
OPERATING RANGE 1 • • 2			
INFORMATION SOURCE (i.e., literature reference, etc)		YEAR	
ITEM DESCRIPTION			
IDENTITY (i.e., makers type No.)			
NUMBER OF ITEMS			
OPERATING TIME/Item		(Mean value)	
DESIGNER (Name of firm)			
NUMBER OF FAULTS			
NO. OF CYCLES OR OPERATIONS/Item		(Mean value)	
USAGE (Electronic circuits)		☐ E. Tubes ☐ T. Solid State ☐ H. Hybrid ☐ Z. Not Applic.	
FAULT CATEGORY		☐ D. Dangerous ☐ S. Safe ☐ T. Spurious trip ☐ Other <u> </u>	
ENVIRONMENT (See note 2)		CLIMATE	TEMPERATURE
		ALTITUDE	VIBRATION
		CORROSION	FUNGUS
		HUMIDITY	
		RADIATION	
		LIFE TEST	
APPLICATION		☐ 1. VERY GOOD (computers) ☐ 2. GOOD (Data Systems) ☐ 3. FAIR (Lab, Control room) ☐ 4. AVERAGE (Industrial) ☐ 5. POOR (Ship, Chemical) ☐ 6. DOUBT (Road, Rail) ☐ 7. PORTABLE (Bench) ☐ 8. SEVERE (Aircraft) ☐ 9. VERY SEVERE (Missile)	
TYPE OF INFORMATION		☐ G. Field data not fully reported ☐ L. Laboratory test data ☐ F. Field data correctly reported ☐ B. Basic data (for prediction) ☐ S. Summarised data ☐ P. Predicted data ☐ C. Inferred or extrapolated data	
ROUTINE MAINTENANCE INTERVAL			
LOCATION (Place of origin of data)			
DESIGN YEAR			
QUALITY		☐ 1. MIL (general) ☐ 2. J.S. (Nato) ☐ 3. DEF ☐ 4. Not Known	
HISTORY TIME/Item		(Time over which collected data applies)	
NO. OF ITEMS & TIME OR CYCLES			
FAILURE RATE		Mean	Lower Upper
CONFIDENCE BAND			
TIME, ETC. FOR BASIS OF CALC.		☐ History ☐ operating time ☐ cycles ☐ single event ☐ length	
DISTRIBUTION		☐ U. Binomial ☐ P. Poisson ☐ E. Exponll. ☐ F. Unknown	
IF FURTHER DATA IS AVAILABLE PLEASE TICK HERE AND ENTER DETAILS ON BACK		☐ Lifetimes ☐ Repair times ☐ Availability ☐ Response times ☐	

Signed

Fig. 4.1. Information for reliability data bank. Source: Systems Reliability Service, United Kingdom Atomic Energy Authority.

Table 4.1. Performance and reliability information obtainable from SYREL

Equipment
1. Mean time between failures
2. Mean time to repair (breakdown)
3. Minimum and maximum repair (breakdown times)
4. Mean time between maintenance
5. Mean time to maintain
6. Minimum and maximum maintenance times
7. Mean man-hours per maintenance
8. Minimum and maximum man-hours per maintenance
9. % reliability (relative to $t = \text{mean time between maintenance}$)
10. % availability = $\left(\frac{\text{operating} + \text{available for operation times}}{\text{total time}} \right)$
11. Number of modifications
12. Mean man-hours (breakdown + maintenance) cost
13. Mean materials/parts cost
14. Operating cost (sum of 12 items and 13)

4.2 Evaluation - Advantages

The SRS data bank was established to generate and disseminate reliability information for industry, government, and others who require a knowledge of or have an interest in reliability and availability statistics. As Fig. 4.2 shows, the data included in the bank are quite comprehensive. The number of components for which at least one data element is available is also quite large.

4.3 Evaluation - Disadvantages

The major disadvantage of the SYREL data bank for users in the United States is its relatively lower availability to most designers. The United States is represented by both NRC and the Reactor Division of Oak Ridge National Laboratory. Other organizations interested in obtaining this data should apply for associate membership with SRS. Another potential disadvantage is the predomination of foreign data that may reflect different environments or the impact of different regulations and policies. SYREL does not publish general summary reports; all reports result from special requests.

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Please fill-in or tick where applicable where information is known (in RED)
Calculated data is not necessarily required. (See back for notes)

FAULT MODE (See note 1)			
MANUFACTURER			
ITEM SIZES/DESIGN RATINGS		1 • • / • • 2	
OPERATING RANGE		1 • • 2	
INFORMATION SOURCE (i.e. Literature reference, etc.)		YEAR	
ITEM DESCRIPTION			
IDENTITY (i.e. Makors type No.)			
NUMBER OF ITEMS			
OPERATING TIME/Item		(Mean value)	
DESIGNER (Name of firm)			
NUMBER OF FAULTS			
NO. OF CYCLES OR OPERATIONS/Item		(Mean value)	
USAGE (Electronic circuits)		☐ E. Tubes ☐ T. Solid State ☐ H. Hybrid ☐ Z. Not Applicable	
FAULT CATEGORY		☐ D. Dangerous ☐ S. Safe ☐ T. Spurious trip ☐ Other: <u> </u>	
ENVIRONMENT (See note 2)		CLIMATE	TEMPERATURE
		ALTITUDE	VIBRATION
		CORROSION	FUNGUS
		LIFE TEST	
APPLICATION		☐ 1. VERY GOOD (computers) ☐ 2. GOOD (Data Systems) ☐ 3. FAIR (Lab, Control room) ☐ 4. AVERAGE (Industrial) ☐ 5. POOR (Ship, Chemical) ☐ 6. MODERATE (Road, Rail) ☐ 7. PORTABLE (Bench) ☐ 8. SEVERE (Aircraft) ☐ 9. VERY SEVERE (Nuclear)	
TYPE OF INFORMATION		☐ G. Field data not fully reported ☐ L. Laboratory test data ☐ F. Field data correctly reported ☐ B. Basic data (for prediction) ☐ S. Summarized data ☐ P. Predicted data ☐ E. Inferred or extrapolated data	
ROUTINE MAINTENANCE INTERVAL			
LOCATION (Place of origin of data)			
DESIGN YEAR			
QUALITY		☐ 1. MIL (general) ☐ 2. J.S. (Mater) ☐ 3. DEF ☐ 4. Not Known	
HISTORY TIME/Item		(Time over which collected data applies)	
NO. OF ITEMS X TIME OR CYCLES			
FAILURE RATE		Mean	Lower Upper
CONFIDENCE BAND			
TIME, ETC. FOR BASIS OF CALC.		☐ history ☐ operating time ☐ cycles ☐ single event ☐ length	
DISTRIBUTION		☐ D. Binomial ☐ P. Poisson ☐ E. Exponential ☐ F. Unknown	
IF FURTHER DATA IS AVAILABLE PLEASE TICK HERE AND ENTER DETAILS ON BACK		☐ Lifetimes ☐ Repair times ☐ Availability ☐ Response times ☐	

Signed

Fig. 4.1. Information for reliability data bank. Source: Systems Reliability Service, United Kingdom Atomic Energy Authority.

Table 4.1. Performance and reliability information
obtainable from SYREL

Equipment
1. Mean time between failures
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3. Minimum and maximum repair (breakdown times)
4. Mean time between maintenance
5. Mean time to maintain
6. Minimum and maximum maintenance times
7. Mean man-hours per maintenance
8. Minimum and maximum man-hours per maintenance
9. % reliability (relative to t = mean time between maintenance)
10. % availability = $\left(\frac{\text{operating} + \text{available for operation times}}{\text{total time}} \right)$
11. Number of modifications
12. Mean man-hours (breakdown + maintenance) cost
13. Mean materials/parts cost
14. Operating cost (sum of 12 items and 13)

4.2 Evaluation - Advantages

The SRS data bank was established to generate and disseminate reliability information for industry, government, and others who require a knowledge of or have an interest in reliability and availability statistics. As Fig. 4.2 shows, the data included in the bank are quite comprehensive. The number of components for which at least one data element is available is also quite large.

4.3 Evaluation - Disadvantages

The major disadvantage of the SYREL data bank for users in the United States is its relatively lower availability to most designers. The United States is represented by both NRC and the Reactor Division of Oak Ridge National Laboratory. Other organizations interested in obtaining this data should apply for association with SRS. Another potential disadvantage is the predomination of foreign data that may reflect different environments or the impact of different regulations and policies. SYREL does not publish general summary reports; all reports result from special requests.

4.4 Availability of Data

Information relating to membership should be directed to

Systems Reliability Service
UKAEA
Wigshaw Lane
Culcheth, Warrington, Lancashire, WA34NE
United Kingdom

ORNL-DWG 76-17251

Fig. 4.2. Three stages of data collection and preparation in the SRS data bank. Source: Systems Reliability Service, United Kingdom Atomic Energy Authority.

5. REACTOR SAFETY STUDY (WASH-1400) - APPENDIX III, "FAILURE DATA"

5.1 Summary

The draft version of WASH-1400, *Reactor Safety Study - An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants*, was published in August 1974 by the U.S. Atomic Energy Commission. Appendix III, "Failure Data," describes the methodology used to obtain the failure rates and repair times necessary as inputs to system models developed for the WASH-1400 study (Rasmussen Study). The failure rates used in the study were derived from reference handbooks, reports, operating experience, and nuclear power plant experience.

Because the goal of WASH-1400 was risk analysis, as opposed to reliability analysis, the authors chose not to use point estimates as has been done in most other data summaries and analyses. Instead, a range of values was determined so that the true value would have a high probability of falling within the range. One of the reasons the range approach was chosen was because of the inadequacy of available pertinent data. The authors also contend that this approach incorporates uncertainties and variations due to the use of different reporting sources, variations in application, fluctuations in the daily operation and environmental conditions, and variations that can exist from one component to another. The authors also point out that the range approach is flexible and general, yielding narrow ranges where there is more accurate knowledge or little variation and yielding wider ranges where there is less resolution or less constancy of behavior. The final assessments are one or two orders of magnitude in width consistent with the resolution of the source data. The source data used in the range assessment were diverse and represented a spectrum of conditions and applications. Included as data sources were SYREL and GIDEP, which are described in other sections of this report.

Tables C.1, C.2, and C.3 (Appendix C) have been extracted from WASH-1400, Appendix III, in order to summarize the data found therein. Table C.1 is a summary of assessments for mechanical equipment while Table C.2 is concerned with electrical equipment. The tables contain the assessed ranges for the data, the median value of the range, and the error factor as compared with current nuclear experience. The range represents a 90% likelihood, or confidence level, associated with the log normal. The median is a reference value for the range, there is a 50-50 chance that the true value is either higher or lower than the median value. The error factor is the limit of the range divided by the median value. Nuclear data statistics were derived from 1972 commercial reactor experience. Units for the data are probability per demand, d, or per hour.

Failure mode frequency is expressed as failure rates or demand probabilities. Operating failure rates, λ , are provided for those components which are required to operate or function for a period of time. Standby failure rates, λ_s , are provided for those passive-type devices, such as pipes and wires, that are normally dormant or in standby until they are

tested or an accident occurs. Finally, for those components that are required to start, change state, or function at the time of the accident, the probability that the device will fail to operate upon demand is given. These demand probabilities, denoted by Q_d , incorporate contributions from failure at demand, failure before demand, as well as failure to continue operation for a sufficient period of time for successful response to the need.

Except for pumps, the applicable environment consists of standard operational power plant conditions. The ranges cover variations that can occur in these environments. Pump data (failure to run, given successful start) was assessed in light of extreme temperature and pressure conditions characterizing a severe accident.

Table C.3 compares the assessed ranges with the raw input values extracted from various sources. These sources are further identified in Appendix III of WASH-1400.

Appendix III of WASH-1400 also includes notes on various considerations used in deriving data shown in the aforementioned tables, test time, human reliability analysis, aircraft crash probabilities, failure data, total loss of electric power, one-line summaries of the failures relating to 1972 operating incidents, nuclear plant reliability experience during 1972 which included approximately 700 failures and anomalies, and a discussion on common mode failures.

5.2 Evaluation - Advantages

This is a recent data evaluation and the only one that attempts to present data specifically for boiling water reactor and pressurized water reactor environments. It recognizes the importance of failure mode data, standby failure rates, and demand probabilities. The one-line summaries of the 1972 operating incidents are of interest. The analysis of test and maintenance time of nuclear components is also unique to this report. It is the only source that provides a point estimate (computational median) and a range assessment.

5.3 Evaluation - Disadvantages

WASH-1400 provides data ranges for less than 30 component types. These ranges are predictions for a general generic type and do not differentiate between various devices that may fall within the generic type. This is recognized by the authors themselves who stated "this data may not be sufficiently detailed, general, or accurate enough for use in other quantitative reliability models or in applications involving greater specificity." Component descriptions are, for the most part, too general to use their corresponding failure rates for reliability analyses of more detail than risk assessment.

The data sources from which WASH-1400 extracted information should be considered. For example, the AVCO report was published in 1962 and was based on data observed in the mid 1950s and on design emanating from the 1940s. Some European sources appear to have used identical data sources. Any conclusion based on the distribution within a given range assessment could, therefore, be in error. The basic report states that, based on the assessment by specialists, "component failure rates and their uncertainties were increased as deemed warranted." Finally, the derivation of standby failure rates and demand probabilities based on source data is not explained.

5.4 Availability of WASH-1400

WASH-1400-(Draft) is distributed in both microfiche and hard copy by National Technical Information Service (NTIS), U.S. Department of Commerce (5285 Port Royal Road, Springfield, Virginia 22151). The full title is

Reactor Safety Study
An Assessment of Accident Risks in U.S. Commercial
Nuclear Power Plants
 United States Nuclear Regulatory Commission
 October 1975

The Reactor Safety Study report has ten appendixes. Appendix III, "Failure Data," can stand alone as a data source.

6. NAVAL SHIP ENGINEERING CENTER
RELIABILITY/MAINTAINABILITY/AVAILABILITY DESIGN
DATA BANK REPORT

6.1 Summary

The Naval Ship Engineering Center Reliability/Maintainability/Availability (NAVSEC RMA) Design Data Bank Report provides a summary listing of two major categories of equipment: hull, mechanical and electrical (HME), and electronic naval shipboard equipment. A data listing entitled "RMA Summary Printout" is a standard product of the data bank and is produced automatically whenever the design data bank report is updated. Data relating to electronic equipment pertains to very few components of interest to the nuclear community; the discussion therefore refers primarily to the HME data.

The RMA Summary Printout for HME equipment contains over 600 entries. The data is derived predominantly from observed shipboard operations. These inputs are usually extracted from analysis reports performed either by the Navy or one of its contractors. Sources are identified. The majority of the data is from the 1967 to 1969 operational time period. Data are presented at the equipment level. Data at the component level, for example, seals, valves, relays, and circuit breakers, are not currently available. Table 6.1 gives an indication of the types of equipment, both HME and electronic, that are included in the design data bank report. Each of the more than 600 HME listings is unique either because of equipment nomenclatures, characteristics (e.g., horsepower), application, or source.

The RMA Summary Printout includes the following data elements:

1. equipment name and general description,
2. type of ship upon which the data were observed,
3. calendar time over which the data were collected,
4. number of failures used to generate the figure of merit,
5. mean time between failure reported and listed by the following priority: observed, measured, predicted, and specified.
6. number of corrective actions including failures that were reported,
7. mean time to repair (arithmetic) reported by the activity and listed by the following priority: observed, measured, predicted, and specified,
8. data source.

Appendix D is a reproduction of the HME Section of the 1975 revision of the "RMA Summary Printout" of the NAVSEC Design Data Bank Report.

Table 6.1. Component identification number locator

00 ORDNANCE	53 CAPSTANS
1 PUMPS	54 PRINTING EQUIPMENT
2 BOILERS	55 REELS & TOWING EQUIPMENT
3 HEAT EXCHANGERS	56 DAVITS
4 CONDENSERS	57 CRANES
5 TURBINES	58 HOISTS & AMMUNITION HANDLING EQUIP.
6 COMPRESSORS	59 ELEVATORS
7 HEATERS	60 STEERING GEARS
8 DISTILLING PLANTS	61 CONTROL EQUIP-CONSTANT FREQUENCY
9 BATTERY CHARGERS	CONTROLS - AMFLIDYNE
10 METERS	CONTROLS - ELECTRICAL
11 CONVERTERS	CONTROLS - MECHANICAL
12 MAINTENANCE & REPAIR SHOP EQUIPMENT	CONTROLS - ROTOTROL
13 TRANSFORMERS	CONTROLS - SELF SYNCHRONOUS
14 CIRCUIT BREAKERS	62 WINCHES
15 CONTROLLERS	63 WINDLASSES
16 GENERATORS	64 FIRE FIGHTING EQUIPMENT
17 MOTORS	65 LUBRICATORS
18 MOTOR GENERATORS	66 ENGINES
19 RELAYS	67 PLUMBING EQUIPMENT
20 RHEOSTATS	68 MAGNETOS
21 SWITCHES	69 GEARS
22 SWITCHBOARDS	70 GOVERNORS
23 ALARMS & SIGNALING DEVICES-VISUAL	71 IGNITION EQUIPMENT
24 LIGHTING FIXTURES & LAMP (ELECT-NON ELECT)	72 MINOR LANDING CRAFT & SMALL BOATS
25 GYRO COMPASS EQUIPMENT	73 EJECTORS
26 PROJECTION EQUIPMENT	74 EDUCATORS
27 INTERIOR COMMUNICATION EQUIPMENT	75 STRAINERS
28 NAVIGATIONAL EQUIPMENT (also TIME- PIECES)	76 PURIFIERS
29 INJECTORS	77 TRAPS
30 BURNERS	78 CCUPLINGS
31 MARINE HARDWARE & HULL ITEMS	79 SILENCING EQUIPMENT
32 REFRIGERATION EQUIPMENT	80 BRAKES
33 AIR CONDITIONING EQUIPMENT	81 BLOWERS
34 STARTERS	82 WELDING SYSTEMS
35 WIPERS	83 SHIP & BOAT PROPULSION COMPONENTS
36 ALARMS & SIGNALING DEVICES-AUDIBLE	84 SICK-BAY EQUIPMENT
37 BEARINGS	85 DECK MACHINERY
38 INDICATORS	86 PHOTOGRAPHIC EQUIPMENT
39 CLUTCHES	87 UNDERWATER LOG EQUIPMENT
40 FANS	88 VALVES
41 SHOP EQUIPMENT	89 FIRE FIGHTING RESCUE & SAFETY EQUIP.
42 REGULATORS	90 RIGGING & RIGGING GEAR (BOOMS, ETC.)
43 GALLEY EQUIPMENT	91 LAUNDRY EQUIPMENT
44 DEHUMIDIFICATION EQUIPMENT	92 TANKS
45 CAGES	93 PIPE, TUBING, HOSE & FITTINGS (METAL & FLEXIBLE)
46 TESTING & MEASURING EQUIPMENT	94 ASW & MINESWEEPING EQUIPMENT
47 CHEMICAL WARFARE EQUIPMENT	95 AUTOMOTIVE & CONSTRUCTION EQUIPMENT
48 FILTERS	96 CONSTRUCTION EQUIPMENT
49 CARBURETORS	97 PERISCOPES & MAST
50 PANELS	98 SPECIAL POWER PLANT EQUIPMENT
51 ISOLATORS	99 MISCELLANEOUS EQUIPMENT
52 HYDRAULIC EQUIPMENT	

6.2 Evaluation - Advantages

The NAVSEC data bank (HME portions) provides data heretofore unavailable on heavy machinery. The data can be traced to specific applications and provides both mean-time-to-failure and mean-time-between-corrective actions. Relatively narrow confidence bands can be established due to the large number of observations for most entries. The NAVSEC data bank provides maintainability information that relates to total active repair time.

6.3 Evaluation - Disadvantages

Although this data bank is one of the few sources of machinery reliability and maintainability data, the data is not from a nuclear environment or even a utility environment. The data bank does not include failure mode information. The current version of the data bank concentrates primarily on the data observed from 1967 to 1969 and, therefore, may not relate to the state-of-the-art.

6.4 Availability of Data Bank Report

The NAVSEC Design Data Bank Report and other special printouts may be obtained by non-Navy branches of the government and their respective contractors by writing to

Commander
Naval Ship Engineering Center
Hyattsville, Maryland 20782
Attention: Code 6112

7. NON-ELECTRONIC RELIABILITY NOTEBOOK

7.1 Summary

The USAF Rome Air Development Center (RADC) has sponsored efforts in the area of nonelectronic reliability data for the past decade. These efforts culminated in the RADC Non-Electronic Reliability Notebook. The latest revision of the data section (Sect. 2, "Part Failure Data") was released in January 1975. It was prepared under contract by the Orlando Division of Martin Marietta Aerospace Corporation. Failure rate data are given for approximately 300 types of components and parts. Table E.1 (Appendix E) identifies these devices.

The data presented were taken from military operating and test experience in a variety of dormant, ground, submarine, shipboard, airborne, helicopter, missile, and satellite applications. Some failure rates were derived through the synthesis of similar generic part types. Other data were extracted from other data collection programs such as GIDEP.

Failure rate data for each part type are arranged by environmental application and are interpreted in failures per million hours or per million part cycles. If the data upon which the failure rate is based contain one or more failures, values for the two-sided 90% confidence limits associated with the point estimates are also given. Failure rates based on data where zero failures were experienced were derived using the upper 60% confidence level and are so indicated.

A list of environmental K factors is given with each component failure data summary sheet. These K factors are intended to indicate the difference caused by the environmental stress on a given part type.

7.2 Evaluation - Advantages

The RADC Non-Electronic Reliability Notebook covers over 300 component part types in a variety of environments. It is the only publication of its kind with a coverage this broad and with reporting depth that results in a narrow confidence interval at 90% confidence. It is one of the few sources that provides environmental factors. The inclusion of failure rates for items without recorded failures is a unique feature as is the insight with respect to the impact of the environment.

7.3 Evaluation - Disadvantages

The major disadvantage of this data source is that no data from the nuclear industry are included. Specific data sources, for example, type of system, are not given. The notebook does not provide failure cause, mode, or effect data, nor does it provide maintainability data. Finally, no design recommendations or corrective action data are available.

