N P R D S

Nuclear Plant Reliability Data System

Long Range
Action Plan

9/13/83

CONTENTS

1. PURPOSE

The purpose of this long range action plan is to provide recommended actions to the Users Group to enhance the Nuclear Plant Reliability Data System (NPRDS). The basic approach used is summarized, in order, by the table of contents. After reviewing historical and current documentation relevant to the NPRDS, the first topic that is discussed is a top-down approach. This analysis yielded the primary users and helped identify their needs. The NPRDS of the future will be designed to meet these identified needs and other criteria which were developed for an enhanced NPRDS. When the enhanced NPRDS was compared to the current NPRDS, differences were noted. Recommended actions to resolve these differences were developed, followed by a discussion of the logical sequence, or schedule, to resolve the differences.

It is important to note that none of the recommendations presented in this action plan involve major scope changes or significant reporting form mechanistic revisions.

2. INTRODUCTION

History

In the early 1970's, various U.S. utility industry committees of the American National Standards Institute (ANSI) and the Edison Electric Institute (EEI) recognized the growing need for failure data on nuclear plant components and established an ad hoc committee to scope and develop a data collection system. The objective of this system was to make available reliability statistics (e.g., failure rates, mean-time-between-failures, mean-time-to-restore) for safety related systems and components. These statistics would be used by industry groups and by the staff of the U.S. Atomic Energy Commission (AEC) to improve nuclear plant reliability and availability; to expedite licensing actions; to justify readjustment of testing schedules; to identify significant component failure modes and wear-out patterns.

This system, the NPRDS, was developed by a contractor, the Southwest Research Institute (SWRI), under the direction of an ANSI (later an ANS--American Nuclear Society) subcommittee whose members came from utilities, NSSS vendors, EEI, and the AEC. Plants began reporting data on a voluntary basis in 1974, and from 1974 to 1982 all data processing and data base management was carried out by SWRI.

In January 1982, the Institute of Nuclear Power Operations (INPO) assumed management responsibility for the system and the ANS subcommittee was replaced by the NPRDS Users Group, whose members represent the primary users of the data--INPO staff, utilities, NSSS vendors, architect/engineers, the U.S. Nuclear Regulatory Commission and Department of Energy.

NPRDS-1983

The Nuclear Plant Reliability Data System (NPRDS) is a collection of detailed engineering data on systems and components important to nuclear plant safety and productivity. The data base covers 78 U.S. nuclear units, each of which provides engineering data on 6,000-7,000 components from some 30 systems, and failure data when these components fail to perform a required function. The NPRDS provides broad-based equipment history information to support plant operations and maintenance and component reliability statistics to support risk assessment and trending studies.

There are two basic kinds of information submitted to NPRDS--engineering/test information and failure reports. The engineering/test record on a component contains information necessary to identify the component and its application such as manufacturer, model number, operating environment, size, horsepower, and test frequencies. This information is submitted once, when the component is placed in service, and stored in the data base. Then, whenever that component fails to perform as intended, a report is submitted containing a description of the failure mode, cause and effect, corrective actions taken, and other information necessary to assess the failure.

The data is easily retrievable from the computer and the engineering and failure information can be combined in various ways. A search of the failure records then identifies problems experienced with that component in other plants and the corrective actions taken. Uses of the data are varied but may be summarized as follows:

<u>Utility and Plant Staffs</u>

- o As a comprehensive equipment history file to support maintenance planning and repair activities
- o To avoid forced or prolonged outages by identifying other plants stocking a needed piece of equipment for a possible loan
- o Spare parts stocking based on mean-time-between-failures
- o Comparison of component failure rates at a given plant with the industry average failure rate.

Design Groups

- Identification of common failure modes and causes
- Vendor selection based on component application and performance
- Identification of component wearout and aging patterns
- Engineering studies of component performance as a function of operating characteristics such as test frequency and operating environment
- Input to plant availability improvement programs.

Operating Experience Reviewers

- Identification of significant failure modes affecting safety or availability
- Trending of component failure rates
- Development of accurate failure probability estimates for use in fault tree analyses (PRA studies).

NPRDS data is available to users either through various quarterly and annual summary reports or through direct on-line access of the data base from a computer terminal.

3. ANALYSIS OF THE NPRDS

In analyzing the NPRDS, the first question that was addressed was--What is the overall primary objective of the NPRDS? Second--Who has been tasked to meet this primary objective? And finally--What needs do these organizations have which NPRDS could, or should fulfill?

The primary objective of the NPRDS is to provide engineering and component failure rate data so that the utilities can operate their reactor plants in a safe, reliable, and economical manner and reduce the risk of component failures resulting in forced outages, on-site plant damage, and environmental impairment.

Once the primary objective has been established, the "Who" becomes a function of the license status of the plant. But there are four basic organizations responsible for meeting the primary objective. They are 1. Design/Engineering, 2. Construction/Procurement, 3. Operations/Technical Support, and 4. Maintenance. These elements can represent large, single-purpose corporations (e.g., Architect Engineers responsible for the design), or branches within a utility, contractor, or subcontractor. By analyzing the elements, the majority of the potential users of the NPRDS can be identified. A list of potential users is shown on Table 3-1. As the data base could never meet all the needs of all the potential users, it must realistically be trimmed to a list of primary users. The recommended primary user list is contained on Table 3-2. The remainder of the potential users still have access to the data base through INPO's quarterly and annual reports.