7.4 Availability of Notebook

The notebook is distributed by the National Technical Information Service (NTIS), U.S. Department of Commerce (5285 Port Royal Road, Springfield, Virginia 22151). The full title is

RADC Non-Electronic Reliability Notebook
RADC - Tr - 69 - 458

D. F. Cottrell, T. K. Gagnier, E. W. Kimball,
T. W. Kirejczyk, et al.
Martin Marietta Aerospace

In requesting the notebook from NTIS, refer to NTIS #A062899.

8. GOVERNMENT/INDUSTRY DATA EXCHANGE PROGRAM FAILURE RATE DATA BANK

8.1 Summary

The Government/Industry Data Exchange Program (GIDEP) Failure Rate Data Bank consists of two major sections: a computer data storage and retrieval system and a backup microfilm bank file.

The computer data storage and retrieval system is used for the standard failure rate and replacement rate data listings, special calculations, and searches. This data bank system has been established to facilitate remote terminal access compatible with the GIDEP remote terminal programs.

The microfilm data bank file is used for storage and distribution of source documents, failure analysis curves, methods used in the collection of the data, additional information too extensive to include in the computer data bank, and other comments. The microfilm is available on request.

GIDEP operates according to a chartered agreement of the joint commanders of the Army Material Command, Air Force Logistics Command, and Air Force Systems Command. The program is administered through the Department of the Navy. GIDEP has over 400 participants of which approximately 80% are industrial organizations. The program enjoys a good participation by the nuclear industry and national laboratories.

Table F.1 (Appendix F) shows the major classifications of the GIDEP generic code and will give the reader an indication of the coverage available in the GIDEP program. GIDEP publishes two documents of particular interest here: *Summaries of Failure Rate Data* and *Summaries of Replacement Rate Data*. The failure rate data summary includes the following information:

1. item name
2. participant code
3. item identification number
4. vendor
5. observed environment
6. application
7. stress level (stress ratio, temperature, mechanical stress)
8. screening class (the extent to which items were screened prior to their installation or testing)
9. observation period
10. mean repair time
11. number of failures
12. number of items
13. duration (total item experience)
14. failure rate per million units of measure

When known, failure mode information is included in the data summary listings as a subline to the listed line entry. Only the predominant failure modes (generally the top three) are included. The number following the failure mode is the number of failures attributed to that mode.

Included in the data summary listings are group means with 60% confidence intervals about the group means. Each confidence interval is computed by using a nonparametric normal distribution around the mean time to failure from the group data. If fewer than five line entries or fifteen failures were included in the group or the data were too variable, a confidence level is not computed. Where no failures occurred, 0.91 failures were assumed for calculating and showing a failure rate in the tabulated data. Failure rates calculated by this method are preceded by a less than (<) symbol. This method provides an upper 60% confidence failure rate.

The replacement rate data summary contains essentially the same information for replacements as opposed to failures.

8.2 Evaluation - Advantages

The GIDEP Failure Rate Data Interchange is a readily available source for failure rates of a wide variety of items. A review of the data summary indicates that nuclear participants are providing some data. The inclusion of failure mode information and failure rates for non-failed components are definite assets.

8.3 Evaluation - Disadvantages

Because GIDEP is a voluntary system, the quality of data appears to vary significantly between participants' inputs. But because the source can be determined, it is assumed that the quality of inputs can be verified.

Another disadvantage is in the "observed environment" category. Nine categories are listed; however, only one applies to the nuclear industry - "ground, fixed."

Finally, design recommendations for corrective action are not given and could not be expected because of the large number of data entries and participants.

8.4 Availability of Summaries

Summaries are available to all participants. Further information on participation and publications may be obtained from:

Failure Rate Data Interchange
Government/Industry Data Exchange Program
Fleet Missile Systems Analysis and Evaluation Group
Corona, California 91720
Telephone (714) 736-4677

Appendix A

LIQUID METAL ENGINEERING CENTER (LMEC) DATA

Table A.1. Components and subcomponents covered by the failure data handbook for nuclear power facilities

System component/subcomponent	Number of failures	Observed MTBF	MTBF interval at lower limit	90% confidence upper limit
Chemical system components				
demineralizers	6	2,940	1,675	6,700
Containment system components/subcomponents				
Airlocks - equipment	4	4,170	2,170	12,100
Airlocks - personnel	6	1,300	1,880	7,660
Airlocks - emergency	2	7,140	1,000	40,400
Fuel-handling hoists	8	6,000	1,660	12,000
Shielding	9	5,100	5,600	17,400
Vessel internals (removable)	8	5,000	1,050	10,000
Tanks - sodium	6	8,500	4,750	19,000
Tanks - condensate and water	1	5,600	2,670	20,400
Electrical system components				
Motor generator sets	14	11,000	22,700	54,700
Generators, emergency diesel	4	610	520	1,780
Heaters, resistance	16	8,000	5,520	12,700
Heaters, induction	10	6,700	4,200	12,200
Motors, electric (200 hp)	14	8,000	5,440	13,500
Motors, electric (200 hp)	20	8,000	5,760	12,100
Relays	7	9,100	5,360	19,400
Circuit breakers	14	3,200	2,190	5,100
Transformers	4	3,600	1,890	10,500
Power switch gear	2	9,500	4,000	53,800
Turbine generators (generator side)	10	12,500	7,900	22,875
Energy conversion (mechanical) system components				
Furnace equipment	6	9,500	5,440	21,700
Turbines, steam	4	5,260	2,740	15,300
Motors, pneumatic	1	4,550	1,550	88,000
Transmissions and drive shafts	60	8,000	6,280	10,000
Turbine generator (turbine side)	3	9,800	4,705	35,900
Valve operators	48	5,000	4,000	6,450
Fuel-handling and core components				
Fuel and breeder elements	19	20,000	11,400	30,400
Fuel-handling equipment (liquid-metal, internal)	1	13,300	6,400	48,800
Heat-transfer system components				
Fans	5	8,000	4,500	21,500
Blowers	11	6,700	4,300	11,900
Cold trap	8	4,500	2,770	9,090
Hot trap	1	2,400	830	47,300

Table A.1 (continued)

System component/subcomponent	Number of failures	Observed MTBF	MTBF interval at lower limit	90% confidence upper limit
Turbine lube-oil cooler	1	8,000	2,720	155,000
Desuperheater	9	3,850	2,380	7,300
Feedwater heater	3	5,600	2,670	20,350
Filter, sodium	1		Component operating hours not available	
Filter, miscellaneous	3	10,000	4,800	36,600
Strainer	2	8,000	3,360	45,200
Intermediate heat exchanger	2	31,300	13,100	177,000
Piping, sodium vapor and inert gas	5		Component operating hours not available	
Piping, sodium	12		Component operating hours not available	
Piping, steam	6		Component operating hours not available	
Piping, water	7		Component operating hours not available	
Piping, miscellaneous	6		Component operating hours not available	
Piping, supports (sodium)	5	9,500	5,140	24,600
Pumps, condensate	10	6,250	3,970	11,400
Pumps, feedwater	40	2,200	1,710	2,200
Pumps, sodium-centrifugal, free surface	80	9,100	7,730	9,100
Pumps, sodium EM	39	4,000	3,120	5,320
Pumps, sodium-freeze seal	21	25,000	18,250	37,300
Pumps, miscellaneous	10	3,100	3,100	1,950
Rupture discs	2	3,200	1,350	18,200
Generators, steam	49		Component operating hours not available	
Traps, sodium freeze	35	25,000	18,000	33,750
Traps, sodium vapor	23	4,200	2,790	6,125
Traps, steam	4	2,600	1,370	7,600
Valves, feedwater	50		Component operating hours not available	
Valves, steam	44		Component operating hours not available	
Valves, miscellaneous	41		Component operating hours not available	
Valves, condensate	10		Component operating hours not available	
Valves, circulating water	21		Component operating hours not available	
Valves, sodium	122		Component operating hours not available	
Instrumentation and control components				
Dryers, air	2	4,700	2,000	26,900
Alarm, sodium level	2	4,700	1,950	26,300
Compressors	41	5,000	3,980	6,100
Safety rod	3	5,300	2,570	19,600
Controllers-electrical-electronic	21	4,800	3,480	7,100
Controllers-mechanical	4	25,000	13,000	72,500
Controllers-pneumatic	1		Component operating hours not available	
Indicators and recorders (electronic)	12	10,000	6,600	17,300
Indicators and recorders (mechanical)	2	14,300	6,000	80,700
Indicators and recorders (pneumatic)	2	3,600	1,500	20,200

Table A.1 (continued)

System component/subcomponent	Number of failures	Observed MTBF	MTBF interval at lower limit	90% confidence upper limit
Indicators and recorders (sight glass)	55	3,400	2,750	4,310
Indicators and recorders (steam)	3	3,500	1,685	12,900
Relays, instrumentation	2	3,600	1,530	20,600
Neutron source	1	8,000	2,720	155,000
Sensors, temperature	3	6,700	3,200	24,400
Sensors, pressure	11	5,600	3,610	9,900
Sensors, reluctance and conductivity	3	11,100	5,330	40,700
Sensors, neutron monitor source	4	4,900	2,540	14,100
Sensors, fission gas monitor	2	16,700	7,000	94,000
Wiring, power	9	11,100	6,890	21,000
Wiring, signal	3	16,700	8,000	61,000
Connectors	2	9,100	3,820	51,000

Appendix B

SYSTEMS RELIABILITY SERVICE DATA BANK (SVREL) DATA

Table B.1. Examples of reliability data from SYREL data bank

Boiler feed pumps

Manufacturer	A	B
Size	7000 hp	6000 hp
Operating pressure	2500 psig	2500 psig
Population	6	10
History time	3 1/2 years	5.1 years
Failure rate	6 faults per pump per year	4 faults per pump per year

Industrial gas turbine

Application	Average industrial
Range/size/power	6400 hp
Information type	Field, correctly reported
Data year	1970
Failure rate of fuel control unit of the gas turbine -	
Number of items	3
Items x operating time	20 item-years
Number of faults	2
Failure rate (mean) (based on operating time)	11.4 faults/10 ⁶ hr
Lower limit	1.38 faults/10 ⁶ hr
Upper limit	41.2 faults/10 ⁶ hr
Confidence band	95%

Electric motors

Description	Three-phase motor for feed pump, frequency 60 cps, 26 hp, 415 V
Manufacturer	X
Location	Y
Number of items	12
Mean operating time	2.28 years
Sample size (operating time)	27.4 item-years
Mean history time	10 years
Number of faults	2
Mean failure rate (operating time)	8.33 faults/10 ⁶ hr
Upper failure rate (operating time)	30.1 faults/10 ⁶ hr
Lower failure rate (operating time)	1.01 faults/10 ⁶ hr
Confidence band	95%
Distribution	Poisson
Application	Average industrial
Information type	Field, correctly reported

Nuclear reactor period meter with trip facility

Location	X
Manufacturer	C
Identity	NE035-01
History time	26,000 hr
Mean operating time	11,400 hr
items x time	205,000 item-hr
Number of items	18
Number of faults	22
Operating failure rate	
Mean value	107 faults/10 ⁶ hr
Lower confidence limit	67 faults/10 ⁶ hr
Upper confidence limit	162 faults/10 ⁶ hr
Confidence band	95%
Distribution assumed	Exponential

Table B.1 (continued)

Transistor, silicon, pnp, planar

Manufacturer	D
Identity	MM2712
History time	12,600 hr
Mean operating time	2,160 hr
Number of items	1088
Number of faults	9
Items x time	2,350,000 item-hr
Operating failure rate	
Mean value	3.82 faults/ 10^6 hr
Lower confidence limit	1.75 faults/ 10^6 hr
Upper confidence limit	7.28 faults/ 10^6 hr
Confidence band	95%
Distribution assumed	Exponential

Diode, rectifier, silicon

Manufacturer	G
Identity	ZS701
History time	11,300 hr
Mean operating time	1980 hr
Number of items	1440
Number of faults	1
Items x operating time	2,800,000 item-hr
Operating failure rate	0.357 faults/ 10^6 hr (mean)

Table 8.2. SYREL Reliability Data Store (items for which there is at least one reliability entry in the data store)²

Absorbers (1)	Light sources, electrical (8)
Accelerometers (1)	Lines, overhead transmission (2)
Accumulators (1)	Mechanical parts (9)
Actuators (1)	Mechanisms and machines (5)
Amplifiers (6)	Mechanisms, power transmittal (9)
Antennae (1)	Microelectronic circuits (10)
Attaching methods and materials (6)	Modules (other than microelectronic circuits) (1)
Audio devices (3)	Motors and motor generators (10)
Batteries (2)	Networks (2)
Bearings (5)	Mounts, resilient (2)
Bellows (3)	Nuclear reactors (1)
Blowers and fans (1)	Orifices (7)
Boards, printed circuit (1)	Oscillators (2)
Capacitors, fixed (17)	Power supplies, electrical rotating (7)
Capacitors, variable (4)	Power supplies, electrical nonrotating (4)
Circuit breakers, power (1)	Pumps and hydraulic motors (20)
Coils, inductance, fixed (8)	Radar equipment and components (1)
Computer and recording elements (3)	Reactors, electrical (1)
Connectors, electrical (12)	Recorders (assemblies only) (1)
Conveyors (1)	Regulators, electrical (3)
Control boards and panels (1)	Regulators, fluid (8)
Counters (4)	Relays (20)
Crystals (1)	Resistors, fixed (33)
Delay lines (3)	Resistors, variable (21)
Electrical instruments (precision) (1)	Semiconductors, diode (30)
Electron tubes (51)	Semiconductors, transistors (31)
Fasteners (1)	Shields and shielding (3)
Ferrites and ferrite devices (1)	Solenoids (2)
Filters, electrical (1)	Steam raising plant (2)
Filters, nonelectrical (5)	Switches (33)
Fittings, tubing and hose (8)	Synchros (including resolvers) (2)
Fuses and circuit protective devices (6)	Tanks and tank parts (5)
Gaskets and seals (8)	Telephone equipment (9)
Gyros (3)	Thermocouples (1)
Hardware (15)	Timers and programmers (5)
Heat exchangers (2)	Transducers (24)
Heaters, nonelectrical (1)	Transformers (17)
Heaters, electrical (2)	Ducting (1)
Hose (3)	Turbines and turbine parts (23)
Ignition parts and explosives (3)	Valves (49)
Instruments and controls (33)	Waveguide and microwave (8)
Instruments, nuclear applications (23)	Wire, cables and harnesses (4)
Inverters/converters (not power supply) (2)	
Industrial machinery-crushing (1)	
Internal combustion engines (reciprocating) (6)	

²Numbers in parentheses indicate the number of subcategories under each component type; for example, valve (5) indicates bleed, bypass, check, check air media, check water media.

Appendix C

WASH-1400 SUMMARY DATA

Table C.1. Summary of assessments for mechanical hardware and comparison with nuclear experience

Components	Failure mode	Assessed range on probability of occurrence	Computational median	Error factor	Nuclear experience
Pumps (includes driver)	Failure to start on Demand, $(1)Q_d$:	3×10^{-4} to $3 \times 10^{-3}/d$	$1 \times 10^{-3}/d$	3	$1 \times 10^{-3}/d$
	Failure to run, given start, λ_o : (normal environments)	3×10^{-6} to $3 \times 10^{-4}/hr$	$3 \times 10^{-5}/hr$	10	$3 \times 10^{-6}/hr$
	Failure to run, given start, λ_o : (extreme, post accident environments inside containment)	1×10^{-4} to $1 \times 10^{-2}/hr$	$1 \times 10^{-3}/hr$	10	-
	Failure to run, given start, λ_o : (post accident, after environmental recovery)	3×10^{-5} to $3 \times 10^{-3}/hr$	$3 \times 10^{-4}/hr$	10	-
Valves, Motor Operated:	Failure to operate (includes driver), $Q_d(2)$	3×10^{-4} to $3 \times 10^{-3}/d$	$1 \times 10^{-3}/d$	3	$1 \times 10^{-3}/d$
	Failure (3) to remain open (plug) Q_d :	3×10^{-5} to $3 \times 10^{-4}/d$	$1 \times 10^{-4}/d$	3	$3 \times 10^{-5}/d$ (4)
	λ_s :	1×10^{-7} to $1 \times 10^{-6}/hr$	$3 \times 10^{-7}/hr$	5	-

Table C.1 (continued)

Components	Failure mode	Assessed range on probability of occurrence	Computational median	Error factor	Nuclear experience
Valves, Solenoid Operated:	Rupture, λ_s :	1×10^{-9} to $1 \times 10^{-7}/\text{hr}$	$1 \times 10^{-8}/\text{hr}$	10	-
	Failure to operate, Q_d : (2)	3×10^{-4} to $3 \times 10^{-3}/\text{d}$	$1 \times 10^{-3}/\text{d}$	3	$1 \times 10^{-3}/\text{d}$
	Failure to remain open, (plug) Q_d :	3×10^{-3} to $3 \times 10^{-4}/\text{d}$	$1 \times 10^{-4}/\text{d}$	3	$3 \times 10^{-5}/\text{d}$ (4)
Valves, Air-Fluid Operated:	Rupture, λ_s :	1×10^{-9} to $1 \times 10^{-7}/\text{hr}$	$1 \times 10^{-8}/\text{hr}$	10	-
	Failure to operate, (2) Q_d :	1×10^{-4} to $1 \times 10^{-3}/\text{d}$	$3 \times 10^{-4}/\text{d}$	3	$1 \times 10^{-4}/\text{d}$
	Failure to remain open (plug), Q_d :	3×10^{-5} to $3 \times 10^{-4}/\text{d}$	$1 \times 10^{-4}/\text{d}$	3	$3 \times 10^{-5}/\text{d}$ (4)
	λ_s :	1×10^{-7} to $1 \times 10^{-6}/\text{hr}$	$3 \times 10^{-7}/\text{hr}$	3	-
	Rupture, λ_s :	1×10^{-9} to $1 \times 10^{-7}/\text{hr}$	$1 \times 10^{-8}/\text{hr}$	10	-
Check Valves:	Failure to Open, Q_d :	3×10^{-5} to $3 \times 10^{-4}/\text{d}$	$1 \times 10^{-4}/\text{d}$	3	$1 \times 10^{-4}/\text{d}$
	Internal leak, λ_o : (severe)	1×10^{-7} to $1 \times 10^{-6}/\text{hr}$	$3 \times 10^{-7}/\text{hr}$	3	-
	Rupture, λ_s :	1×10^{-9} to $1 \times 10^{-7}/\text{hr}$	$1 \times 10^{-8}/\text{hr}$	10	-
Vacuum Valve:	Failure to Operate, Q_d :	1×10^{-5} to $1 \times 10^{-4}/\text{d}$	$3 \times 10^{-5}/\text{d}$	3	-
Manual Valve:	Failure to remain open (plug) Q_d :	3×10^{-5} to $3 \times 10^{-4}/\text{d}$	$1 \times 10^{-4}/\text{d}$	3	$3 \times 10^{-5}/\text{d}$

Table C.1 (continued)

Components	Failure mode	Assessed range on probability of occurrence	Computational median	Error factor	Nuclear experience
Relief Valves	Rupture, λ_s :	1×10^{-9} to 1×10^{-7} /hr	1×10^{-8} /hr	10	-
	Fails to open, Q_d :	3×10^{-6} to 3×10^{-5} /d	1×10^{-5} /d	3	1×10^{-5} /d
	Premature open, λ_o :	3×10^{-6} to 3×10^{-5} /hr	1×10^{-5} /hr	3	-
Test Valves, Flow Meters, Orifices	Failure to remain open (plug), Q_d :	1×10^{-4} to 1×10^{-3} /d	3×10^{-4} /d	3	-
	Rupture, λ_s ,	1×10^{-9} to 1×10^{-7} /hr	1×10^{-8} /hr	10	-
<u>Pipes</u>					
Pipe $\leq 3"$ dia. per section	Rupture/Plug. λ_s, λ_o	3×10^{-11} to 3×10^{-8} /hr	1×10^{-9} /hr	30	2×10^{-9} /hr
Pipe $> 3"$ dia. per section	Rupture, λ_s, λ_o	3×10^{-12} to 3×10^{-9} /hr	1×10^{-10} /hr	30	1×10^{-10} /hr
Clutch, mechanical	Failure to operate, Q_d : (1)	1×10^{-4} to 1×10^{-3} /d	3×10^{-4} /d	3	3×10^{-4} /d
Scram Rods (single)	Failure to Insert	3×10^{-5} to 3×10^{-4} /d	1×10^{-4} /d	3	-

Table C.1 (continued)

-
- (1) Demand probabilities are based on the presence of proper input control signals. For turbine driven pumps the affect of failures of valves, sensors and other auxiliary hardware may result in significantly higher overall failure rates for turbine driven pump systems. Statistics are given per demand (e.g. $1 \times 10^{-3}/d = 1 \times 10^{-3}$ per demand).
 - (2) Demand probabilities are based on presence of proper input control signals.
 - (3) Plug probabilities are given in demand probability, and per hour rates, since phenomena are generally time dependent, but plugged condition may only be detected upon a demand of the system.
 - (4) Approximated from plugging that was detected.
-

Table C.2. Summary of assessments for electrical equipment and comparison with nuclear experience

Component	Failure mode	Assessed range	Computational median	Error factor	Nuclear experience
Clutch, Electrical	Failure to operate, $*Q_d$:	1×10^{-4} to $1 \times 10^{-3}/d$	$3 \times 10^{-4}/d$	3	-
	Premature disengagement, λ_o :	1×10^{-7} to $1 \times 10^{-5}/hr$	$1 \times 10^{-6}/hr$	10	-
Motors, Electric	Failure to start, $*Q_d$:	1×10^{-4} to $1 \times 10^{-3}/d$	$3 \times 10^{-4}/d$	3	$3 \times 10^{-4}/d$
	Failure to run, given start, λ_o : (normal environment)	3×10^{-6} to $10^{-5}/hr$	$1 \times 10^{-5}/hr$	3	$1 \times 10^{-6}/hr^{(1)}$
	Failure to run, given start, λ_o : (extreme environment)	1×10^{-4} to $1 \times 10^{-2}/hr$	$1 \times 10^{-3}/hr$	10	-
Relays	Failure to energize, $*Q_d$:	3×10^{-5} to $3 \times 10^{-4}/d$	$1 \times 10^{-4}/d$	3	$3 \times 10^{-5}/d$
	Failure of NO contacts to close, given energized, λ_o :	1×10^{-7} to $1 \times 10^{-6}/hr$	$3 \times 10^{-7}/hr$	3	-

Table C.2 (continued)

Component	Failure mode	Assessed range	Computational median	Error factor	Nuclear experience
Relays (Contd)	Failure of NC contacts by opening, given not energized, λ_o :	3×10^{-8} to 3×10^{-7} /hr	1×10^{-7} /hr	3	-
	Short across NO/NC contact, λ_o :	1×10^{-9} to 1×10^{-7} /hr	1×10^{-8} /hr	10	-
	Coil open, λ_o :	1×10^{-8} to 1×10^{-6}	1×10^{-7} /hr	10	-
	Coil Short to power λ_o :	1×10^{-9} to 1×10^{-7} /hr	1×10^{-8} /hr	10	-
Circuit Breakers	Failure to transfer, $*Q_d$:	3×10^{-4} to 3×10^{-3} /d	1×10^{-3} /d	3	1×10^{-3} /d
	Premature transfer, λ_o :	3×10^{-7} to 3×10^{-6} /hr	1×10^{-6} /hr	3	-
<u>Switches</u>					
Limit	Failure to operate, Q_d :	1×10^{-4} to 1×10^{-3} /d	3×10^{-4} /d	3	1×10^{-4} /d
Torque	Failure to operate, Q_d :	3×10^{-5} to 3×10^{-4} /d	1×10^{-4} /d	3	1×10^{-4} /d

Table C.2 (continued)

Component	Failure mode	Assessed range	Computational median	Error factor	Nuclear experience
Pressure	Failure to operate, Q_d :	3×10^{-5} to $3 \times 10^{-4}/d$	$1 \times 10^{-4}/d$	3	$1 \times 10^{-4}/d$
Manual	Failure to transfer, Q_d :	3×10^{-6} to $3 \times 10^{-5}/d$	$1 \times 10^{-5}/d$	3	$3 \times 10^{-5}/d$
Switch Contacts	Failure of NO contacts to close given switch operation, λ_o :	1×10^{-8} to $1 \times 10^{-6}/hr$	$1 \times 10^{-7}/hr$	10	-
	Failure of NC by opening, given no switch operation, λ_o :	3×10^{-9} to $3 \times 10^{-7}/hr$	$3 \times 10^{-8}/hr$	10	-
	Short across NO/NC contact, λ_o :	1×10^{-9} to $1 \times 10^{-7}/hr$	$1 \times 10^{-8}/hr$	10	-
Battery Power Systems (wet cell)	Failure to provide proper output, λ_g :	1×10^{-6} to $1 \times 10^{-5}/hr$	$3 \times 10^{-6}/hr$	3	$3 \times 10^{-7}/hr^{(2)}$
Transformers	Open Circuit primary or secondary, λ_o :	3×10^{-7} to $3 \times 10^{-6}/hr$	$1 \times 10^{-6}/hr$	3	-

Table C.2 (continued)

Component	Failure mode	Assessed range	Computational median	Error factor	Nuclear experience
Transformers (Contd)	Short primary to secondary, λ_o :	3×10^{-7} to $3 \times 10^{-6}/hr$	$1 \times 10^{-6}/hr$	3	-
Solid State Devices Hi power Applications (diodes, transistors, etc.)	Fails to function, λ_o :	3×10^{-7} to $3 \times 10^{-5}/hr$	$3 \times 10^{-6}/hr$	10	$1 \times 10^{-6}/hr$
	Fails shorted, λ_o :	1×10^{-7} to $1 \times 10^{-5}/hr$	$1 \times 10^{-6}/hr$	10	-
Solid State Devices, Lo power Applications	Fails to function, λ_o :	1×10^{-7} to $1 \times 10^{-5}/hr$	$1 \times 10^{-6}/hr$	10	$1 \times 10^{-6}/hr$
	Fails shorted	1×10^{-8} to $1 \times 10^{-6}/hr$	$1 \times 10^{-7}/hr$	10	-
Diesels (complete plant)	Failure to start, Q_d :	1×10^{-2} to $1 \times 10^{-1}/d$	$3 \times 10^{-2}/d$	3	$3 \times 10^{-2}/d$
	Failure to run, emergency conditions, given start, λ_o :	3×10^{-4} to $3 \times 10^{-2}/hr$	$3 \times 10^{-3}/hr$	10	$1 \times 10^{-3}/hr$
Diesels (Engine only)	Failure to run, emergency conditions, given, start λ_o :	3×10^{-5} to $3 \times 10^{-3}/hr$	$3 \times 10^{-4}/hr$	10	-

Table C.2 (continued)

Component	Failure mode	Assessed range	Computational median	Error factor	Nuclear experience
Instrumentation - general (Includes transmitter, amplifier and output device)	Failure to operate, λ_o :	1×10^{-7} to 1×10^{-5} /hr	1×10^{-6} /hr	10	-
	Shift in calibration, λ_o :	3×10^{-6} to 3×10^{-4} /hr	3×10^{-5} /hr	10	-
Fuses	Failure to open, Q_d :	3×10^{-6} to 3×10^{-5} /d	1×10^{-5} /d	3	-
	Premature open, λ_o :	3×10^{-7} to 3×10^{-6} /hr	1×10^{-6} /hr	3	-
Wires (Typical circuits, several joints)	Open circuit, λ_o :	1×10^{-6} to 1×10^{-5}	3×10^{-6} /hr	3	-
	Short: to ground, λ_o :	3×10^{-8} to 3×10^{-6} /hr	3×10^{-7} /hr	10	-
	Short to power, λ_o :	1×10^{-9} to 1×10^{-7} /hr	1×10^{-8} /hr	10	-
Terminal Boards	Open connection, λ_o :	1×10^{-8} to 1×10^{-6} /hr	1×10^{-7} /hr	10	-
	Short to adjacent circuit, λ_o :	1×10^{-9} to 1×10^{-7}	1×10^{-8} /hr	10	-

Table C.2 (continued)

*Demand probabilities are based on presence of proper input control signals. Rates are given per demand.

(1)Derived from combined standby and operated data.

(2)Derived from standby test or batteries, which does not include load.

Table C.3. Comparison of assessed ranges of failure data with raw data from various sources

		ASSEMBLY AND GEAR	LOWER SHEATH AND ROLLER	UPPER SHEATH AND ROLLER	ALLOY	PARADA	LOAF	DAK	COLLIER	MAC	HOLES AND PIPS	PROTECTOR	CHIMNEY AND LIFT AND DOWN	WHEEL AND LIFT AND DOWN	BOILER AND LIFT AND DOWN	WHEEL AND LIFT AND DOWN	DAVIS
FAILURE MODES	Failure To Start	1x10 ⁻³ D	3x10 ⁻³ 3x10 ⁻³	1x10 ⁻³ D	3x10 ⁻³	3x10 ⁻³	3x10 ⁻³	3x10 ⁻³			3x10 ⁻⁶	NA		3x10 ⁻⁵	3x10 ⁻⁶	3x10 ⁻⁶	1x10 ⁻⁶
	Failure To Run - Stalled	3x10 ⁻³ Roll	3x10 ⁻⁶ 3x10 ⁻⁶	3x10 ⁻⁶ Roll	1 3x10 ⁻⁵	3x10 ⁻⁶	1 3x10 ⁻⁶	1x10 ⁻⁵			3x10 ⁻⁶	NA		1 3x10 ⁻⁶	3x10 ⁻⁶	1x10 ⁻⁵	3x10 ⁻⁶
	Failure To Run - Current Off	1x10 ⁻³ Roll	1x10 ⁻⁶ 1x10 ⁻⁶			3x10 ⁻⁶	1x10 ⁻⁶					NA		NA	NA	NA	NA
	Failure To Operate	1x10 ⁻³ D	3x10 ⁻⁶ 3x10 ⁻³	1x10 ⁻³	1x10 ⁻²	2x10 ⁻³	2x10 ⁻²	2x10 ⁻⁶				NA	1x10 ⁻⁷	1x10 ⁻³	3x10 ⁻³	3x10 ⁻³	2x10 ⁻³
	Failure (Roll)	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA
	External Load Or Repairs	1x10 ⁻⁶ Roll	1x10 ⁻⁶ 1x10 ⁻⁷	3x10 ⁻⁶		NA						NA		1x10 ⁻⁶	NA	NA	NA
	Failure (Roll) - Failure To Operate	1x10 ⁻³ D	3x10 ⁻⁶ 3x10 ⁻³	1x10 ⁻³		1x10 ⁻³						NA	2x10 ⁻⁵	3x10 ⁻⁶	NA	NA	NA
	Failure To Operate	3x10 ⁻⁶ D	1x10 ⁻⁶ 1x10 ⁻³	1x10 ⁻⁶	3x10 ⁻⁶	3x10 ⁻⁶						NA	2x10 ⁻²	2x10 ⁻⁶	1x10 ⁻³	3x10 ⁻⁶	2x10 ⁻³
	Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA
	External Load - Repairs	1x10 ⁻⁶ Roll	1x10 ⁻⁶ 1x10 ⁻⁷	3x10 ⁻⁶		NA						NA		1x10 ⁻⁶	NA	NA	NA
	Failure To Operate	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	1x10 ⁻⁶	2x10 ⁻⁵	3x10 ⁻⁵	3x10 ⁻⁵	2x10 ⁻⁶				NA		3x10 ⁻⁵	NA	3x10 ⁻⁵	NA
	Failure (Roll)	3x10 ⁻⁷ Roll	1x10 ⁻⁷ 1x10 ⁻⁶		2x10 ⁻⁷	1x10 ⁻⁶	1x10 ⁻⁷	3x10 ⁻⁷				NA		NA	NA	NA	NA
	External Load - Repairs	1x10 ⁻⁶ Roll	1x10 ⁻⁶ 1x10 ⁻⁷	3x10 ⁻⁶		NA	1x10 ⁻⁶					NA		1x10 ⁻⁶	NA	NA	NA
	Failure To Operate	3x10 ⁻⁵ D	1x10 ⁻⁵ 1x10 ⁻⁶		1x10 ⁻⁵	1x10 ⁻⁶		1x10 ⁻⁵				NA		1x10 ⁻⁵	NA	NA	NA
	Failure (Roll)	1x10 ⁻⁶ Roll	1x10 ⁻⁶ 1x10 ⁻⁷			2x10 ⁻⁶						NA		NA		NA	NA
	Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA
	Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA
	Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA
	Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA
	Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA
	Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA
	Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA
	Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA
	Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
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Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
Failure To Operate	1x10 ⁻⁵ D	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll)	1x10 ⁻⁵ Roll	3x10 ⁻⁶ 3x10 ⁻⁵	1x10 ⁻⁵		3x10 ⁻⁵		1 3x10 ⁻⁵				NA		NA	NA	NA	NA	
Failure (Roll) - Failure To Run - Stalled	1x10 ⁻⁶ D	3x10 ⁻⁵ 3x10 ⁻⁶	3x10 ⁻⁵ D		NA	3x10 ⁻⁶					NA		NA	NA	NA	NA	
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Table C.3 (continued)

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Appendix D

NAVAL SHIP ENGINEERING CENTER (NAVSEC) HME DATA BANK

BLANK PAGE

SWES EIC CUD EQUIPMENT NAME AND GENERAL DESCRIPTION				RMA SUMMARY PRINTOUT (HME)				DATE 18JUN75				PAGE 1	
				SHIP TYPE	DATA SPAN FROM TO	NU. FAIL	MTBF(1)	MTBF(2)	CMAS	MTTR (1)	MTTR (2)	C SGP TEST SKED	US A DSG FROM TO
5140	T406	32	AIR COND/R-12CHM/REFR PLANT/15UT	S30	0767	-0669	29	2580V	0	181	47.1V	0.0	DB
5140	T406	32	AIR COND/R-12CHM/REFR SYS/15UT	CVA	0767	-0669	25	6655V	0	127	26.6V	0.0	DB
5140	T406	32	AIR COND/R-12CHM/REFR PLANT/13T	DE	0767	-0669	12	11088V	0	44	15.8V	0.0	DB
5140	T406	32	AIR COND/R-12CHM/REFR PLANT/16-3T	DDG	0767	-0669	1	64016V	0	1	3.0V	0.0	DB
5140	T406	32	AIR COND/R-12CHM/REFR PLANT/25T	AU	0767	-0669	27	6161V	0	110	22.1V	0.0	DB
5140	T406	32	AIR COND/R-12CHM/REFR PLANT/27T										
5140	T406	32	AIR COND/R-12CHM/REFR PLANT/27T	DLG	0767	-0669	66	6046V	0	220	22.0V	0.0	DB
5140	T406	32	AIR COND/R-12CHM/REFR PLANT/27T	LST	0767	-0669	19	4628V	0	0	11.9V	0.0	XX
5140	T406	32	AIR COND/R-12CHM/REFR PLANT/45T	DLG	0767	-0669	21	6093V	0	50	14.9V	0.0	DB
5140	T406	32	AIR COND/R-12CHM/REFR PLANT/53T	DLG	0767	-0669	58	8364V	0	347	8.3V	0.0	DB
5140	T406	32	AIR COND/R-12CHM/REFR PLANT/53T	LPH	0767	-0669	18	7202V	0	103	20.1V	0.0	DB
5140	T406	32	AIR COND/R-12CHM/REFR SYS	DE	0767	-0669	31	9794V	0	132	10.9V	0.0	DB
5140	T406	32	AIR COND/R-12CHM/REFR SYS/25T	DDG	0767	-0669	76	7564V	0	375	17.0V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	DLG	0767	-0669	2	20461V	0	5	3.8V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	AE	0767	-0669	1	5673V	0	1	14.2V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	AU	0767	-0669	7	7359V	0	14	8.3V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	AFS	0767	-0669	0	12630V	0	1	0.5V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	CVA	0767	-0669	6	77397V	0	1	1.5V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LST	0767	-0669	0	212984V	0	1	8.0V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	AFS	0767	-0669	4	6314V	0	13	4.2V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	DLG	0767	-0669	3	8919V	0	5	5.3V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LSD	0767	-0669	1	90121V	0	2	9.0V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	MSU	0767	-0669	0	52121V	0	1	7.0V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LD	0767	-0669	17	3232V	0	45	3.0V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	AU	0767	-0669	4	19578V	0	5	14.0V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LSD	0767	-0669	5	40057V	0	25	6.2V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LST	0767	-0669	103	18706V	0	257	20.0V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LST	0767	-0669	17	1842V	0	69	2.5V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LPH	0767	-0669	2	67537V	0	17	5.0V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	ATF	0767	-0669	1	50813V	0	3	13.0V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	DDG	0767	-0669	2	6424V	0	2	46.5V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	DDG	0767	-0669	12	1099V	0	44	12.1V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	DLG	0767	-0669	2	12195V	0	2	18.5V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LSD	0767	-0669	5	11373V	0	8	10.8V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LD	0767	-0669	2	31341V	0	4	23.4V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	AS	0767	-0669	2	13190V	0	15	24.1V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LST	0767	-0669	7	1474V	0	40	44.5V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LSD	0767	-0669	51	2824V	0	120	22.5V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LSD	0767	-0669	4	5524V	0	4	20.0V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LSD	0767	-0669	3	21236V	0	13	16.0V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LST	0767	-0669	1	38448V	0	1	0.5V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	LSD	0767	-0669	2	32765V	0	11	3.5V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	AU	0767	-0669	2	48599V	0	6	0.7V	0.0	DB
5140	T406	33	AIR COND PLANT SCNTN/523	AU	0767	-0669	14	4780V	0	84	12.6V	0.0	DB

SNBS	EIC	LID	EQUIPMENT NAME AND GENERAL DESCRIPTION	RMA SUMMARY PRINTOUT (HME)				CMAS	MTTR (1)	DATE MYTH (2)	ABJUNTS C SMP US A OSG	PAGE TEST FROM TO	3 SKED TO		
				SHIP TYPE	DATA FROM	SPAN TO	FAIL MTBF(1)								
5310	TK03	38	CELL/SAL/UM BUDDGPD DSTL	SSB	0767	-0669	3	280427V	0	0	0.7V	0.0	DA	-	
5340	TV01	8	CELL/SALINITY/EXTERNAL HYDRAULICS	SSB	0767	-0669	89	47260V	0	0	0.3V	0.0	DA	-	
5350	TK03	8	CELL/SALINITY/PROPULSION DEMINERALIZER	SSB	0767	-0669	89	47263V	0	0	0.3V	0.0	DA	-	
5330	TK04	3	CLR FC/3.65UFT CLG SUR/PUTH	SSB	0767	-0669	3	280000V	0	0	2.7V	0.0	DA	-	
5140	TK04	3	CLR FC/3356FT CLG SUR/FLEX EQPT CLG	SSB	0767	-0669	1	140296V	0	0	1.0V	0.0	DA	-	
7280	TK04	3	CLR FC/45 SFT CLG SUR/FW/MSC MTGRCLG	SSB	0767	-0669	1	140296V	0	0	1.0V	0.0	DA	-	
5150	TK04	3	CLR/AIR PUR/PUR IN-HULL ATM FCTN	SSB	0767	-0669	0	0	0	0	0.4V	0.0	XX	-	
5150	TK04	3	CLR/AIR PUR/PUR IN-HULL ATM FCTN	SSB	0767	-0669	95	1929V	0	0	0.8V	0.0	DA	-	
5150	TK04	3	CLR/CU2/PUR IN-HULL ATM FCTN	SSB	0767	-0669	3	61092V	0	0	4.7V	0.0	DA	-	
5720	TK04	34	CLNH/VLKT ST/TRAY TYPE/BSLB	LPD	0767	-0669	7	874V	0	13	21.8V	0.0	DB	-	
5720	TK04	34	CLNH/VLKT ST/TRAY TYPE/BSLB	AFS	0767	-0669	51	94V	0	79	3.8V	0.0	DB	-	
5720	TK04	34	CLNH/VLKT ST/TRAY TYPE/BSLB	AFS	0767	-0669	106	30V	0	127	4.9V	0.0	DB	-	
5720	TK04	34	CLNH/VLKT ST/TRAY TYPE/BSLB	DE	DEG	0767	-0669	16	271V	0	32	31.2V	0.0	DB	-
5720	TK04	34	CLNH/VLKT ST/TRAY TYPE/BSLB	AF	0767	-0669	8	1005V	0	15	5.8V	0.0	DB	-	
5720	TK04	34	CLNH/VLKT ST/TRAY TYPE/BSLB	AFS	0767	-0669	204	154V	0	294	4.5V	0.0	DB	-	
5150	TK04	3	CUIL/AFT CLG/R-1154-6/PUR IN-HULL ATM	SSB	0767	-0669	4	36040V	0	0	5.5V	0.0	DA	-	
5140	TK04	32	CUIL/CLG/AIR DUCT TYPE	SSB	0767	-0669	1	999999V	0	0	3.9V	0.0	DA	-	
5310	TK03	4	CUMU/DSTL STM/6 SQFT/8000GPD DSTL PLAN	SSB	0767	-0669	24	3723V	0	0	4.5V	0.0	DA	-	
5310	TK03	4	CUMU/AIR EJECT/PUR 8000GPD DSTL	SSB	0767	-0669	13	6873V	0	0	2.5V	0.0	DA	-	
5150	TK04	61	CUNT BUX/D40374/PUR IN-HULL ATM FCTN	SSB	0767	-0669	9	16018V	0	0	4.7V	0.0	DA	-	
5260	TA01	61	CUNT CRT/DRAIN PHP/TRIM AND DRAIN	SSB	0767	-0669	14	770V	0	0	5.6V	0.0	DA	-	
5640	TA01	61	CUNT CRT/TRIM PHP/TRIM AND DRAIN	SSB	0767	-0669	26	131208V	0	0	2.7V	0.0	DA	-	
5810	TK04	61	CUNT/AMH HNDLS	SSB	0767	-0669	131	136467V	0	0	2.7V	0.0	DA	-	
5560	TV04	15	CUNT/P/O PHP MTR/EXT MYLR	SSB	0767	-0669	40	788V	0	0	7.8V	0.0	DA	-	
3110	4703	15	CUNT/P/O 30-100W ML SET/400HZ PHH	SSB	0767	-0669	1	108000V	0	0	10.8V	0.0	DA	-	
3110	4703	15	CUNT/P/O 30-100W ML SET/400HZ PHH	SSB	0767	-0669	0	260000V	0	0	10.8V	0.0	DA	-	
3110	4703	15	CUNT/P/O 30-100W ML SET/400HZ PHH	SSB	0767	-0669	1	216000V	0	0	10.8V	0.0	DA	-	
5510	TF01	6	CPRSR/HP AIR RCIPG/HIP20CFH300GPD SICLA	CVA	DD	0767	-0669	76	216V	0	165	0.7V	0.0	DB	-
5510	TF01	6	CPRSR/HP AIR RCIPG/HIP20CFH300GPD SICLA	CVA	DDG	0767	-0669	246	114V	0	717	17.9V	0.0	DB	-
5510	TF01	6	CPRSR/HP AIR RCIPG/HIP4CFH300GPD SICLA	AE	AO	0767	-0669	3	483V	0	0	2.7V	0.0	DB	-
5510	TF01	6	CPRSR/HP IP AIR RCIPG/LP100CFH150PSI	DD	DDG	0767	-0669	52	805V	0	157	28.8V	0.0	DB	-
5510	TF01	6	CPRSR/HP IP AIR RCIPG/LP100CFH150PSI	DD	DE	0767	-0669	78	3598V	0	181	14.5V	0.0	DB	-
5510	TF03	6	CPRSR/LP IP AIR RCIPG/LP100CFH150PSI	DD	DEG	0767	-0669	289	2765V	0	809	2.5V	0.0	DB	-
5510	TF03	6	CPRSR/LP IP AIR RCIPG/LP100CFH150PSI	DD	DDG	0767	-0669	5	9354V	0	15	30.1V	0.0	DB	-
5180	TS00	6	CPRSR/REFR/TY N UPN	SSB	0767	-0669	92	1525V	0	0	3.1V	0.0	DA	-	
5310	TK04	6	CPRSR/VAPOR/2000GPD 3LOBE/1200RPM/MAG	SSB	0767	-0669	36	650V	0	0	23.8V	0.0	DA	-	
5310	TF01	6	CPRSR/AIR/HIP/13CFH/450GPD/CL AA	SSB	0767	-0669	310	570V	0	0	0.5V	0.0	DA	-	
5310	TA03	6	CPRSR/AIR BLST BLUM/LP/1300CFH200PSI	LPD	0767	-0669	2	4250V	0	3	4.5V	0.0	DB	-	
5310	TA03	6	CPRSR/AIR BLST BLUM/LP/2200CFH13PSI	SSB	0767	-0669	3	70V	0	3	1.4V	0.0	DB	-	
5310	TA03	6	CPRSR/AIR BLST BLUM/LP/2200CFH13PSI	SSB	0767	-0669	1	535V	0	1	0.5V	0.0	DB	-	
5310	TF03	6	CPRSR/AIR/LP IP RCIPG/90CFH150PSI	AFS	0767	-0669	8	2807V	0	26	23.6V	0.0	DB	-	
5310	TF01	6	CPRSR/HP AIR RCIPG/HIP13.5CFH450GPD	SSB	0767	-0669	113	165V	0	227	14.8V	0.0	DB	-	
5310	TF01	6	CPRSR/HP AIR RCIPG/HIP13.5CFH450GPD	SSB	0767	-0669	32	325V	0	53	6.4V	0.0	DB	-	
5310	TF01	6	CPRSR/HP AIR RCIPG/HIP13.5CFH450GPD	SSB	0767	-0669	232	126V	0	361	9.7V	0.0	DB	-	
5310	TF01	6	CPRSR/HP AIR RCIPG/HIP4CFH300GPD SICLA	AE	AO	0767	-0669	104	919V	0	266	6.1V	0.0	DB	-

SMBS	EIC	CID	EQUIPMENT NAME AND GENERAL DESCRIPTION	SHIP TYPE	RNA SUMMARY PRINTOUT (HME)			MTTR (1)	CHAS (12)	MTBF(11)	MTBF(12)	DATE 18JUN75	PAGE 4
					DATA SPAN	NO.	FAIL						
FROM TO													
5510	TF01	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	AFS	0767	-0669	1	10520V	0	8	2.1V	0.0	DB
5510	TF01	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	DE	0767	-0669	55	383V	0	115	11.4V	0.0	DB
5510	TF01	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	CLG	0767	-0669	AB	337V	0	193	19.1V	0.0	DB
5510	TF01	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	CVA	0767	-0669	9	11677V	0	51	35.0V	0.0	DB
5510	TF01	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	AE	0767	-0669	39	1471V	0	129	4.7V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	ATF	0767	-0669	34	51V	0	58	7.0V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	LSD	0767	-0669	20	4093V	0	45	26.9V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	AD	0767	-0669	6	423V	0	18	12.0V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	LPD	0767	-0669	13	5659V	0	49	27.0V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	MSO	0767	-0669	4	70V	0	17	6.1V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	LST	0767	-0669	45	70V	0	88	19.7V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	MSC	0767	-0669	36	40V	0	69	13.5V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	DUG	0767	-0669	23	393V	0	40	1.0V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	CVA	0767	-0669	53	436V	15	153	16.3V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	AD	0767	-0669	14	2253V	0	32	24.0V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	DEG	0767	-0669	11	4331V	0	30	5.0V	0.0	DB
5510	TF03	6	CPKSR/MP AIR KCIPG/MP10CFM60GOPSIS	ATF	0767	-0669	14	4599V	0	38	21.4V	0.0	DB
5150	T311	6	CPKSR/2STAGE/20LB CU2 PER HR/300NPH	SSB	-	-	0	3273V	0	0	3.2V	0.0	DB
5510	TF03	6	CPKSR/CTFGL/15CFM/85PSI/CONTROL AIR	SSB	0767	-0669	8	17537V	0	0	18.0V	0.0	DB
5820	TM06	53	CPSN/VENT ELEC/MKPG/1SPD/MAX PULL15000	DLG	0767	-0669	1	534V	0	2	0.3V	0.0	DB
5820	TM06	53	CPSN/VENT ELEC/MKPG/1SPD/MAX PULL15000	ATF	0767	-0669	1	3383V	0	3	0.5V	0.0	DB
5820	TM06	53	CPSN/VENT ELEC/MKPG/2SPD/MAX PULL15000	DLG	0767	-0669	1	1037V	0	6	0.1V	0.0	DB
5820	TM06	53	CPSN/VENT ELEC/MKPG/2SPD/MAX PULL15000	LPD	0767	-0669	0	3103V	0	0	0.1V	0.0	DB
5820	TM06	53	CPSN/VENT ELEC/MKPG/1SPD/MAX PULL15000	AFS	0767	-0669	3	167V	0	5	7.3V	0.0	DB
5820	TM06	53	CPSN/VENT ELEC/MKPG/2SPD/MAX PULL15000	LSD	0767	-0669	11	753V	0	44	1.2V	0.0	DB
5820	TM06	53	CPSN/VENT ELEC/MKPG/2SPD/MAX PULL15000	DEG	0767	-0669	0	153V	0	0	1.8V	0.0	DB
2210	FL01	2	CSU/MN ST BLK/1375PSI/430AND560CUFT	DLG	0766	-1267	11	10626V	0	104	16.5V	0.0	DB
5150	T301	99	LTLS HLD/PUR IN-HULL ATM FCN	SSB	0767	-0669	23	6264V	0	0	2.1V	0.0	DB
5930	T700	52	CYL ANL PSTN/MYUN HAM/TRASH DSPL	SSB	0767	-0669	4	5984V	0	0	3.3V	0.0	DB
4250	TR05	97	CYL/MST/MERIS 2/UPRT URT RING	SSB	0767	-0669	4	59973V	0	0	3.3V	0.0	DB
5310	TR04	8	U1STILLER/COULER/DISTILLATE/80G/GPD	SSB	0767	-0669	24	3723V	0	0	4.3V	0.0	DB
5310	TR04	8	U1STILLER/COULER/DISTILLATE/80G/GPD	SSB	0767	-0669	36	650V	0	0	23.8V	0.0	DB
5310	TR04	8	U1STILLER/COULER/DISTILLATE/80G/GPD	SSB	0767	-0669	24	3723V	0	0	4.3V	0.0	DB
5310	TR01	61	U1STILLER/MP BRINE SYS/DCR/PRESSURE	SSB	0767	-0669	4	22336V	0	0	7.3V	0.0	DB
5120	TR08	53	LAPR/OIN/VENT/INTL AIR FLTN	SSB	0767	-0669	5	378576V	0	0	2.1V	0.0	DB
2550	TR06	99	U1KILZ/MP PRPLN/UMIL2D MTR	SSB	0767	-0669	32	32862V	0	0	2.9V	0.0	DB
4250	TR06	97	UP/PEALS 2/UPRT LET RING	SSB	0767	-0669	54	2221V	0	0	6.3V	0.0	DB
5310	TR01	44	DRYER/AIR/THIN TWR/GEN HP AIR FCN	SSB	0767	-0669	230	240V	0	0	0.2V	0.0	DB
5310	TR03	8	U1TL PLANT/LP FLASH/1200G/GPD515UFT	AFS	0767	-0669	16	3157V	0	123	9.1V	0.0	DB
5310	TR03	8	U1TL PLANT/LP FLASH/1200G/GPD515UFT	DLG	0767	-0669	28	4230V	0	194	12.7V	0.0	DB
5310	TR03	8	U1TL PLANT/LP FLASH/1200G/GPD515UFT	DLG	0767	-0669	15	4733V	0	89	7.0V	0.0	DB
5310	TR03	8	U1TL PLANT/LP FLASH/1200G/GPD515UFT	DLG	0767	-0669	16	2134V	0	110	8.7V	0.0	DB
5310	TR03	8	U1TL PLANT/LP FLASH/1200G/GPD515UFT	DLG	0767	-0669	27	4157V	0	384	12.2V	0.0	DB
5310	TR03	8	U1TL PLANT/LP FLASH/1200G/GPD515UFT	DLG	0767	-0669	37	2709V	0	311	12.0V	0.0	DB

RMA SUMMARY PRINTOUT (HME)													DATE 18JUN75		PAGE 5											
SNBS	CIC	CIC	EQUIPMENT NAME AND GENERAL DESCRIPTION										SHIP TYPE	DATA FROM	SPAN TO	NO. FAIL	MTBF(1)	MTBF(2)	CMAS	MTTH (1)	MTTH (2)	US A	USC	SHIP	TEST FROM	SKED TO
5310	TR03	B	USTL PLANT/LP FLASH/12000GPD6935UFT	AL	0767	-0669	12	3876V	0	39	19.5V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT/LP FLASH/12000GPD7685UFT	UDG	0767	-0669	69	2363V	0	576	18.8V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT/LP FLASH/12000GPD7685UFT	ULG	0767	-0669	9	3824V	0	100	9.8V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT/LP FLASH/12000GPD7725UFT	UDG	0767	-0669	10	3843V	0	115	6.6V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT/LP FLASH/20000GPD4025UFT	LSU	0767	-0669	12	7035V	0	61	13.6V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT/LP FLASH/30000GPD4905UFT	LPD	0767	-0669	30	3313V	0	160	2.1V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT/LP FLASH/40000GPD4165UFT66GT	DE	0767	-0669	13	990V	0	54	9.1V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT/LP FLASH/40000GPD270G5UFT	AS	0767	-0669	13	3346V	0	49	25.9V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT/LP FLASH/50000GPD9605UFT	LPM	0767	-0669	10	5191V	0	60	6.9V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT/LP FLASH/80000GPD3485UFT	DEG	0767	-0669	6	3131V	0	22	2.6V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT SUBMG/10000GPD1125UFT2ST	DE	0767	-0669	20	1289V	0	152	16.1V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT VERT BSKT/8000GPD	SSB	0767	-0669	41	2148V	0	324	19.4V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT VERT BSKT/8000GPD1205UFT	SSB SSN	0767	-0669	22	1614V	0	154	13.1V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT VERT BSKT/8000GPD1205UFT	SSB SSN	0767	-0669	29	1332V	0	148	13.5V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT VERT BSKT/8000GPD965UFT	SSB	0767	-0669	25	1970V	0	203	9.9V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR04	B	USTL PLANT/VAPOR CPRSN/2400GPD	ATF	0767	-0669	13	879V	0	60	9.8V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT/LP FLASH/12000GPD3455UFT	-	-	-	0	0	0	0	18.1V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR03	B	USTL PLANT/LP FLASH/12000GPD4725UFT24GT	DE DEG	0767	-0669	7	4924V	0	61	1.5V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR04	B	USTL PLANT/VAPOR CPRSN/2000GPD	SSB SSN	0767	-0669	63	45V	0	266	20.1V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR04	B	USTL PLANT/VAPOR CPRSN/2000GPD2035UFT	SSB SSN	0767	-0669	14	50V	0	74	19.4V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5160	TS03	32	LYMA/RFC ANL PRT NO 7464	SSB	0767	-0669	21	6681V	0	0	2.2V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5160	TF01	44	LYMA/GEN HP AIR FCTN	SSB	0767	-0669	35	8000V	0	0	0.1V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5310	TR01	73	EJCTR ASSY/A1A/140PS1 INZL 1STG USTL	SSB	0767	-0669	13	6073V	0	0	7.5V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5730	TN00	54	ELEV/CRG/ST/CAP 16000LB	AFS	0767	-0669	24	204V	0	57	22.7V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5730	TN00	54	ELEV/CRG/ST/CAP 16000LB	LPD	0767	-0669	3	1818V	0	16	3.3V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5730	TN00	54	ELEV/CRG/ST/CAP 6000LB	AO	0767	-0669	11	782V	0	27	33.2V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
5730	TN00	54	ELEV/CRG/ST/CAP 6000LB	AE	0767	-0669	13	533V	0	62	17.2V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2330	C101	66	ENG/DLSL/PRPLN/1600MP750RPM	LST	0767	-0669	80	3062V	0	431	17.1V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2330	C101	66	ENG/DLSL/PRPLN/900MP750RPM	ATF	0767	-0669	7	7169V	0	22	12.6V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2330	C101	66	ENGINE/DIESLL PRUPULSION/2400MP 650RPM	3601	-7723	-	0	0	0	7	4.0V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2370	3101	66	ENG/DLSL/AUX/127MP1800RPM	MSU	0767	-0669	14	183V	0	56	32.7V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2370	3101	66	ENG/DLSL/AUX/127MP1800RPM	MSC	0767	-0669	31	2974V	0	222	18.3V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2370	3101	66	ENG/DLSL/AUX/143MP1200RPM	LST	0767	-0669	5	2519V	0	25	17.1V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2370	3101	66	ENG/DLSL/AUX/160MP1800RPM	MSC MSU	0767	-0669	32	1367V	0	160	0.7V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2370	3101	66	ENG/DLSL/AUX/211MP900RPM	AO	0767	-0669	7	1182V	0	24	3.7V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2370	3101	66	ENG/DLSL/AUX/450MP1200RPM	LST	0767	-0669	59	2717V	0	415	18.7V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2370	3101	66	ENG/DLSL/AUX/716MP1210RPM	DEG	0767	-0669	4	5937V	0	28	20.6V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
3110	3101	66	ENG/DLSL/GEN UK/716MP1200RPM	DEG	0767	-0669	0	34272V	0	6	30.6V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2330	C101	66	ENG/DLSL/PRPLN/1600MP750RPM	LST	0767	-0669	43	2457V	0	188	13.2V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2330	C101	66	ENG/DLSL/PRPLN/450MP1200RPM	MSC	0767	-0669	22	6344V	0	155	38.4V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2330	C101	66	ENG/DLSL/PRPLN/600MP1200RPM	SSN	0767	-0669	0	2056V	0	3	8.3V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2330	C101	66	ENG/DLSL/PRPLN/896MP750RPM	ATF	0767	-0669	7	3573V	0	13	44.5V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2330	C101	66	ENG/DLSL/PRPLN/900MP744RPM	LST	0767	-0669	17	1334V	0	65	22.4V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2330	C101	66	ENG/DLSL/PRPLN/940MP720RPM	SSN SSB	0767	-0669	1	7673V	0	0	2.0V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		
2330	C101	66	ENG/DLSL/PRPLN/875MP750RPM	ATF	0767	-0669	29	5504V	0	137	13.1V	0.0	DB	-	-	-	-	-	-	-	-	-	-	-		

RMA SUMMARY PRINTOUT (HME)										DATE 18JUN75		PAGE 6	
SHIP DATA SPAN										C SHP TST SALS		PAGE 6	
RMA SUMMARY PRINTOUT (HME)										C SHP TST SALS		PAGE 6	
SWBS	ELC	CID	EQUIPMENT NAME AND GENERAL DESCRIPTION	SHIP TYPE	DATA SPAN	NO. FAIL	MTBF(1)	MTBF(2)	CMAS	MTTR (1)	MTTR (2)	OS A	USG FROM
2370	3101	66	ENG/DLS/AUX/275HP/180GRPH	MSU	0767	-0669	36	453V	0	124	55.9V	0.0	DB
2370	3101	66	ENG/DLS/AUX/300HP/750GRPH	ATF	0767	-0669	38	2536V	0	146	18.4V	0.0	DB
2370	3101	66	ENG/DLS/AUX/440HP/120GRPH	LST	0767	-0669	25	2171V	0	131	2.0V	0.0	DB
2370	3101	66	ENG/DLS/AUX/600HP/200GRPH	MSC	MSU	0767	1	1803V	0	5	0.7V	0.0	DB
3110	3101	66	ENG/DLS/GEN DR/440HP/120GRPH	LST	0767	-0669	12	5528V	0	43	21.6V	0.0	DB
2330	3101	66	ENG/DLS/PRPLN/2400HP/80GRPH	LST	0767	-0669	18	3309V	0	108	4.0V	0.0	DB
2330	3101	66	ENG/DLS/PRPLN/600HP/200GRPH	MSU	0767	-0669	49	5412V	0	98	24.3V	0.0	DB
2330	3101	66	ENG/DLS/PRPLN/600HP/200GRPH	MSU	0767	-0669	28	1542V	0	132	2.9V	0.0	DB
2330	3101	66	ENG/DLS/PRPLN/900HP/700GRPH	ATF	0767	-0669	35	4361V	0	182	24.4V	0.0	DB
2330	3101	66	ENG/DLS/PRPLN/900HP/700GRPH	ATF	0767	-0669	3	28359V	0	15	27.3V	0.0	DB
5160	1804	99	EXCM/10M/MIXED REL/LLC CLG	S58	0767	-0669	1	140290V	0	0	0.1V	0.0	CA
5560	1804	72	EXTERNAL HYDRAULICS/ACCUMULATOR	S58	0767	-0669	58	3626V	0	0	7.7V	0.0	CA
5510	1804	52	EXTERNAL HYDRAULICS/AIR FLASK/ACC	S58	0767	-0669	6	210320V	0	0	9.3V	0.0	CA
5560	1804	52	EXTERNAL HYDRAULICS/RESURGER	S58	0767	-0669	11	38260V	0	0	3.1V	0.0	CA
5150	1308	40	PAN MHL AND MTR/A1204-B-1/PUR IN-MULLAT	S58	0767	-0669	25	5766V	0	0	0.5V	0.0	CA
5120	1308	40	PAN/MP/AIR COND NM/34/VENT SYS	S58	0767	-0669	16	26290V	0	0	2.6V	0.0	CA
5120	1308	40	PAN/EXH/STRY SP/5/VENT SYS	S58	0767	-0669	3	70107V	0	0	14.4V	0.0	CA
5120	1308	40	PAN/EXH/DPN COMPT/6/VENT SYS	S58	0767	-0669	4	52580V	0	0	32.6V	0.0	CA
5120	1308	40	PAN/EXH/7/VENT SYS	S58	0767	-0669	13	16178V	0	0	8.4V	0.0	CA
5120	1308	40	PAN/PWC FAIR/AIR COND NM/30/35/VENT SYS	S58	0767	-0669	5	84128V	0	0	5.4V	0.0	CA
5120	1308	40	PAN/MSL FC CLG/31/32/VENT SYS	S58	0767	-0669	10	42084V	0	0	9.4V	0.0	CA
5120	1308	40	PAN/RELOC/12/VENT SYS	S58	0767	-0669	2	105160V	0	0	0.2V	0.0	CA
5120	1308	40	PAN/RECIRC/13/18/19 THRU 27/VENT SYS	S58	0767	-0669	45	51412V	0	0	10.4V	0.0	CA
5120	1308	40	PAN/RECIRC/14/29/VENT SYS	S58	0767	-0669	13	52357V	0	0	8.7V	0.0	CA
5120	1308	40	PAN/RECIRC/18/VENT SYS	S58	0767	-0669	8	26290V	0	0	3.9V	0.0	CA
5120	1308	40	PAN/RTN FR A-1/26/VENT SYS	S58	0767	-0669	14	15023V	0	0	8.5V	0.0	CA
5120	1308	40	PAN/SHIP SPLY/APT VENT/2/VENT SYS	S58	0767	-0669	4	52580V	0	0	6.5V	0.0	CA
5120	1308	40	PAN/SPLY/DPN COMPT/34/VENT SYS	S58	0767	-0669	7	30445V	0	0	7.2V	0.0	CA
5120	1308	40	PAN/STNM/42/43/VENT SYS	S58	0767	-0669	4	105160V	0	0	8.8V	0.0	CA
5120	1308	40	PAN/TUMP NM/RECIRC/41/VENT SYS	S58	0767	-0669	43	9144V	0	0	5.9V	0.0	CA
5330	1801	67	FAUCET	S58	0767	-0669	90	49000V	0	0	1.3V	0.0	CA
5510	1801	78	FLTR/CUMD/GEN HP AIR FCIN	S58	0767	-0669	65	2700V	0	0	0.1V	0.0	CA
5560	1804	48	FLTR/BLTIN BVP/EXT MTON	S58	0767	-0669	18	46738V	0	0	7.5V	0.0	CA
5930	1700	48	FLTR/ALVT CARBON/SEWAGE DSPL	S58	0767	-0669	12	277846V	0	0	4.5V	0.0	CA
5150	1308	40	FLTR/ALVT/30/42/PUR IN-MULL ATN	S58	0767	-0669	13	11089V	0	0	1.3V	0.0	CA
5120	1308	40	FLTR/ALVT/25	S58	0767	-0669	100	16825V	0	0	5.1V	0.0	CA
5950	1801	45	GAGE/HP AIR/51G EGN FCIN	S58	0767	-0669	17	185576V	0	0	1.8V	0.0	CA
5930	1700	45	GAGE/LAPACITY/SEWAGE DSPL/LLVOLUME	S58	0767	-0669	22	38240V	0	0	10.1V	0.0	CA
5930	1700	45	GAGE/PRESS/SEN DSPL	S58	0767	-0669	2	315480V	0	0	4.3V	0.0	CA
5150	1308	40	GAS ANAL EQPT/CO CHANNEL	S58	0767	-0669	13	10792V	0	0	9.4V	0.0	CA
5450	1308	40	GAS ANAL EQPT/CO ELECTRONICS	S58	0767	-0669	3	46765V	0	0	6.4V	0.0	CA
5150	1308	40	GAS ANAL EQPT/CO CHANNEL	S58	0767	-0669	19	7384V	0	0	11.7V	0.0	CA
5150	1308	40	GAS ANAL EQPT/CO2 ELECTRONICS	S58	0767	-0669	2	70148V	0	0	5.9V	0.0	CA
5150	1308	40	GAS ANAL EQPT/F31 CHANNEL	S58	0767	-0669	23	6100V	0	0	0.4V	0.0	CA
5150	1308	40	GAS ANAL EQPT/F31 ELECTRONICS	S58	0767	-0669	1	140296V	0	0	5.7V	0.0	CA

RMA SUMMARY PRINTOUT (HPE)											16JUN75		PAGE 7		
SWBS	LIC	CID	EQUIPMENT NAME AND GENERAL DESCRIPTION	SHIP TYPE	DATA FROM	SPAN TU	NG. FAIL	MTBF(1)	MTBF(2)	CMA5	MTTR (1)	DATE MTTR (2)	C SMP	TEST FROM	SKED TO
5150	T30M	46	GAS ANAL EQPT/F12 CHANNEL	SSB	0767	-0669	6	23383V	0	0	4.7V	0.0	UA	-	-
5150	T30M	46	GAS ANAL EQPT/H2 CHANNEL	SSB	0767	-0669	1	140296V	0	0	12.4V	0.0	UA	-	-
5150	T30M	46	GAS ANAL EQPT/H2 ELECTRONICS	SSB	0767	-0669	9	15588V	0	0	7.8V	0.0	UA	-	-
5150	T30M	46	GAS ANAL EQPT/PURIFY IN-HULL ATM/INSTN	SSB	0767	-0669	1	144159V	0	0	9.8V	0.0	UA	-	-
3110	3101	16	GEN/AC/SSTG/450V2000KW3600RPM		0767	-0669	1	59865V	0	13	1.3V	0.0	DB	-	-
3110	3101	16	GEN/AC/SSTG/450V500KW1200RPM	DE	DLG	0767	-0669	0	71809V	0	4	1.6V	0.0	DB	-
3110	3101	16	GEN/AC/SSTG/450V500KW1200RPM	DD	DDG	0767	-0669	8	61345V	0	34	10.5V	0.0	DB	-
3110	3101	16	GEN/AC/SSTG/450V750KW1200RPM	DLG	LPD	0767	-0669	4	56048V	0	20	16.0V	0.0	DB	-
3140	4703	16	GEN/AC/MG/400HZ/120V/5KW/3428KPM	DE		0767	-0669	4	11372V	0	12	6.8V	0.0	DB	-
3110	3101	16	GEN/AC/SS D5L ELEC/450V100KW1800RPM	MSU		0767	-0669	0	24100V	0	0	6.8V	0.0	DB	-
3110	3101	16	GEN/AC/SS D5L ELEC/450V210KW1800RPM	MSU		0767	-0669	0	117800V	0	0	21.0V	0.0	DB	-
3110	3101	16	GEN/AC/SS D5L ELEC/450V60KW1800RPM	MSU		0767	-0669	0	5790V	0	0	6.8V	0.0	DB	-
3110	3101	16	GEN/AC/SSTG/230V400KW1200RPM	AU		0767	-0669	3	92484V	0	24	21.0V	0.0	DB	-
3110	3101	16	GEN/AC/SSTG/450V100KW1200RPM	DLG		0767	-0669	2	41935V	0	18	2.0V	0.0	DB	-
3110	3101	16	GEN/AC/SSTG/450V150KW1200RPM	UD		0767	-0669	11	64665V	0	107	9.4V	0.0	DB	-
2350	310J	16	GEN/DC/PRPLN D5L ELEC/375V616KW700RPM	ATF		0767	-0669	0	122946V	0	9	54.2V	0.0	DB	-
2350	310J	16	GEN/DC/PRPLN D5L ELEC/550V620KW750RPM	ATF		0767	-0669	4	27975V	0	18	32.6V	0.0	DB	-
5150	T300	3	HE/ P/U C02 SCRUBBER/PM 5-36129A	SSB		0767	-0669	8	16020V	0	0	19.4V	0.0	DA	-
5150	T503	32	MT INTCHGR/KEFK	SSB		0767	-0669	2	70148V	0	0	12.8V	0.0	DA	-
5510	T300	7	MTR ASSY/ P/U C02 SCRUBBER/PM 40380-1	SSB		0767	-0669	8	18020V	0	0	19.4V	0.0	DA	-
5520	T601	7	MTR/SPC/ELEC/440V/12KW/25GAL	SSB		0767	-0669	22	67000V	0	0	3.8V	0.0	DA	-
7280	T601	7	MTR/MTR/ELEC/440VAC/25GAL/MSL MTRCLG	SSB		0767	-0669	68	8428V	0	0	2.1V	0.0	DA	-
5520	T601	7	MTR/IMRS/ELEC/440VAC	SSB		0767	-0669	36	650V	0	0	23.8V	0.0	DA	-
5290	T601	47	IND/ELEC TACH 9-5000	SSB		0767	-0669	0	999999V	0	0	5.6V	0.0	DA	-
5280	T601	67	LAV/PUTW FCTN	SSB		0767	-0669	1	999999V	0	0	0.2V	0.0	DA	-
4250		97	MAGNIFICATILN/PERKIS 2/UPT DETECT RNGE	SSB		0767	-0669	3	39982V	0	0	0.8V	0.0	DA	-
5510	T601	86	MANF/2VL/.751PS 100PS1/DW	SSB		0767	-0669	3	70107V	0	0	2.9V	0.0	DA	-
3140	4703	16	MG/400HZ/VARVACURDC400MPVARVACURDC300K	SSN		0767	-0669	0	28753V	0	0	1.6V	0.0	DB	-
3140	4704	18	MG/400HZ/250VDC100MP480VAC64KW	SSS		0767	-0669	54	3898V	0	183	30.7V	0.0	DB	-
3140	4704	18	MG/400HZ/250VDC75MP130VAC32.4KW	SSB		0767	-0669	49	2907V	0	223	35.6V	0.0	DB	-
3140	4704	18	MG/400HZ/250VDC75MP130VAC43KW	SSN		0767	-0669	6	3080V	0	13	0.8V	0.0	DB	-
3140	4703	18	MG/400HZ/272VAC10.7MP130VAC5KW	SSB		0767	-0669	17	17235V	0	55	10.9V	0.0	DB	-
3140	4704	18	MG/400HZ/275VAC45.1P450VAC30KW	DD		0767	-0669	2	19445V	0	5	1.6V	0.0	DB	-
3140	4703	18	MG/400HZ/400VAC300MP450VAC200KW	DLG		0767	-0669	0	81118V	0	3	57.5V	0.0	DB	-
3140	4703	18	MG/400HZ/400VAC300MP450VAC200KW	DLG		0767	-0669	3	25859V	0	16	20.3V	0.0	DB	-
3140	4703	18	MG/400HZ/440VAC-HP450VAC200KW	ELG		0767	-0669	1	91990V	0	7	1.6V	0.0	DB	-
3140	4703	18	MG/400HZ/440VAC-HP450VAC200KW	DLG		0757	-0669	3	38465V	0	4	20.2V	0.0	DB	-
3140	4703	18	MG/400HZ/440VAC100MP450VAC60KW	DLG		0767	-0669	1	1617V	0	13	2.4V	0.0	DB	-
3140	4703	18	MG/400HZ/440VAC155MP450VAC100KW	DLG		0767	-0669	3	7229V	0	3	70.3V	0.0	DB	-
3140	4703	18	MG/400HZ/440VAC25MP120VAC10KW	DE		0767	-0669	0	34366V	0	0	1.6V	0.0	DB	-
3140	4703	18	MG/400HZ/VMP VKW			0767	-0669	1	295437V	0	7	51.5V	0.0	DB	-
3140	4704	18	MG/400HZ/270VAC18MP120VAC10KW	LST AE		0767	-0669	2	1111V	0	3	51.8V	0.0	DB	-
3140	4703	18	MG/400HZ/400VAC100MP450VAC60KW	DLG	DLG	0767	-0669	0	80918V	0	2	10.3V	0.0	DB	-
3140	4703	18	MG/400HZ/440VAC100MP450VAC60KW			0767	-0669	22	0	0	40	18.1V	0.0	DB	-
3140	4703	18	MG/400HZ/440VAC100MP450VAC60KW	DUG	DLG	0767	-0669	3	6388V	0	6	28.7V	0.0	DB	-

SMB: EIC CID EQUIPMENT NAME AND GENERAL DESCRIPTION				RMA SUMMARY PRINTOUT (HME)				DATE 18JUN75				PAGE 1		
SHIP	DATA	SPAN	NO.	TYPE	FROM	TO	FAIL	MTBF(1)	MTBF(2)	CMAS	MTTR	MTTA	DS	TEST SKID
											(1)	(2)	A	TO
3140 4703 18	MG/400HZ/440VAC100HP450VAC60KW	DDG	LPG	0767	-0669	2	10901V	0	4	2.1V	0.0	DB	-	-
3140 4703 18	MG/400HZ/440VAC150HP450VAC100KW	DDG	DLG	0767	-0669	3	90613V	0	4	2.0V	0.0	DB	-	-
3140 4703 18	MG/400HZ/440VAC450VAC30KW	DD	DEG	0767	-0669	19	14625V	0	54	2.0V	0.0	DB	-	-
3140 4703 18	MG/400HZ/440VAC450VAC30KW	DD	DEG	0767	-0669	54	6943V	0	101	26.2V	0.0	DB	-	-
3140 4703 18	MG/400HZ/440VAC50HP450VAC30KW	DDG	DLG	0767	-0669	6	9998V	0	12	77.6V	0.0	DB	-	-
3140 4703 18	MG/400HZ/440VAC50HP450VAC30KW	DDG	DLG	0767	-0669	32	3462V	0	91	16.2V	0.0	DB	-	-
3140 4703 18	MG/400HZ/440VAC50HP450VAC30KW	DDG	DLG	0767	-0669	34	3240V	0	127	10.3V	0.0	DB	-	-
3140 4703 18	MG/400HZ/440VACURDC440HPVARVALUAC300K	SSB		0767	-0669	0	172673V	0	0	1.6V	0.0	DB	-	-
3140 4703 18	MG/400HZ/220VAC75HP85VAC24.5KW	DE	DEG	0767	-0669	0	141528V	0	0	1.8V	0.0	DB	-	-
3140 4704 18	MG/400HZ/250VDC450HP450VAC300KW	SSB		0767	-0669	0	259719V	0	1	53.5V	0.0	DB	-	-
3140 4704 18	MG/400HZ/250VDC450HP450VAC300KW	SSB		0767	-0669	0	389849V	0	3	53.5V	0.0	DB	-	-
3140 4704 18	MG/400HZ/250VDC65HP130VAC43.2KW	SSN		0767	-0669	8	4641V	0	22	60.4V	0.0	DB	-	-
3140 4704 18	MG/400HZ/250VDC65HP130VAC43.2KW	SSN		0767	-0669	0	52052V	0	0	1.6V	0.0	DB	-	-
3140 4704 18	MG/400HZ/250VDC65HP400VAC64KW	SSB		0767	-0669	51	3096V	0	293	15.8V	0.0	DB	-	-
3140 4705 18	MG/400HZ/250VAC8HP130VAC5KW	SSB		0767	-0669	25	15596V	0	49	17.1V	0.0	DB	-	-
3140 4703 18	MG/400HZ/440VAC100HP450VAC60KW	DDG		0767	-0669	41	4386V	0	88	53.5V	0.0	DB	-	-
3140 4703 18	MG/400HZ/440VAC8HP120VAC5KW	SSN		0767	-0669	2	35088V	0	4	16.1V	0.0	DB	-	-
2550 F30H 17	MUT/AC/MN CNUS PMP/440V20HP1160RPM	DD	DDG	0767	-0669	8	28090V	0	4	28.2V	0.0	DB	-	-
2550 F30V 17	MUT/AC/MN FD BOOST PMP/440V35HP1170RPM	DD	DDG	0767	-0669	17	7337V	0	17	50.1V	0.0	DB	-	-
2550 F30V 17	MUT/AC/MN FD BOOST PMP/440V40HP1170RPM	DDG	DLG	0767	-0669	25	13959V	0	32	60.5V	0.0	DB	-	-
2550 F304 17	MUT/AC/MN FD PMP/440V150HP3600RPM	SSB	SSN	0767	-0669	7	13021V	0	13	24.4V	0.0	DB	-	-
5640 TAG1 17	MUT/DC/250V/101HP 3500/1750RPM/TRIM PM	SSB		0767	-0669	38	89802V	0	6	9.2V	0.0	DA	-	-
3140 4705 17	MUT/AL/DC MG/440V75HP1750RPM	DE	DEG	0767	-0669	15	637V	0	41	25.3V	0.0	DB	-	-
2550 F30H 17	MUT/AC/MN CNUS PMP/220V15HP1760RPM	AU		0767	-0669	2	95282V	0	12	11.9V	0.0	DB	-	-
2550 F30H 17	MUT/AC/MN CNUS PMP/440V15HP1760RPM	LSD		0767	-0669	7	10652V	0	11	9.1V	0.0	DB	-	-
2550 F30H 17	MUT/AC/MN CNUS PMP/440V30HP1165RPM	DLG		0767	-0669	1	0	0	1	12.0V	0.0	DB	-	-
2550 F30H 17	MUT/AC/MN CNUS PMP/440V30HP1175RPM	DLG		0767	-0669	1	174057V	0	1	28.0V	0.0	DB	-	-
2550 F30H 17	MUT/AC/MN CNUS PMP/440V30HP675RPM	DLG		0767	-0669	0	93265V	0	1	12.0V	0.0	DB	-	-
2550 F30V 17	MUT/AC/MN FD BOOST PMP/440V10HP1740RPM	LSD		0767	-0669	11	6972V	0	14	13.1V	0.0	DB	-	-
2550 F30V 17	MUT/AC/MN FD BOOST PMP/440V40HP1175RPM	DLG		0767	-0669	0	362453V	0	0	19.2V	0.0	DB	-	-
3140 4703 17	MUT/AC/400HZ MG/440V15HP3500RPM	DE		0767	-0669	6	7581V	0	13	26.0V	0.0	DB	-	-
2350 LLO1 17	MUT/DC/MN VAPLN/750V3000HPVRY GHP M	ATF		0767	-0669	0	65713V	0	4	19.2V	0.0	DB	-	-
2550 F30V 17	MUT/MN FD BOOST PMP/AC/440V40HP1160RPM	DLG		0767	-0669	13	9496V	0	15	46.1V	0.0	DB	-	-
2380 FM01 17	MUT/AC/440V/3.1P/3485RPM/TNG/SEC PRPLN	SSB		0767	-0669	1	1104V	0	0	1.2V	0.0	DA	-	-
2380 FM01 17	MUT/AL/440V/325HP/900RPM/SEC PRPLN	SSB		0767	-0669	2	553V	0	0	0.8V	0.0	DA	-	-
9290 TAG1 17	MUT/DC/250V/101HP 3500/1750RPM/DRAIN	SSB		0767	-0669	7	1541V	0	6	3.9V	0.0	DA	-	-
9310 TK04 17	MUT/AL/440V/15HP/1160RPM/USTL PLANT	SSB		0767	-0669	36	650V	0	6	23.8V	0.0	DA	-	-
9510 TG01 17	MUT/AC/02 PLANT CPASR/440V/10HP/3525RPM	SSB		0767	-0669	6	23383V	0	0	4.3V	0.0	DA	-	-
9560 TG01 17	MUT/AC/440V/20HP/1800RPM	SSB		0767	-0669	40	788V	0	0	7.8V	0.0	DA	-	-
9150 F30V 17	MUT/AMINE PMP/440V/2HP/3500RPM	SSB		0767	-0669	14	13091V	0	0	8.3V	0.0	DA	-	-
9630 TL08 10	MTR/MOV-3 FUSN/BCLP/HVRNG FCTN	SSB		0767	-0669	5	1340V	0	0	4.8V	0.0	DA	-	-
9630 TL08 10	MTR/QUICKREINING/BCLP/HVRNG FCTN	SSB		0767	-0669	1	6760V	0	0	0.2V	0.0	DA	-	-
2380 FM01 03	GRF/VAR/SEC PRPLN	SSB		0767	-0669	20	967500V	0	0	7.1V	0.0	DA	-	-
4250 LLOF 07	PERISCOPE=1/DASHMOTS	SSB		0767	-0669	46	2607V	0	0	3.7V	0.0	DA	-	-
4250 LLOF 07	PERISCOPE=1/EYEPIECE BOX	SSB		0767	-0669	16	7497V	0	0	0.4V	0.0	DA	-	-

RNA SUMMARY PRINTOUT (HME)										DATE 10/01/75		PAUL Y	
SHIP DATA SPAN										C SHIP		TEST SKED	
TYPE										US A USG		FROM TO	
SWBS	LC	LID	EQUIPMENT NAME AND GENERAL DESCRIPTION	TYPE	DATA SPAN	FAIL	MTBF(1)	MTBF(2)	CRAS	MTTR	MTTF	US A USG	FROM TO
4250	LEOF	97	PERISCOPE-1/OPTICAL SYSTEM	SSB	0767	-0669	12	4995V	0	0	2.4V	0.0	LA
4250	LEOF	97	PERISCOPE-2/OPTICAL SYSTEM	SSB	0767	-0669	2	5995V	0	0	9.1V	0.0	DA
4250	LEOF	97	PERISCOPE-3/OPTICAL SYSTEM	SSB	0767	-0669	30	3995V	0	0	1.5V	0.0	DA
4250	LEOF	97	PERISCOPE-4/OPTICAL SYSTEM	SSB	0767	-0669	5	2995V	0	0	1.9V	0.0	DA
4250	LEOF	97	PERISCOPE-5/OPTICAL SYSTEM	SSB	0767	-0669	7	17135V	0	0	0.7V	0.0	DA
4250	LEOF	97	PERISCOPE-6/OPTICAL SYSTEM	SSB	0767	-0669	3	3995V	0	0	2.4V	0.0	DA
4250	LEOF	97	PERISCOPE-7/OPTICAL SYSTEM	SSB	0767	-0669	11	12754V	0	0	5.7V	0.0	DA
2550	310E	1	PHM/ANALYZER/25GPM75P513500RPM	DDG	0767	-0669	20	8827V	0	95	9.0V	0.0	LB
2550	310E	1	PHM/ANALYZER/25GPM75P513500RPM	DDG	0767	-0669	33	5134V	0	75	6.2V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	4	2149V	0	7	4.9V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	41	6695V	0	82	11.1V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	12	2792V	0	23	3.1V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	0	1185V	0	0	4.3V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	42	7189V	0	226	13.4V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	13	4170V	0	29	14.4V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	0	0	0	0	14.1V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	17	7024V	0	68	1.1V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	57	2076V	0	104	6.4V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	21	2659V	0	55	11.8V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	70	3291V	0	138	9.5V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	01	7467V	0	154	13.3V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	133	2137V	0	324	13.8V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	9	5833V	0	21	2.3V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	2	357312V	0	22	9.5V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	11	18693V	0	27	3.9V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	71	4807V	0	0	7.4V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	8	17537V	0	0	7.7V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	1	5614V	0	1	2.0V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	6	10958V	0	35	5.6V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	17	24853V	0	93	10.8V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	12	5695V	0	47	7.4V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	31	23637V	0	103	10.4V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	13	10630V	0	36	8.9V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	1	52632V	0	0	6.0V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	0	0	0	0	1.5V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	11	3189V	0	35	11.8V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	1	52632V	0	3	2.0V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	7	20030V	0	17	23.5V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	0	75932V	0	7	4.2V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	0	0	0	0	1.5V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	11	3189V	0	35	11.8V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	0	62506V	0	11	20.4V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	2	7964V	0	4	1.0V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	20	14635V	0	56	8.9V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	2	25433V	0	18	9.5V	0.0	LB
5330	T803	1	PHM/FW SVCE/CNTFGL/30GPM75P513500RPM	DDG	0767	-0669	3	37416V	0	22	4.5V	0.0	LB

RMA SUMMARY PRINTOUT (HME)														DATE 18JUN75				PAGE 10	
SWBS	ETC	CID	EQUIPMENT NAME AND GENERAL DESCRIPTION	SHIP TYPE	DATA FROM	SPAN TO	NO. FAIL	MTBF(1)	MTBF(2)	CMAS	MTTH (1)	MTTR (2)	DS A	USG	TEST FROM	SKED TO			
5330	T803	1	PHP/FW SVCE/LNTFGL/656PM70PS13500RPM	DLG	0767	-0669	4	12081V	0	12	5.1V	0.0	DB	-	-	-			
5330	T803	1	PHP/FW SVCE/CNTFGL/806PM72PS13500RPM	AE	0767	-0669	5	11709V	0	15	1.3V	0.0	DB	-	-	-			
5420	T805	1	PHP/HEAF/JPSXFK/KTKY/2006PM160PS164WRP	LPU	0767	-0669	1	4211V	0	4	3.0V	0.0	DB	-	-	-			
5330	T803	1	PHP/MUT FW/CNTFGL/356PM3PS11725RPM	CVA DLG	0767	-0669	5	45614V	0	7	3.3V	0.0	DB	-	-	-			
5330	T803	1	PHP/MUT FW/CNTFGL/56PM15PS13500RPM	LPU	0767	-0669	0	329582V	0	2	1.9V	0.0	DB	-	-	-			
5330	T803	1	PHP/MUT FW/CNTFGL/56PM22PS11725RPM	CVA LPH	0767	-0669	8	65515V	0	10	5.7V	0.0	DB	-	-	-			
5330	T803	1	PHP/MUT FW/CNTFGL/56PM5PS11725RPM	AFS MSU	0767	-0669	10	47368V	0	14	12.1V	0.0	DB	-	-	-			
5420	T805	1	PHP/MN AVN GAS/CNTFGL/1656PM90PS13450	LPH	0767	-0669	9	1169V	0	23	27.3V	0.0	DB	-	-	-			
2550	F30H	1	PHP/MN CND5/LNTFGL/1506PM75PS11750RPM	AD	0767	-0669	16	11910V	0	100	10.4V	0.0	DB	-	-	-			
2550	F30H	1	PHP/MN CND5/CNTFGL/1656PM70PS11750RPM	LSD	0767	-0669	11	6776V	0	29	65.4V	0.0	DB	-	-	-			
2550	F30H	1	PHP/MN CND5/CNTFGL/2356PM60PS11745RPM	DE	0767	-0669	13	3916V	0	61	14.9V	0.0	DB	-	-	-			
2550	F30H	1	PHP/MN CND5/CNTFGL/2356PM60PS11745RPM	DE	0167	-0769	14	2281V	0	69	5.2V	0.0	DB	-	-	-			
2550	F30G	1	PHP/MN CND5/CNTFGL/3256PM57PS11145RPM	DD	0767	-0669	233	3895V	0	702	13.9V	0.0	DB	-	-	-			
2550	F30H	1	PHP/MN CND5/CNTFGL/4306PM60PS11150RPM	DLG	0767	-0669	12	6489V	0	34	5.8V	0.0	XX	-	-	-			
2560	F803	1	PHP/MN CND5/SWC/CNTFGL/1656PM70PS11750RPM	AU	0767	-0669	7	26994V	0	24	1.7V	0.0	DB	-	-	-			
2560	F803	1	PHP/MN CND5/SWC/CNTFGL/1606PM13PS1125	LSD	0767	-0669	5	4803V	0	13	2.1V	0.0	DB	-	-	-			
2560	F803	1	PHP/MN CND5/SWC/CNTFGL/1656PM13PS1140	DD	0767	-0669	5	12700V	0	21	11.1V	0.0	DB	-	-	-			
2560	F803	1	PHP/MN CND5/SWC/CNTFGL/1656PM14PS1140	DDG	0767	-0669	10	10257V	0	25	11.4V	0.0	DB	-	-	-			
2560	F803	1	PHP/MN CND5/SWC/CNTFGL/2206PM13PS11765	DLG	0767	-0669	14	17395V	0	31	8.3V	0.0	DB	-	-	-			
2560	F803	1	PHP/MN CND5/SWC/CNTFGL/2656PM13PS1140	DD	0767	-0669	35	4623V	0	88	7.1V	0.0	DB	-	-	-			
2560	F803	1	PHP/MN CND5/SWC/CNTFGL/7006PM/OPS1/30	DE	0767	-0669	5	2671V	0	10	6.9V	0.0	DB	-	-	-			
2550	F30V	1	PHP/MN FD BUOST/CNTFGL/3306PM35PS11170	DE	0767	-0669	10	4175V	0	36	5.7V	0.0	DB	-	-	-			
2550	F30G	1	PHP/MN FD BUOST/CNTFGL/4556PM35PS11145	DD	0767	-0669	262	3531V	0	705	4.8V	0.0	DB	-	-	-			
2550	F30V	1	PHP/MN FD BUOST/CNTFGL/4606PM35PS11150	DLG	0767	-0669	39	11243V	0	40	13.6V	0.0	DB	-	-	-			
2550	F30V	1	PHP/MN FD/CNTFGL/3006PM476PS13550RPM	SSB SSN	0767	-0669	15	7794V	0	29	9.2V	0.0	DB	-	-	-			
2550	F30V	1	PHP/MN FD/CNTFGL/3006PM575PS14000RPM	AD	0767	-0669	27	6498V	0	90	7.0V	0.0	DB	-	-	-			
2550	F30V	1	PHP/MN FD/CNTFGL/4256PM775PS15220RPM	DD	0767	-0669	329	2759V	0	783	16.8V	0.0	DB	-	-	-			
5330	T803	1	PHP/PRM FW/VAC/KTRY/15CFM1750RPM	LPU	0767	-0669	1	135291V	0	3	5.0V	0.0	DB	-	-	-			
2560	310E	1	PHP/SWC/SSTG/CNTFGL/1640GPM15PS1176GRP	DLD	0767	-0669	5	16774V	0	28	8.6V	0.0	DB	-	-	-			
2560	E905	1	PHP/SWC/SSTG/CNTFGL/1800GPM57PS11150RPM	AU	0767	-0669	1	138185V	0	11	1.5V	0.0	DB	-	-	-			
2560	310E	1	PHP/SWC/SSTG/CNTFGL/7006PM15PS11150RPM	LSD	0767	-0669	6	16654V	0	16	23.7V	0.0	DB	-	-	-			
2560	310E	1	PHP/SWC/SSTG/CNTFGL/6356PM15PS11750RPM	DDG	0767	-0669	29	14101V	0	135	9.1V	0.0	DB	-	-	-			
7280	F807	1	PHP/MSL FW CRCLT/CNTFGL/1806PM60PS1350	SSB	0767	-0669	25	7650V	0	0	10.7V	0.0	DA	-	-	-			
5290	T801	1	PHP/URAIN/CNTFGL/1806PM	SSB	0767	-0669	15	719V	0	0	4.8V	0.0	DA	-	-	-			
5310	TR00	1	PHP/LP BRINE/2000GPD/CNTFGL/26PM33PS1	SSB	0767	-0669	9	2598V	0	0	8.2V	0.0	DA	-	-	-			
5310	TR00	1	PHP/ESTLT/2000GPD/CNTFGL/46PM37PS13550	SSB	0767	-0669	25	3574V	0	0	19.6V	0.0	DA	-	-	-			
5310	TR00	1	PHP/MP BRINE/8000GPD/CNTFGL/256PM3330K	SSB	0767	-0669	45	376V	0	0	28.2V	0.0	DA	-	-	-			
5560	T804	1	PHP/EXT MYCR CONT/KTRY/166PM1300PS1175	SSB	0767	-0669	40	788V	0	0	7.8V	0.0	DA	-	-	-			
5310	TR00	1	PHP/DSTL PLANT/CHEM TRTM/REGIF/56PM15	SSB	0767	-0669	16	5584V	0	0	2.5V	0.0	DA	-	-	-			
5310	TR00	1	PHP/LP BRINE/8000GPD/CNTFGL/156PM27PS1	SSB	0767	-0669	51	1752V	0	0	11.6V	0.0	DA	-	-	-			
2550	F30V	1	PHP/MN FD BUOST/CNTFGL/4906PM65PS11160	DLG	070167	-763069	43	4306V	0	102	11.0V	0.0	XX	-	-	-			
2450	6400	83	PROP/VAR P/CPCH SYS	LST	0767	-0669	13	4651V	0	48	24.5V	0.0	DB	-	-	-			
2450	6408	83	PROP/VAR P/CPCH SYS	MSU	0767	-0669	7	2466V	0	9	18.1V	0.0	DB	-	-	-			
2450	F807	83	PROP/CRP/16FT/50L	CDC	0767	-0671	0	54000V	0	0	6.3V	0.0	AG	-	-	-			
2610	C704	76	PUR/FO /DELAVAL/ CNTFGL/225GPM	ATF	0767	-0669	4	1912V	0	9	2.4V	0.0	DB	-	-	-			

RMA SUMMARY PRINTOUT (HME)										DATE 18JUN75		PAGE 11				
SHIP DATA SPAN NO.										C SHP TEST SKEL						
SNBS	LIC	CID	EQUIPMENT NAME AND GENERAL DESCRIPTION	SHIP TYPE	DATA FROM	TO	FAIL	MTBF(1)	MTBF(2)	CHAS	MTTR (1)	MTTR (2)	DS A	DSG	FLUM	TU
5410	F507	76	PUR/FU /DELAVAL/ CNTFGL/225GPM	DD	DDG	0767	-0669	2	178V	0	4	1.1V	0.0	DB		-
5410	F507	76	PUR/FU /DELAVAL/ CNTFGL/225GPM	AD		0767	-0669	2	2032V	0	9	2.4V	0.0	DB		-
2610	B704	76	PUR/FU /DELAVAL/ CNTFGL/250GPM	MSC		0767	-0669	4	8510V	0	14	78.8V	0.0	DB		-
5410	F507	76	PUR/FU /DELAVAL/ CNTFGL/350GPM	LSD		0767	-0669	11	461V	0	30	6.3V	0.0	DB		-
5410	B704	76	PUR/FU /DELAVAL/ CNTFGL/350GPM	LST	LSD	0767	-0669	21	1460V	0	49	8.9V	0.0	DB		-
5410	F507	76	PUR/FU /DELAVAL/CNTFGL/150GPM	AE		0767	-0669	0	805V	0	2	0.2V	0.0	DB		-
5410	F507	76	PUR/FU /DELAVAL/CNTFGL/220GPM	CVA	LPH	0767	-0669	10	721V	0	44	6.7V	0.0	DB		-
5410	F507	76	PUR/FU /DELAVAL/CNTFGL/250GPM	AG		0767	-0669	0	190V	0	5	9.3V	0.0	DB		-
2610	F507	76	PUR/FU /DELAVAL/CNTFGL/425GPM	DE	LST	0767	-0669	6	2683V	0	17	10.3V	0.0	DB		-
2610	F507	76	PUR/FU /SHARPLES/CNTFGL/250GPM	SSB	SSN	0767	-0669	5	68V	0	8	1.6V	0.0	DB		-
5410	F507	76	PUR/FU /SHARPLES/CNTFGL/450GPM	AD	LST	0767	-0669	4	1179V	0	23	13.2V	0.0	DB		-
2610	B704	76	PUR/FU/SHARPLES/CNTFGL/150GPM	LST		0767	-0669	64	662V	0	108	15.5V	0.0	DB		-
2610	C704	76	PUR/FU/SHARPLES/CNTFGL/200GPM	ATF		0767	-0669	10	2195V	0	46	2.9V	0.0	DB		-
2610	B704	76	PUR/FU/SHARPLES/CNTFGL/250GPM	MSO		0767	-0669	4	1710V	0	25	1.5V	0.0	DB		-
5410	F507	76	PUR/FU/SHARPLES/CNTFGL/275GPM	DLG		0767	-0669	7	88V	0	19	5.8V	0.0	DB		-
2610	C704	76	PUR/FU/SHARPLES/CNTFGL/275GPM	ATF		0767	-0669	11	2504V	0	55	0.3V	0.0	DB		-
2610	B704	76	PUR/FU/SHARPLES/CNTFGL/450GPM	LST		0767	-0669	21	1704V	0	63	39.6V	0.0	DB		-
5420	T605	76	PUR/JP-5/DISC TYPE/ CNTFGL/200GPM	CVA		0767	-0669	3	1154V	0	5	1.5V	0.0	DB		-
2620	F007	76	PUR/LUBU/DELAVAL/ CNTFGL/225GPM	DD	DDG	0767	-0669	15	2807V	0	44	19.6V	0.0	DB		-
2620	F007	76	PUR/LUBU/DELAVAL/ CNTFGL/225GPM	CVA		0767	-0669	24	2387V	0	58	12.7V	0.0	DB		-
2620	F007	76	PUR/LUBU/DELAVAL/ CNTFGL/225GPM			0767	-0669	8	0	0	32	2.4V	0.0	DB		-
2620	C805	76	PUR/LUBU/DELAVAL/ CNTFGL/225GPM	ATF			-	0	0	0	0	2.4V	0.0	DB		-
2610	F007	76	PUR/LUBU/DELAVAL/ CNTFGL/350GPM	LSD	LST	0767	-0669	16	2641V	0	76	6.3V	0.0	DB		-
2620	F007	76	PUR/LUBU/DELAVAL/ CNTFGL/150GPM	AE		0767	-0669	1	15927V	0	5	0.2V	0.0	DB		-
2620	F007	76	PUR/LUBU/DELAVAL/ CNTFGL/225GPM	CVA	LPD	0767	-0669	14	6700V	0	65	0.4V	0.0	DB		-
2620	F007	76	PUR/LUBU/DELAVAL/ CNTFGL/225GPM	CVA	DDG	0767	-0669	19	4272V	0	87	12.6V	0.0	DB		-
2610	F007	76	PUR/LUBU/DELAVAL/ CNTFGL/375GPM	DE	LST	0767	-0669	11	1748V	0	32	5.9V	0.0	DB		-
2620	B806	76	PUR/LUBU/SHARPLES/ CNTFGL/125GPM	LST		0767	-0669	32	1190V	0	85	12.6V	0.0	DB		-
2620	C805	76	PUR/LUBU/SHARPLES/ CNTFGL/200GPM	ATF		0767	-0669	8	5043V	0	41	48.2V	0.0	DB		-
2620	L805	76	PUR/LUBU/SHARPLES/ CNTFGL/200GPM	ATF		0767	-0669	8	5675V	0	33	2.2V	0.0	DB		-
2610	F007	76	PUR/LUBU/SHARPLES/ CNTFGL/225GPM	DE	DLG	0767	-0669	128	1842V	0	447	8.9V	0.0	DB		-
2620	F007	76	PUR/LUBU/SHARPLES/ CNTFGL/225GPM	DLG		0767	-0669	20	1789V	0	53	22.2V	0.0	DB		-
2620	F007	76	PUR/LUBU/SHARPLES/ CNTFGL/275GPM	DEG	SSB	0767	-0669	94	2115V	0	320	3.9V	0.0	DB		-
2620	F007	76	PUR/LUBU/SHARPLES/ CNTFGL/225GPM	SSB		0767	-0669	23	1917V	0	61	5.4V	0.0	DB		-
2620	F007	76	PUR/LUBU/SHARPLES/ CNTFGL/375GPM	AD	LST	0767	-0669	37	1358V	0	101	13.5V	0.0	DB		-
2620	B806	76	PUR/LUBU/SHARPLES/ CNTFGL/375GPM	LST		0767	-0669	22	1723V	0	60	6.8V	0.0	DB		-
5160	T503	32	REFR SYS/R-11 TU BRINE/FOOD STOR/175T	AF		0767	-0669	18	2323V	0	132	22.4V	0.0	DB		-
5160	T503	32	REFR SYS/R-120IR EXP/FOOD STOR/1.5T	MSO		-	-	0	5081V	0	0	11.9V	0.0	DB		-
5160	T503	32	REFR SYS/R-120IR EXP/FOOD STOR/1.5T	MSC		0767	-0669	11	4136V	0	56	21.3V	0.0	DB		-
5160	T503	32	REFR SYS/R-120IR EXP/FOOD STOR/1T	DE		0767	-0669	16	2778V	0	76	5.6V	0.0	DB		-
5160	T503	32	REFR SYS/R-120IR EXP/FOOD STOR/2.44T	LST		0767	-0669	27	2375V	0	122	11.9V	0.0	DB		-
5160	T503	32	REFR SYS/R-120IR EXP/FOOD STOR/2T	DLG		0767	-0669	56	2093V	0	274	6.5V	0.0	DB		-
5160	T503	32	REFR SYS/R-120IR EXP/FOOD STOR/2T	DLG		0767	-0669	23	1415V	0	67	8.8V	0.0	DB		-
5160	T503	32	REFR SYS/R-120IR EXP/FOOD STOR/3T	LST		0767	-0669	24	818V	0	99	41.4V	0.0	DB		-
5160	T503	32	REFR SYS/R-120IR EXP/FOOD STOR/4.5T	AD		0767	-0669	7	4650V	0	22	25.1V	0.0	DB		-

RMA SUMMARY PRINTOUT (HME)										DATE 18JUN75		PAGE 12	
SNBS	ELC	CIC	EQUIPMENT NAME AND GENERAL DESCRIPTION	SHIP TYPE	DATA FROM	SPAN TO	NO. FAIL	MTBF(1)	MTBF(2)	CHAS	MYTR (1)	MYTR (2)	US A DSG FROM TO
5160	T503	32	REFK SYS/R-1201R EXP/FOOD STOR/4T	DD	DDG	0767	-0669	17	1860V	0	64	15.4V	0.0 DM
5160	T503	32	REFK SYS/R-1201R EXP/FOOD STOR/7.6T	AU		0767	-0669	16	2030V	0	50	4.4V	0.0 DB
5160	T503	32	REFK SYS/R-1201R EXP/FOOD STOR/1.4T	SSB		0767	-0669	19	3978V	0	145	9.9V	0.0 DB
5160	T503	32	REFK SYS/R-1201R EXP/FOOD STOR/3.7T	DLG		0767	-0669	6	4374V	0	45	10.3V	0.0 DB
4250	TV01	52	RESTRICTOR/VAR/HMV100/PUPT DETECT ANGE	SSB		0767	-0669	23	5215V	0	0	1.2V	0.0 DA
4250	TV01	52	RESTRICTOR/VAR/HMX248/PUPT DETECT ANGE	SSB		0767	-0669	2	59973V	0	0	0.3V	0.0 DA
4250	TV01	52	RESTRICTOR/VAR/HMV111/PUPT DETECT ANGE	SSB		0767	-0669	3	39982V	0	0	0.9V	0.0 DA
3110	470T	42	HULTX/SP AND V/30-100W MG SET/400HZ PW	SSB		0767	-0669	11	9818V	0	0	6.9V	0.0 DA
3110	470T	42	HULTX/SP/600W MG SET/400HZ PWR	SSB		0767	-0669	5	43200V	0	0	7.2V	0.0 DA
3110	470T	42	HULTX/V/50W MG SET/400HZ PWR	SSB		0767	-0669	30	6109V	0	0	4.6V	0.0 DA
3110	470T	42	HULTX/V/600W MG SET/400HZ PWR	SSB		0767	-0669	8	27000V	0	0	12.3V	0.0 DA
5310	470T	42	HULTX/DRAIN/OSTL PLANT	SSB		0767	-0669	6	14891V	0	0	40.5V	0.0 DA
5310	TK04	10	KUTAMTR/UM 2000GPD DSTL	SSB		0767	-0669	3	37576V	0	0	2.3V	0.0 DA
5930	T700	42	SAN TR/SEN DSPL	SSB		0767	-0669	14	60091V	0	0	14.1V	0.0 DA
2210	F101	81	SE/MTN/CM/BLR SYS	DLG		0767	-0669	12	901V	0	122	8.6V	0.0 DB
2360	TV04	52	SECONDARY PROPULSION/HOIST MECHANISM	SSB		0767	-0669	3	369V	0	0	0.3V	0.0 DA
2360	FM03	63	SECONDARY PROPULSION/SOL/MOTOR HOIST	SSB		0767	-0669	1	1106V	0	0	0.5V	0.0 DA
2360	FM04	63	SECONDARY PROPULSION/XMTR/SYNL/TNG	SSB		0767	-0669	4	27605V	0	0	6.9V	0.0 DA
5510	TF01	44	SEP/MTNE/GEN HP AIR FCTN	SSB		0767	-0669	8	22100V	0	0	0.1V	0.0 DA
5150	TF01	76	SLP/MTN/PUK IN-HULL ATM FCTN	SSB		0767	-0669	1	18327V	0	0	0.4V	0.0 DA
5110	T107	7	SPH/ELLC/440V	SSB		0767	-0669	23	46450V	0	0	5.3V	0.0 DA
5310	TF01	75	STRAINER/Y/DISTILLED WATER	SSB		0767	-0669	8	236610V	0	0	2.3V	0.0 DA
9640	TA01	75	STR/TRIM AND DRAIN	SSB		0767	-0669	1	56560V	0	0	0.7V	0.0 DA
5290	TA01	75	STR/EX/DRAIN SYS/TRIM AND DRAIN	SSB		0767	-0669	22	490V	0	0	0.9V	0.0 DA
5290	TA01	75	STR/MALOMB/DRAIN SYS/TRIM AND DRAIN	SSB		0767	-0669	1	194000V	0	0	0.9V	0.0 DA
2360	CB04	21	SW/MTX LIM/SEC PHPLN	SSB		0767	-0669	2	553V	0	0	6.5V	0.0 DA
5630	TL08	21	SW/DIFF PRESS/HOV451-OPS-7/HVRNG FCTN	SSB		0767	-0669	7	3829V	0	0	4.8V	0.0 DA
5310	T406	21	SW/PRESS/EVAP ST SPLY/DW FCTN	SSB		0767	-0669	3	67358V	0	0	4.1V	0.0 DA
5330	TB01	61	SW/THRMSTC/40 TO 180 DEG F	SSB		0767	-0669	4	368000V	0	0	10.4V	0.0 DA
7280	TB01	42	TANK/FW/STO CAP 100GAL/MSL MTGXCLG	SSB		0767	-0669	5	38208V	0	0	1.6V	0.0 DA
5560	TV04	42	TR/VENT AND SPLY/EXT HYDR	SSB		0767	-0669	4	262900V	0	0	16.1V	0.0 DA
5310	TK01	92	TR/BRINE/HP BRINE SYS/DW FCTN	SSB		0767	-0669	4	52580V	0	0	4.4V	0.0 DA
5930	1A05	43	TRASH CAN RTNR BODY	SSB		0767	-0669	10	2234V	0	0	1.9V	0.0 DA
5930	1A05	43	TRASH CAN/BASE PIVOT	SSB		0767	-0669	2	11168V	0	0	25.3V	0.0 DA
5930	1A05	43	TRASH CAN/RETAINER LATCH	SSB		0767	-0669	2	11168V	0	0	3.5V	0.0 DA
5930	1A05	21	TRASH COMPACTOR/INTERLOCK ASS'BL	SSB		0767	-0669	16	1396V	0	0	4.0V	0.0 DA
5930	1A05	34	TRASH DISPOSAL UNIT/ACTUATOR/ROTARY	SSB		0767	-0669	14	399V	0	0	3.0V	0.0 DA
3110	310C	5	TURB/ST GEN/SSTG/1000W	DLG		0767	-0669	3	27956V	0	38	26.4V	0.0 DB
3110	310C	5	TURB/ST GEN/SSTG/1500W	DLG		0767	-0669	13	5681V	0	61	40.5V	0.0 DB
3110	310C	5	TURB/ST GEN/SSTG/1500W					0	0	0	0	79.6V	0.0 DX
3110	310C	5	TURB/ST GEN/SSTG/3000W	DE		0767	-0669	6	10958V	0	58	19.0V	0.0 DB
3110	310C	5	TURB/ST GEN/SSTG/4000W	AU		0767	-0669	26	16007V	0	133	33.7V	0.0 DB
3110	310C	5	TURB/ST GEN/SSTG/5000W	DD	DDG	0767	-0669	23	17423V	0	143	21.7V	0.0 DB
3110	310C	5	TURB/ST GEN/SSTG/5500W	DL		0767	-0669	56	13096V	0	330	25.2V	0.0 DB
3110	310C	5	TURB/ST GEN/SSTG/7500W	DLG				0	4862V	0	0	25.7V	0.0 DB

RMA SUMMARY PRINTOUT (HMM)										DATE 18JUN75		PAGE 13				
SWDS	EIC	CIG	EQUIPMENT NAME AND GENERAL DESCRIPTION	SHIP TYPE	DATA FROM	SPAN TO	NO. FAIL	MTBF(1)	MTBF(2)	CMAS	MTTR (1)	MTTR (2)	US A	USG	TEST SKED FROM TO	
2610	F501	5	TURB/ST/FL SVCE PMP/2240/5640RPM525PSI	DE	0167	-0769	3	17529V	0	23	31.2V	0.0	LB		-	
2550	F30G	5	TURB/ST/MN CNDP PMP	DD	0767	-0669	66	14618V	0	435	64.8V	0.0	DB		-	
2550	F30G	5	TURB/ST/MN CNDP PMP	DD	DDG	0767	-0669	13	17019V	0	140	49.5V	0.0	DB	-	
2550	F30B	5	TURB/ST/MN FD BOOST PMP	DD	UDG	0767	-0669	19	14281V	0	102	19.1V	0.0	DB	-	
2550	F30B	5	TURB/ST/MN FD BOOST PMP/	DD	0767	-0669	52	17792V	0	484	39.9V	0.0	LB		-	
2550	F303	5	TURB/ST/MN FD PMP	UD	DDG	0767	-0669	7	19943V	0	49	4.7V	0.0	LB	-	
2510	F303	5	TURB/ST/MN FD PMP	DD	0767	-0669	30	15652V	0	259	20.1V	0.0	DB		-	
2550	F303	5	TURB/ST/MN FD PMP	AD	0767	-0669	6	31500V	0	48	41.0V	0.0	DB		-	
2550	F303	5	TURB/ST/MN FL PMP	DDG	DLG	0767	-0669	13	36088V	0	165	79.6V	0.0	DB	-	
2550	F303	5	TURB/ST/MN FD PMP	DE	LSD	-	0	0	0	0	11.9V	0.0	DB		-	
2550	F303	5	TURB/ST/MN FD PMP/5776RPM525PSIG	DE	0167	-0769	19	2939V	0	49	87.7V	0.0	CB		-	
2560	F803	5	TURB/ST/MN SWCP	DE	0767	-0669	1	14356V	0	15	48.0V	0.0	DB		-	
2560	F803	5	TURB/ST/MN SWCP	DLG	0767	-0669	4	17824V	0	16	25.9V	0.0	DB		-	
2560	F803	5	TURB/ST/MN SWCP	DD	DLG	0767	-0669	3	21167V	0	10	14.7V	0.0	DA		-
2560	F803	5	TURB/ST/MN SWCP	DD	0767	-0669	10	20620V	0	102	8.6V	0.0	DB		-	
2560	F803	5	TURB/ST/MN SWCP	DDG	0767	-0669	6	17045V	0	28	3.5V	0.0	DB		-	
2560	F803	5	TURB/ST/MN SWCP	DE	DEG	0767	-0669	0	16141V	0	3	10.6V	0.0	DB		-
2560	F803	5	TURB/ST/MN SWCP	DLG	0767	-0669	1	172236V	0	16	2.0V	0.0	DB		-	
5930	T700	88	VALVE/RESTRICTOR/VARIABLE/TRASH	SSB	0767	-0669	1	210320V	0	0	0.3V	0.0	DA		-	
5930	T700	88	VALVE/RESTRICTOR/VARIABLE/TRASH/GBG	SSB	0767	-0669	2	105160V	0	0	0.4V	0.0	DA		-	
2210	F101	88	V/R/LF BAR SAF/PLT ACTR/MN BLR/1.50IPS	DLG	0767	-0669	1	66261V	0	24	7.5V	0.0	DB		-	
2210	F101	88	V/R/LF BAR SAF/SUPHTR/MN BLR/2.50IPS	DLG	0767	-0669	0	95594V	0	10	33.0V	0.0	DB		-	
2210	F101	88	V/SAF ST DRUM/R/LF/MN BLR/2.50IPS	DLG	0767	-0669	1	132521V	0	10	8.5V	0.0	DB		-	
6440	T700	67	WC/SEN DSPL	SSB	0767	-0669	25	109366V	0	0	2.8V	0.0	DA		-	
5710	TMO6	62	WINCH/SNAKING, WARPING/MAX CAP 1100LB	DDG	DLG	0767	-0669	6	797V	0	16	12.8V	0.0	DB		-
5710	TMO6	62	WINCH/SNAKING, WARPING/MAX CAP 14440LB	LST	0767	-0669	6	738V	0	9	6.8V	0.0	DB		-	
5810	TMO4	63	WNLS/AMR NMAG/ELEC/10000LB36FPM	MSO	0767	-0669	6	64V	0	15	13.9V	0.0	DB		-	
5810	TMO4	63	WNLS/AMR NMAG/ELEC/2800LB24FPM	MSC	0767	-0669	5	178V	0	10	20.1V	0.0	DB		-	
5810	TMO4	63	WNLS/AMR NMAG/ELEC/4230LB36FPM	MSC	0767	-0669	1	277V	0	1	3.2V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELEC/11010LB36FPM	ATF	0767	-0669	14	111V	0	42	17.4V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELEC/12806LB36FPM	DD	DDG	0767	-0669	2	132V	0	15	2.5V	0.0	DB		-
5810	TMO4	63	WNLS/VERT SFT/ELEC/15100LB36FPM	DEG	0767	-0669	0	72V	0	4	9.4V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELEC/2540LB36FPM	LST	0767	-0669	7	103V	0	31	31.7V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELEC/6065LB36FPM	DE	0767	-0669	4	11V	0	4	4.6V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELEC/9498LB36FPM	DL	0767	-0669	3	38V	0	11	3.9V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELHYD/10000LB36FPM	DLG	0767	-0669	0	209V	0	5	8.5V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELHYD/14000LB30FPM	CVA	0767	-0669	3	144V	0	33	3.7V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELHYD/17500LB36FPM	DLG	0767	-0669	1	109V	0	1	0.8V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELHYD/22112LB36FPM	LST	0767	-0669	2	106V	0	7	4.2V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELHYD/24400LB36FPM	DLG	0767	-0669	0	342V	0	3	2.4V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELHYD/45225LB36FPM	AFS	0767	-0669	2	82V	0	7	12.6V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELHYD/48413LB30FPM	AE	0767	-0669	1	233V	0	7	0.2V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELHYD/49725LB36FPM	LPD	0767	-0669	2	243V	0	10	52.0V	0.0	DB		-	
5810	TMO4	63	WNLS/VERT SFT/ELHYD/60600LB36FPM	LSD	0767	-0669	7	88V	0	37	37.5V	0.0	DB		-	
5830	TMO1	62	WN/BOAT/ELEC/1DM GYP/MAXCAP4000LB80FPM	MSO	0767	-0669	0	965V	0	1	0.5V	0.0	DB		-	

RMA SUMMARY PRINTOUT (HME)														PAGE 14		
SWBS	EIC	CID	EQUIPMENT NAME AND GENERAL DESCRIPTION	SHIP TYPE	DATA SPAN		NO. FAIL	MTBF(1)	MTBF(2)	CMAS	MYTR (1)	MYTR (2)	DUTY US A	C SHP TEST	FROM	TO
					FROM	TO										
5830	TM01	62	WN/BOAT/ELEC/2DM GYP/MAXCAP15000LB40FP	DDG DE	0767	-0669	3	1703V	0	13	6.7V	0.0	DB	-	-	-
5830	TM01	62	WN/BOAT/ELEC/2DM GYP/MAXCAP15000LB40FP	DLG	0767	-0669	3	496V	0	4	4.8V	0.0	DB	-	-	-
5830	TM01	62	WN/BOAT/ELEC/2DM GYP/MAXCAP15000LB40FP	LPD	0767	-0669	1	958V	0	3	0.9V	0.0	DB	-	-	-
5830	TM01	62	WN/BOAT/ELEC/2DM GYP/MAXCAP15000LB40FP	AFS DLG	0767	-0669	2	491V	0	3	0.8V	0.0	DB	-	-	-
5830	TM01	62	WN/BOAT/ELEC/2DM GYP/MAXCAP26600LB40FP	LSD LST	0767	-0669	0	6397V	0	5	1.7V	0.0	DB	-	-	-
5830	TM01	62	WN/BOAT/ELEC/2DM GYP/MAXCAP26600LB40FP	LSD LST	0767	-0669	2	2089V	0	4	3.2V	0.0	DB	-	-	-
5830	TM01	62	WN/BOAT/ELEC/2DM GYP/MAXCAP7140LB40FP	DE DLG	0767	-0669	1	71V	0	1	0.4V	0.0	DB	-	-	-
5830	TM01	62	WN/BOAT/ELEC/2DM/MAXCAP5750LB80FP	DLG	0767	-0669	1	1508V	0	1	21.4V	0.0	DB	-	-	-
5830	TM01	62	WN/BOAT/ELHYD/1DM/MAXCAP7500LB120FP	AU	0767	-0669	2	356V	0	3	2.1V	0.0	DB	-	-	-
4650	RTGQ	62	WN/RT/ELEC/1DM GYP/MAXCAP400LB360FP	DDG DLG	0767	-0669	1	1641V	0	16	8.0V	0.0	DB	-	-	-
4650	RTGQ	62	WN/RT/ELEC/1DM/MAXCAP400LB360FP	MSC MSU	0767	-0669	10	233V	0	20	5.5V	0.0	DB	-	-	-
5730	TS01	62	WN/CAR/ELEC/DM2GYP/MAXCAP1500LB85FP	DLG	0767	-0669	0	1228V	0	1	0.3V	0.0	DB	-	-	-
5730	TS01	62	WN/CAR/ELEC/1DM1GYP/MAXCAP7400LB220FP	AE LPM	0767	-0669	15	677V	0	34	17.4V	0.0	DB	-	-	-
5710	TS01	62	WN/CAR, SNAKING/ELHYD/MAXCAP14400LB	LST	0767	-0669	23	134V	0	101	16.2V	0.0	DB	-	-	-
5710	TS01	62	WN/CAR, SNAKING/ELHYD/MAXCAP7400LB220FP	AE	0767	-0669	10	706V	0	18	1.9V	0.0	DB	-	-	-
5710	TS01	62	WN/CAR, SNAKING/ELHYD/MAXCAP7400LB220FP	LST	0767	-0669	8	165V	0	30	16.4V	0.0	DB	-	-	-
5710	TS01	62	WN/CAR, SNAKING, HYLINE/ELHYD/MAXCAP5000	AU	0767	-0669	66	254V	0	158	2.7V	0.0	DB	-	-	-
5950	N104	62	WN/FANFAKE STREAMING/ELEC/MAXCAP1200LB	DD DLG	0767	-0669	24	152V	0	99	13.8V	0.0	DB	-	-	-
4760	N105	62	WN/MINESWEEP MCHRY/ELEC/MAXCAP33400LB	MSU	0767	-0669	5	564V	0	8	15.1V	0.0	DB	-	-	-
4760	N105	62	WN/MINESWEEP MCHRY/ELEC/MAXCAP33400LB	MSU	0767	-0669	9	737V	0	19	36.3V	0.0	DB	-	-	-
4760	N105	62	WN/MINESWEEP MCHRY/ELEC/MAXCAP7500LB	MSC	0767	-0669	12	698V	0	36	40.5V	0.0	DB	-	-	-
5840	TM06	62	WN/MN DR RAMP/ELEC/MAXCAP11000LB15FP	LST	0767	-0669	4	26V	0	10	10.9V	0.0	DB	-	-	-
5840	TM06	62	WN/MN DR RAMP/ELEC/MAXCAP22700LB15FP	LST	0767	-0669	11	33V	0	32	8.1V	0.0	DB	-	-	-
5710	TT08	62	WN/RAS/ELHYD/AUTUTNSN/MAXCAP600LB	AFS	0767	-0669	75	64V	0	216	20.7V	0.0	DB	-	-	-
5810	TM01	62	WN/STERN AHR/ELEC/SGL DM DBL GYP	LST	0767	-0669	19	174V	0	74	10.5V	0.0	DB	-	-	-
5730	TM06	62	WN/TOPG/ELEC/1DM GYP/MAXCAP630LB60FP	LST	0767	-0669	1	2651V	0	5	1.2V	0.0	DB	-	-	-
5730	TT06	62	WN/TOPG/ELEC/1DM/MAXCAP10000LB45FP	AU	0767	-0669	4	156V	0	5	8.6V	0.0	DB	-	-	-
5820	TM05	62	WN/TUNING/ELEC/3DM GYP/MAXCAP60000LB	ATF	0767	-0669	10	2482V	0	49	18.9V	0.0	DB	-	-	-
5950	RTGQ	62	WN/RT/ELEC/1DM1GYP/MAXCAP400LB360FP	DDG DEG	0767	-0669	1	1408V	0	11	0.4V	0.0	DB	-	-	-
5710	TS01	62	WN/CAR/ELEC/1DM1GYP/MAXCAP3720LB28FP	AF	0767	-0669	25	630V	0	109	6.6V	0.0	DB	-	-	-
5630	TL08	99	XDCK/DIFF PRESS/MOV-454-XP-11/MVRNG	SSB	0767	-0769	6	2233V	0	0	7.4V	0.0	DA	-	-	-
5630	TL08	99	XDCK/SEA PRESS/MOV-417-XP-17/MVRNG FCT	SSB	0767	-0669	29	9242V	0	0	8.2V	0.0	DA	-	-	-
3110	4703	16	400HZ MG SET/GENERATOR-30/10KW	SSB	0767	-0669	18	6000V	0	0	10.9V	0.0	DA	-	-	-
3110	4703	16	400HZ MG SET/GENERATOR/60KW		0767	-0669	43	5023V	0	0	12.2V	0.0	DA	-	-	-
3140	4703	17	400HZ MG SET/MOTOR-30/10KW	SSB	0767	-0669	75	1440V	0	0	6.6V	0.0	DA	-	-	-
3110	4703	17	400HZ MG SET/MOTOR/5KW	SSB	0767	-0669	9	23333V	0	0	3.9V	0.0	DA	-	-	-
3110	4703	17	400HZ MG SET/MOTOR/60KW	SSB	0767	-0669	80	2700V	0	0	7.6V	0.0	DA	-	-	-
3140	4703	18	400HZ MG SET/400VAC 15HP 350VDC 7.5KW	DU DDG	0767	-0669	0	31263V	0	0	1.6V	0.0	DB	-	-	-
3140	4703	18	400HZ MG SET/440VAC 14HP 250VDC 9KW	DLG DDG	0767	-0669	2	15019V	0	5	1.8V	0.0	DB	-	-	-
3140	4703	18	400HZ MG SET/440VAC 250VDC 23HP 15KW	LSD DLG	0767	-0669	0	12820V	0	10	28.7V	0.0	DB	-	-	-

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Appendix E

ROME AIR DEVELOPMENT CENTER (RADC) DATA

Table E.1. Components covered by the RADC Non-Electronic Reliability Notebook with possible application in the nuclear industry

Accumulators	Boards
Hydraulic	Printed Circuit
	Terminal
Actuators	
Linear, Electrical	Circuit Protection Devices
Linear, Hydraulic	Circuit Breaker
Linear, Hydraulic Servo	Circuit Breaker, 3-Pole
Linear, Mechanical Driven	Electrical Surge Arrester,
Linear, Pneumatic	Spark Discharge
Linear, Pneumatic Piston	Fuse
Rolling Diaphragm	
Rotary, General	Computer Peripheral Devices
Rotary, Electrical	Magnetic Cores
Explosive	Magnetic Tape Unit
	Memory Disc
Antennas	Memory Drum
General	
Radar	Connections
Radio	Solder
	Welded
Batteries	Wire Wrap
Rechargeable	
Non-Rechargeable, One-Shot	Connectors
Connectors	General
	Circular
Bearings	Coaxial
General	Rectangular
Ball	
Needle	Connector Pins
Roller	
Sleeve	Counters, Fixed Rotational
Spherical	
Bellows	Diaphragms, Burst
General	
Explosive	Drives, Constant Speed
Blowers & Fans	
General	Engines
Axial	Diesel
Centrifugal	Gas Turbine

Table E.1 (continued)

Filters, Non-electric	Instruments
Gaseous	Ammeter
Liquid	Galvanometer
	Meter
Fittings	Indicator
General	General
Hydraulic	Air Pressure
Quick Disconnect, Liquid	Engine Torque
Swivel, Hydraulic	Fuel Quantity
	Liquid Level
Gaskets & Seals	Magnetic Sensing Device
Gaskets	Rate of Flow
O-Rings	Tachometer
Packing	Temperature
Seals, General	
Seals, Magnetic	Joints, Microwave, Rotary
Seals, Pressure	
	Manifolds
Gimbals	
	Mechanisms, Power Transmittal
Hardware	Arm
Bushing	Axle
Brushes	Bellcrank
Duct	Cam
Fuse Holder	Clutch, Friction
Retaining Ring	Clutch, Magnetic
Roller, Cargo Loading	Cord
Tailpipe	Coupling
Tubing, Metal	Crank
Washer	Drive Rod
	Drum
Heat Exchangers	Fan Belt
	Gear
Heaters, Electrical	Gearbox
	Pulley
Hoses	Shaft
General	Sprocket
Flexible Metal	
	Motors, Electrical
Ignition Parts & Explosives	General
Igniter, General	Induction
Igniter, Electric	Instrumentation
Explosive Bolt	Fractional H. P., AC
Explosive Motor	2 H. P., AC
Explosive Squib	3 H. P., AC
Explosive Switch	5 H. P., AC
Explosive Timer	7.5 H. P., AC
Squib Switch	10 H. P., AC
	20 H. P., AC

Table E.1 (continued)

Motors, Electrical (Continued)	Relays
Hydraulic, DC	General
Permanent Magnet, DC	Armature
Servo, DC	Contactor
Torque, DC	Crystal Can, Latching
Motor-Generator Set	Crystal Can, Non-Latching
Generators	Latching, General
General	Latching, Polarized
AC	Non-latching, General
DC	Reed
Turbine Driven	Thermal
Mounts, Resilient	Time Delay
Pumps	Sensors
General	Horizontal
Boiler Feed	Torque
Centrifugal	Slip Ring Assemblies
Coolant	Solenoids
Fuel	Switches
Fuel Boost	Centrifugal
Fuel Transfer, Hydraulic Driven	Coaxial
Gerotor Type	Float, Liquid Level Indicator
Hydraulic	Limit
Hydraulic, Manual	Pressure, General
Hydraulic, Variable Delivery	Pressure, Hydraulic
Impeller	Pushbutton
Oil	Reed
Oil Boost	Rotary
Vacuum	Sensitive
Water	Stepping
Compressor, Hydraulic Driven	Thermostatic
Electric Driven	Toggle
Engine Driven	Waveguide
Turbine Driven	Synchros & Resolvers
Regulators	Synchro, General
Fluid Tension	Synchro Control Trans- former
Fuel	Synchro Control Trans- mitter
Oxygen Demand	Synchro Differential
Pressure	Resolver
Temperature	

Table E.1 (continued)

Tanks	Fuel, Float
General	Fuel, Gate
Compressed Gas	Fuel, Pressure Regulator
Fuel	Fuel, Selector
Fuel Cell	Fuel, Shut-Off
Liquid Oxygen	Fuel, Solenoid
Metal Storage	Hydraulic
Oil	Hydraulic, Ball
Reservoir, Hydraulic	Hydraulic, Check
	Hydraulic, Control
Thermocouples	Hydraulic, Pressure
	Regulator
Timers, Electromechanical	Hydraulic, Relief
	Hydraulic, Restrictor
Transducers	Hydraulic, Sequencer
General	Hydraulic, Servo
Fluid Flow	Hydraulic, Shuttle
Motional	Hydraulic, Shut-Off
Pressure	Hydraulic, Solenoid
Tachometer Generator	Hydraulic, Spool, 4-Way
Temperature	Oil, General
	Pneumatic
Transmitters	Pneumatic, Bleed
Flow	Pneumatic, Check
Humidity	Pneumatic, Control
Pressure	Pneumatic, Pressure
Temperature	Regulator
	Pneumatic, Relief
Transformers, Variable	Pneumatic, Selector
	Pneumatic, Shut-Off
Valves	Pneumatic, Solenoid
General	Water
Ball	Water, General
Butterfly	Water, Check
Check	
Control	
Globe	
Relief	
Selector	
Sequencer	
Shut-Off	
Solenoid	
Freon, General	
Fuel	
Fuel, Check	

Appendix F

GOVERNMENT/INDUSTRY DATA EXCHANGE PROGRAM (GIDEP) GENERIC CODES

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Table F.1. Major classifications of the GIDEF generic code

Item name	Refer to major/subclass
ABLATIVE COATINGS.	331
ACCELEROMETERS.	023
ACCUMULATORS.	025
ACTUATORS.	027
ADAPTERS.	336
	361.01
ADHESIVES.	501
AIR-CONDITIONERS.	593
AIR-SPEED INDICATOR.	428.02
ALARMS.	091
ALTERNATORS & ALTERNATOR DRIVES.	557.01
ALTIMETERS.	428.04
AMMETERS.	428.09
AMMUNITION.	415
AMPLIFIERS.	051
AMPLIFIERS, FLUID.	339
ANALYZER, GAS.	428
ANTENNAS.	081
ANTI-SKID DEVICES.	117
APU.	557
ARMING & SAFING.	415
ARMS.	511
ASPHALT.	501.12
ATTACHING METHODS & MATERIALS.	085
	307
	336
ATTENUATING NETWORKS.	651
	661
ATTENUATORS, MICROWAVE.	941.02
AUDIO DEVICES.	091
AXLES, LANDING-GEAR.	511
BAROMETER.	428.05
BASES.	361
BASES, ATTEN-SUPPORT.	511
BASES, SHOCK-MOUNT.	541.20
BATTERIES, NON-RECHARGEABLE.	101
BATTERIES, RECHARGEABLE.	102
BATTERY BOXES.	361
BATTERY CHARGER.	562
BEARINGS.	104
BELLOWS.	115
BELLS.	091
BELTS.	511.60
BIBLIOGRAPHIES OF PUBLICATIONS ON PARTS.	347.10
BINDING.	085.30
BIOLOGICAL EFFECTS ON PARTS/MATERIALS.	347.75
BLADDERS.	805
BLOWERS & FANS.	121
BOARDS, PRINTED CIRCUIT.	142

Table F.1 (continued)

Item name	Refer to major/subclass
BOLOMETERS	428.40
BOLTS	307.10
BOLTS EXPLOSIVE	415
BONDING	085.5
BOOTS, DUST-MOISTURE-SEAL	345
BOTTLES, AIR	805
BRACKETS	361.03
BRAKES	117
BRAZING	085.1
BREATHING APPARATUS	119
BRUSHES, ELECTRICAL	361.04
BUFFER	807
	191
BULBS, LIGHT	461
BUMPERS	361
BUS BARS	361.08
BUSHINGS	361.10
CABINETS	361.11
CABLE, ELECTRICAL	951
CABLE, HOIST	511
CALORIMETER	428
CAMERAS	545
CAMS	511.95
CAPACITORS, FIXED	153
CAPACITORS, FIXED (Code Inactive)	152
	157
CAPACITORS, VARIABLE	161
CAPS	361
CARTRIDGES	415
CARTRIDGES, DEHYDRATOR	325.11
CASES	361.21
CASINGS	921
CATAPULTS	415.80
CAVITIES, TUNED	941.20
CELLS, BATTERY	102
CELLS, PHOTO	651
CERAMIC MATERIAL	501.20
CHAINS	511
CHAMBERS, COMBUSTION, TURBINE-ENGINE	563
CHANGER	230
CHARGER, BATTERY	561
CHASSIS	361
CHOKE	181
	182
	321
CHOPPERS	601
CHUTES, AMMUNITION	361.23
CIRCUIT BREAKERS	341
CIRCUIT PROTECTIVE DEVICES	341
CIRCUITS, EVALUATION OF	170
CIRCUITS, INTEGRATED	515
CIRCUITS, LOGIC	170
	191.20

Table F.1 (continued)

Item name	Refer to major/subclass
CIRCUITS, MICRO.	515
CIRCUITS, PRINTED.	142
CIRCULATORS	941.25
CLAMPS	307.20
CLIPS	307.20
CLOCKS	811
CLUTCHES	511.80
COATINGS	331
COAXIAL CABLE	941
COCKS, DRAIN	927
CODER	807
	191
COIL FORMS	361.55
COILS, INDUCTANCE, ADJUSTABLE	182
COILS, INDUCTANCE, FIXED	181
COMMUNICATIONS EQUIPMENT	817
COMPARATORS	545.10
COMPASSES	428.15
COMPATIBILITY OF MATERIALS REPORTS	347.15
COMPRESSORS	575
COMPRESSORS, REFRIGERATION	593.20
COMPUTER & RECORDING ELEMENTS	191
COMPUTER SOFTWARE	195
COMPUTERS	190
CONDITIONERS, SIGNAL	807
CONDUITS	921
CONNECTIVE-LINKS	361.63
CONNECTIONS	085
CONNECTORS, ELECTRICAL	201
CONNECTORS, HYD & MECH	336
CONSOLES	361
CONTACT-ASSYS, ELEC	601
CONTACTS, ELECTRICAL	361.12
CONTAINERS	347
CONTROLS	428
CONVERTERS	230
CONVERTERS, NON ROTATING	230
CONVERTERS, ROTARY (ELEC)	557.01
COOLERS & COOLING SYSTEMS	593
CORD-ASSYS	951
CORES, MEMORY	191
CORK	501
CORROSION	502
COUNTERS	232
COUPLERS, ANTENNA	902
COUPLERS, DIRECTIONAL	941

Table F.1 (continued)

Item name	Refer to major/subclass
COUPLINGS FLUID	336
COUPLINGS, MECHANICAL	511.40
COUPLINGS, SHAFT, RIGID	511.40
COUPLINGS, WAVEGUIDE	941.30
COVERS	361.22
CRYOGENICS	570
CRYOGENIC SYSTEMS	593
CRYSTALS	241
CRYSTAL TRANSDUCERS	852
CYLINDERS, COMPRESSED-GAS	805.50
DAMPENERS	027
DECALCOMANIA	411
DECODERS	807
	191
DELAY LINES	271
DEMODULATORS	807
DESSICANTS	501.35
DESTRUCT SYSTEMS	415.05
DETECTING-RANGING-SETS	428
DETECTORS	852
DETONATORS	415
DIAPHRAGMS, VALVE	927
DIFFUSERS, AIR	428
DIODES	751
DIODES (Code Inactive)	741
DIODES, LIGHT EMITTING	751
	741
DISCONNECTS	336
DISCRIMINATORS, ELECTRICAL	321
DISTRIBUTION BOXES	361
DOORS	361
DOSIMETER	543
DRAG-LINKS	361
DRIVES	511
DRUM, COMPUTER	191.50
DUCTS	361
	921
DUPLEXERS	807
	817
DYNAMOTORS	557.03
EJECTORS, FLUID & GAS	597
ELAPSED TIME INDICATORS	811.05
ELECTRO EXPLOSIVE DEVICES	415

Table F.1 (continued)

Item name	Refer to major/subclass
ELECTROMAGNETS	361.64
ELECTRON TUBES	301
ELECTRONIC-COMPONENT-ASSYS	530
ENCAPSULANTS	501.32
ENCAPSULATION	525
ENCODERS	191
	807
ENGINE, ROCKET	563
ENVIRONMENTAL CONTROL	391
	593
ENVIRONMENTAL EFFECT STUDIES ON PARTS	347.60
ENVIRONMENTAL SIMULATION EQUIPMENT	306
EQUALIZERS	597
ETCHES & REMOVAL PROCESSES	331.20
	570
EVAPORATORS	396
EXPLOSIVE DEVICES	415
EXPLOSIVES	415
FABRICS	501
FAIRLEADS	361.52
FANS	121
FASTENERS	307
	361
FASTENERS, EXPLOSIVE	415
FATIGUE	502
FERRITE CORES, MEMORY	191
FERRITE DEVICES, MICROWAVE	941
FIBER OPTICS	545
FIELD EFFECT TRANSISTORS	742.50
FILMS	331
	501
FILTERS, ELECTRICAL	321
FILTERS, NON-ELECTRICAL	325
FINISHES & SURFACE TREATMENTS	331
FITTINGS, WIRE	361.87
FITTINGS, TUBING & HOSE	336
FLEX SHAFTS	511.10
FLEXURES	104
FLOWMETER	428
FLUERIC DEVICES	339
FLUIDS	337
FRAME	361
FREQUENCY CONVERTERS/TRANSMITTERS	428.27
FREQUENCY METERS	428.27
FREQUENCY MULTIPLIERS	428.27
FREQUENCY TRACKERS	428.27
FUEL SYSTEMS & EO	563
	565

Table F.1 (continued)

Item name	Refer to major/subclass
FUSEHOLDERS	361.16
FUSES & CIRCUIT PROTECTIVE DEVICES	341
FUSES, HYDRAULIC	339
FUSES, IMPACT	415.80
GAGES	428
GALVANOMETERS	051.32
GAS ANALYZER	428
GAS GENERATORS	415
GASKETS & SEALS	345
GATES, ELECTRONIC	791.05
GAUGES	428
GEARS	511.20
GENERAL TECHNICAL DATA	347
GENERATORS	532
	557.04
GENERATORS, SIGNAL	555
GIMBALS, ROCKET MOUNTING	541
GOVERNORS	597
GROMMETS	361.52
GYROS	358
GYROSWITCHES	791.21
HANDLES	361.50
HARDWARE (Mechanical & Electro Mechanical)	361
HARDWARE IN SPACE, PROBLEMS OF	347.95
HARMONIC DRIVES	511
HARNESSES	951
HAZARDOUS GAS ANALYZER	428
HEADS, ROTARY-WING	511
HEADS, SOUND-RECORDER	191
HEADSET	091
HEARING AID	091
HEAT EXCHANGERS	386
HEATERS, ELECTRICAL	391
HEAT SINKS	361.57
HELICOIL	361
HELIUM SYSTEMS	805
	337.32
HINGES	361.58
HOISTS	511
HOLDERS, LAMP & FUSE	361.16
HONEYCOMB, STRUCTURAL	501
	502
HOOKS	307.40
HORNS	091.10
HOSE	404
	921

Table F.1 (continued)

Item name	Refer to major/subclass
HOUSINGS	361.21
HUBS	361.59
HUMAN ENGINEERING OF PARTS/COMPONENTS	347.90
HYDRAULIC MOTORS AND PUMPS	575
HYDRAULIC SYSTEMS	025
	027
	337
HYDROGEN EMBRITTLEMENT	331
	502
HYDROPHONES	852.73
IDENTIFICATION DEVICES & METHODS	411
IGNITION PARTS & EXPLOSIVES	415
ILLUMINATION	461
INDEXES OF PUBLICATIONS ON PARTS	347.10
INDICATING EQUIPMENT	809
INDICATOR, ELAPSED TIME	811.05
INDICATOR, LAMPS	461
INDICATOR, REVOLUTIONS	232
INDICATORS	428
INDUCTANCE COILS, ADJUSTABLE	182
INDUCTANCE COILS, FIXED	181
INDUCTORS	181
	182
INFRARED EQ (SENSING)	852
INFRARED TESTING	556.30
INITIATORS	415
INSERTS	361
INSTRUMENTS, ACCELEROMETERS	023
INSTRUMENTS AND CONTROLS	428
INSTRUMENTS, COUNTERS	232
INSTRUMENTS, NUCLEAR ENERGY	428.55
INSTRUMENTS, TIMERS & PROGRAMMERS	811
INSULATION, FINISHES	311
INSULATION, HARDWARE	361
INSULATION, MATERIALS	501
INTEGRATED CIRCUITS	515
INTEGRATION, LARGE SCALE	515
INTERCOMMUNICATION-STATIONS	091
INTERCONNECTING-BOXES	361.25
INTERFEROMETERS, ELECTRICAL	545
INTERPHONE SYSTEMS	091
INTERVALOMETERS	557
INVERTERS	230
ISOLATOR, VIBRATION	541
ISOLATORS, RF-REFLECTION	761.10
JACK	201
	361

Table F.1 (continued)

Item name	Refer to major/subclass
JOINTS, FLEXIBLE, FITTINGS	336
JOINTS, FLEXIBLE, POWER TRANSMITTAL	511
JOINTS, SOLDERED	085.10
JOINTS, SWIVEL	336
	511
JUNCTION-BOXES	361.25
KEYBOARDS	191
KEYERS	428.41
KEYS & PINS	361.60
KLYSTRON	301.09
KNOBS	361
LABELS	411
LADDERS	361.56
LAMPHOLDERS	361.16
LAMPS, INDICATOR	461
LANDING GEAR	505.20
	117
LARGE SCALE INTEGRATION	515
LASERS & MASERS	461.85
LATCHES	361.62
LAUNCHERS	505.50
LEADS, ELEC	361.87
LENS	545
LEVERS	511.50
LIGHT EMITTING DIODES	741
LIGHT SOURCES, ELECTRICAL	461
LIMITERS, ELEC-NOISE	321
LIMITERS, TORQUE	361
LINES, DELAY	272
LINES, FUEL	404
	921
LINES, TRANSMISSION	951
LININGS	501
LINKAGE	511
LINKS	361.63
LIQUID FUEL ENGINE PROPULSION PARTS & MATS	563
LIQUIDS	337
LISTS OF PUBLICATIONS ON PARTS	347.10
LOCKS	361
LOGIC CIRCUITRY	191.20
LOUDSPEAKERS	091.10
LUBRICANTS	337
	484
MACHINE-GUNS	505.60
MACHMETERS	428
MACH SERVO	511
MAGAZINES	361.66
MAGNETIC AMPLIFIERS	051.35

Table F.1 (continued)

Item name	Refer to major/subclass
MAGNETIC-DRUMS	191.50
MAGNETIC RECORDING WIRE	191
MAGNETRONS	301
MAGNETS, PERMANENT	361.64
MANIFOLDS	563
MANUFACTURING PROCESSES AND TECHNIQUES	570
MARINE CABLE	951
MASERS & LASERS	461.85
MATERIAL REPORTS, COMPATIBILITY	347.15
MATERIALS, METALLIC	502
MATERIALS, NON-METALLIC	501
MATHEMATICS, RELIABILITY	347.40
MEASURING EQUIPMENT	809
MECHANICAL ASSEMBLIES	505
MECHANISMS, POWER TRANSMITTAL	511
MEMORY	191
METAL FORMING & MACHINE PROCESSES	570
METALS	502
METERS	428
METERS, TIME-TOTALIZING	811
MICROELECTRONIC CIRCUITS	515
MICROPHONE	091.20
MICROSCOPE	545.20
MICROSWITCHES	791
MICROWAVE EQ., OSCILLATORS	555
MICROWAVE EQ., RECEIVERS	817
MICROWAVE EQ., SIGNAL GENERATORS	555
MICROWAVE EQ., TRANSCEIVERS	817
MICROWAVE EQ., TRANSMITTERS	817
MICROWAVE EQ., WAVEGUIDE	941
MIXER-STAGES	051.20
MODULAR PACKAGING TECHNIQUES	501
	525
MODULATION-ELIMINATORS	321
MODULATORS	051.55
MODULES (other than 515)	530
MONITORS	051
MOTORS, MOTOR GENERATORS	532
MOTORS, HYDRAULIC	575
MOTORS, ROCKET	303
MOTOR PARTS, ROCKET	565
MOUNTING OF PARTS	347.23
MOUNTS, RESILIENT (Shock & Vib Isolation)	541
MUFFLERS	091.40
MULTIMETERS	428.25
MULTI-PART/COMPONENT REPORTS	347.15
MULTIPLEXERS	817
MULTIVIBRATORS	170.35

Table F.1 (continued)

Item name	Refer to major/subclass
NETWORKS, CIRCUITS	170
NETWORKS, DELAY LINES	271.4
NETWORKS, MODULES	530
NEW MISSILE/AEROSPACE SAFETY HAZARDS	347.97
NIXIE TUBES	301
NOZZLES	563
NUCLEAR ENERGY AND MEASURING EQUIPMENT	545
NUTS & BOLTS	307
"O" RINGS	345.50
OCEANOGRAPHIC STUDIES	347.45
OCEANOGRAPHY	347.45
OPTICAL DEVICES & CAMERAS	545
OPTICALLY COUPLED ISOLATORS	743.90
ORDNANCE DEVICES	415
OSCILLATORS & SIGNAL GENERATORS	555
OSCILLOGRAPHS	587
OSCILLOSCOPES	556
OXYGEN	337.75
PACKAGING CONTAINERS	347.23
	525
PAINTS & APPLIED COATINGS	331
PANELS	361.71
PANS	361.22
PARTS PROCUREMENT SPECIFICATIONS & PLANS	347.55
PARTS TESTING EQUIPMENT	556
PARTS USE, MOUNTING & APPLICATION DATA	347.23
PAWLS	361.78
PERISCOPE	545.30
PHOTOCELLS	651
PHOTOGRAPHIC EQUIPMENT	545
PINS & KEYS	361.60
PIPE	921
PISTONS	361.65
PITOT-TUBES	921
PLASTICS	501
PLATES	361.68
PLATING	331
PLUGS, MECHANICAL	361
PLUGS, IGNITOR	415.40
PLUGS, ELECTRICAL	201
POLYMERS	501
POTENTIOMETERS	661
POTTING	525
POTTING COMPOUNDS	501.32
POWDER METALS (PIM)	502
POWER SUPPLIES, ELECTRICAL, NON-ROTATING	561
	230

Table F.1 (continued)

Item name	Refer to major/subclass
POWER SUPPLIES, ELEC, NON-ROTATING (Inactv)	562
POWER SUPPLIES, ELECTRICAL ROTATING.	532
	557
POWER TRANSISTORS.	742.20
PRESSURE SWITCHES.	791
PRESSURE TRANSDUCER	852.5
PRESSURE VESSELS.	805
PREVALVE.	927
PRIMA-CORDS.	415
PRIMERS.	331
PRINTED CIRCUIT BOARDS	142
PROBES	852
PROBLEMS OF HARDWARE IN SPACE.	347.95
PROCESSING (Mfg. Processes & Techniques).	085
	525
	570
PROCUREMENT SPECIFICATIONS, GENERAL	347.55
PROGRAM PLANS AND Q.A. OF PARTS.	347.25
PROGRAMS, COMPUTER	195
PROGRAMMERS.	811
PROJECTORS.	545.06
PROJECTORS, SONAR.	428.73
PROJECTORS, TARGET-COURSE.	428.15
PROPELLANTS	563
	565
PROPULSION PARTS & MATLS, LIQUID FUEL ENGS.	563
PROPULSION PARTS & MATLS, SOLID FUEL ENGS	565
PROTECTIVE COATINGS	331
PROTECTIVE CLOTHING	574
PROTECTIVE DEVICES, CIRCUIT	341
PUBLICATIONS ON PARTS, INDEX ON	347.10
PULLEYS	511.90
PULSE FORMING NETWORKS	321
PUMPS & HYDRAULIC MOTORS	575
PUSHBUTTON SWITCH	791
PRYOMETER	545
PYROTECHNICS	415
QUALITY ASSURANCE & PROGRAMS PLANS	347.25
RACKS	361.21
RADAR, ANTENNAS	081
RADAR, SETS	817
RADAR, WAVEGUIDE.	947
RADIAC SET.	543.02

Table F.1 (continued)

Item name	Refer to major/subclass
RADIATION EFFECTS ON PARTS/MATERIALS	347.65
RADIATION EFFECTS, ORDNANCE	415
RADIO-SETS	817
RADOMES	081
REACTORS (Chokes, Inductors, etc.)	181
	182
READERS	191
	545
READOUT & DISPLAY DEVICES	301
	428
RECEIVERS	817
RECEPTACLES, ELECTRICAL	201.50
RECORDERS (Assemblies Only)	587
RECTIFIERS	301
	741
	743
REELING-MACHINES	741
REELS	361
REFRIGERATION DEVICES	593
REGULATORS, DIODE, ZENER	741
REGULATORS, ELECTRICAL	595
REGULATORS, ELECTRON TUBE	301.73
REGULATORS, FLUID,	597
RELAYS	601
RELAYS, OPTICAL, FIBER	545
RELIABILITY MATHEMATICS	347.40
RELIABILITY OF PARTS, GENERAL	347.25
RESERVOIRS	805
RESISTORS, FIXED	651
RESISTORS, VARIABLE (Potentiometers or Rheostats)	661
RESOLVERS, ELECTRICAL	795
RESTRICTORS, FLUID-FLOW	597.10
RETAINERS	361.72
RETRACTORS	361
REVOLUTIONS INDICATOR	232
RHEOSTATS	661
RINGS	361
RIVETING	085.65
RIVETS	307.70
ROCKET FUEL	565.70
RODS	511
ROLLERS	104
ROTARY JOINT	511
RUBBER	501.8
SAFE-ARM DEVICES	415
SAFETY HAZARDS	347.97
SCREENS	325
SCREWS	307.80
SCROLL-HOUSING	361
SEALS	345

Table F.1 (continued)

Item name	Refer to major/subclass
SELECTOR MODULATION	807
SEMICONDUCTORS, DIODES	731
SEMICONDUCTORS, DIODE (Code Inactive)	751
SEMICONDUCTORS, INTEGRATED CIRCUITS	515
SEMICONDUCTORS, SPECIAL TYPES OF	743
SEMICONDUCTORS, SPECIAL TYPES OF (Inactive)	753
SEMICONDUCTORS, TRANSISTORS	742
SEMICONDUCTORS, TRANSISTORS (Inactive)	752
SENSORS	852
SEPARATORS	339
SERVOCYLINDERS	027
SERVOMECHANISMS	795
SERVOVALVES	927
SERVOES, ELECTRICAL	532
SEXTANTS	545.60
SHAFTS	511.10
SHIELDS & SHIELDING	761
SHIMS & SPACERS	361.74
SHOCK ABSORBERS	541.20
SIGHTS	545
SIGNAL GENERATORS	555
SILICON CONTROLLED RECTIFIERS	741.30
SIMULATION EQUIPMENT, ENVIRONMENTAL	306
SIRENS	091.10
SLIDING	921
SLIP RINGS	361.54
SOCKETS	361
SOFTWARE, COMPUTER	195
SOLAR CELLS	102.60
SOLDERING	085
SOLENOIDS	771
SOLID FUEL PROPULSION PARTS & MATERIALS	565
SOLVENTS	337
SPACERS & SHIMS	361.74
SPEEDOMETERS	428
SPIDERS	852
SPRINGS	511
SPROCKETS	361.77
SQUIBS	361
STABILIZATION, GRAVITY	415
STABILIZERS, ROTARY-WING	358
STAINLESS STEEL	505.80
STAINS & PENETRANTS	502
STAPLES	331
STARTERS	307.90
STOPS, ELEC	511
STRAINERS	532
STRAPS	731
STROBE LIGHT	325
SUPPORTS	361
	461
	361.78

Table F.1 (continued)

Item name	Refer to major/subclass
SURFACE TREATMENTS	331
SWASHPLATES	511.90
SWITCHES, ELECTRICAL	791
SWIVEL-JOINTS	511
SYNCHRONIZERS	811
SYNCHROS (Incl. Resolvers)	795
TACHOMETERS	428
TANKS & TANK PARTS	805
TAPES, MAGNETIC	191.75
TELEMETRY	807
	817
TELESCOPES	545.70
TELEVISION CAMERAS	301
TELEVISION TUBES	545.80
TEMPERATURE-ELEMENTS	428
TERMINAL-BOARDS	361.80
TERMINATIONS	361.87
TEST METHODS	347
TEST PLANNING	347.50
TEST SETS	428
THERMAL INSULATION	331
	361.70
	501
THERMIONIC CONVERTERS	561.07
THERMISTORS	651.75
THERMOCOUPLES	852
THERMOMETERS	428.74
THERMOSTATS	791
	852
	428
THRUSTERS	415
THYRATRONs	301
THYRISTORS	741.76
TIMERS & PROGRAMMERS	811
TIPS, AILERON	361.89
TIRES	117
	501
	361
TITANIUM	502
TORSION-BAR	361.58
TOTALIZERS	428.23
TRACK-SHOES, VEHICULAR	361.86
TRAINS, EXPLOSIVES	415
TRANSCIVERS, RECEIVERS, & TRANSMITTERS	817
TRANSDUCERS	852
TRANSDUCERS, AUDIO	091
TRANSFORMERS	902
TRANSISTORS	742
TRANSISTORS, (Code Inactive)	752
TRANSMISSION LINES	951
TRANSMISSIONS	511

Table F.1 (continued)

Item name	Refer to major/subclass
TRANSMITTERS, RADIO	817
TRANSMITTERS, SENSORS	852
TRAPS, MOISTURE	325.46
TRAVELING WAVE TUBE	301
TRAVELING WAVE TUBE AMPLIFIERS	051
TREADS	361.86
TRIMMERS, CAPACITORS	161
TRIMMERS, COILS	182
TRIMMERS, RESISTORS	661
TUBES, ELECTRON	301
TUBES, FLASH	461
TUBING, CASHINGS & SLEEVING	921
TUNERS, RF	161
TUNING FORKS	555
TUNNEL DIODES	741.80
TURBINES, COOLING	386.05
TURRETS	505.85
TWINE, HARNESS LACING	361
UMBILICAL CONNECTORS	201
UNIVERSAL JOINTS	336
VALVES	927
VALVES (Code Inactive)	925
	926
VALVES, REGULATING	597
	927
VARACTORS	741.90
VENTURI-TUBES	921
VESSELS, PRESSURE	805
VIBRATORS, CHOPPERS	555
VIDEO-CONDITIONING-GROUPS	428
VIDICON	301.01
VISORS	761.40
VOLTMETER	428.05
VOTER, MAJORITY (Logic Ckt)	191.20
WARNING DEVICES	091.10
WASHERS	361.74
WAVEGUIDE & MICROWAVE COMPONENTS	941
WAVEMETERS	428.90
WELDING	085
WHEELS	117
WINCHES	511
WINDOWS	361
WIRE, CABLES & HARNESSES	951
WIRE-FABRICS	502
WIRE, MAGNETIC RECORDING	191
WRAPPING	085.40
	525
ZENERS	741
ZIPPERS	361
	307.99