To aid in meeting the primary objective, each of these organizations has specific needs. Once these needs have been identified, the scope of the enhanced NPRDS has been developed. Where a conflict of needs occurs, the utilities' need should prevail, since the utilities are the sole source of data and currently are the principal funding source for maintaining the NPRDS. A summary table of the primary users and their needs is presented in Table 3-3. These needs have been identified, based principally on the

TABLE 3-1 POTENTIAL USERS OF NPRDS DATA BASE

1.	U.S. Utilities
2.	Foreign Utility Participants of INPO
3.	Nuclear Regulatory Commission
4.	Vendors
5.	Nuclear Steam System Suppliers
6.	Architect Engineers
7.	Department of Energy/DOE Contractors
8.	Professional Societies (ANS, IEEE, etc)
9.	Other Government Agencies (NASA, FAA, etc)
10.	Utility Subcontractors
11.	Other Industries
12.	Non-NPRDS Utilities (Total of six)
13.	Universities
14.	Insurance Companies
15.	Foreign Utilities
16.	Other Data Base Sponsors
17.	Computer Suppliers
18.	Reliability Engineering Firms

TABLE 3-2 PRIMARY USERS OF NPRDS DATA BASE

1. U.S. Utilities including EPRI and INPO
2. Foreign Utility Participants of INPO
3. Nuclear Regulatory Commission
4. Vendors
5. Nuclear Steam System Suppliers
6. Architect Engineers
7. Department of Energy/DOE Contractors

TABLE 3-3 USERS AND USAGES (SHOWING RELATIVE PRIORITY FOR EACH USER)

Users/Uses	US Utilities	Foreign Utilities	NRC	Equipment Vendors	NSSS Vendor	AE's	DOE
Maintenance	1	2	2	1	1	1	2
Spares	[illegible]	1	3	1	2	2	3
Procurement Decision	2	2	--	--	1	1	2
Vendor Evaluation	2	1	4	1	1	1	3
Equip. History	2	1	2	1	2	2	2
Failure Rates	2	1	1	1	1	1	1
Failure Modes	2	1	1	1	1	1	3
Comp. Performance	2	1	2	1	2	2	3
Trending	2	2	1	1	2	2	4
Comp. Uses	2	2	2	2	1	1	4
Equip. Quals	2	1	3	3	3	3	4
Tech. Specs.	3	3	1	4	2	2	4
Saf. Sign. Events	3	3	2	4	2	2	1
PRA	4	4	1	4	4	3	1
Accident Analysis	--	4	1	4	4	4	1

objectives of the primary user. A relative priority, based on a subjective assessment of the primary needs has also been assigned to assist the NPRDS Users Group rank the importance each need relative to the user objectives. The uses are further explained on Table 3-4.

TABLE 3-4 USES OF NPRDS

Use (Table 3-3)	Explanation
Maintenance	- Scheduling of preventive maintenance, evaluating utility maintenance program by comparison failure rates
Spares	- Stocking, locating emergency repair parts from other plants with similar equipment
Procurement decisions	- Search of data to review operating problems on which procurement decisions can be based
Vendor evaluation	- Self-explanatory
Equipment history	- Easier accessibility than plant maintenance records for utilities that don't maintain their own computer based equipment history-allows comparison to other plants
Failure rates	- Self-explanatory
Failure modes	- Self-explanatory
Component performance	- Predicting wearout and operating problems
Trending	- Trending studies to identify safety or productivity-related problems
Component uses	- Identify current uses of specific components in various systems, identify improper application of components
Equipment qualifications	- Aid in using different vendor component for replacement
Technical specifications	- Using data to justify changes to tech. spec. surveillance testing requirements
Safety significant events	- Review of operating experience for generic problems that could affect whole industry
PRA	- System and component reliability studies for PRA input
Accident analysis	- Study of precursors for accident initiation

4. NPRDS REQUIREMENTS

The enhanced NPRDS must have the following qualities:

1. It must meet the utilities' needs.

2. It should meet the majority of the needs of the remaining primary users.

3. The credibility of the data must be accepted without question.

4. The system must be supported by the utilities, and a satisfactory number of utilities must participate in the program.

5. The system must become relatively stable. Only periodic, minor changes should be imposed on the participants.

6. All extraneous data which was previously reported, but was of little or no value to the primary users, must be purged from the reporting requirements.

7. The system must be responsive and "friendly" to all primary users.

8. It must satisfy the NRC reporting desires to supplement the July, 1983 Licensee Event Report (LER) rulemaking.

9. The Users Group must have a high level of utility support and participation.

10. The utilities must recognize a cost benefit in their participation.

11. INPO, in its management of the NPRDS, must continue to be responsive to the recommendations of the Users Group.

These requirements can be realistically attained within two to three years. Section 5 addresses the differences between the current NPRDS data base and the recommended NPRDS enhancements. The next Section (6) presents several recommendations to resolve these differences in a manner which is intended to produce the enhanced NPRDS.

5. DIFFERENCES BETWEEN CURRENT NPRDS AND THE ENHANCED NPRDS

Several concerns arise when comparing the current data base with the recommended data base. Some of them are readily apparent, stemming from the number of utilities participating, while others are subtle.

The major concern lies with the number of utilities participating in the NPRDS. If the NPRDS is to continue as a voluntary program, the level of participation by the utilities must increase.

The utility perceived benefits in NPRDS participation are not at the level they warrant. There is a significant cost-saving potential in participation and use. It's unfortunate that a certain number of days of less forced outage time can't be assigned to NPRDS participation. That would, of course, relate to a dollar savings that utility management could compare to the program cost for justification to continue participation in NPRDS. But such lack of concrete evidence is the plight of statistical reliability engineering work. Intuitively, one can argue the use of statistical mean-time-to-failure data for preventive maintenance scheduling, but its difficult to assign a definite dollar value to the cost savings from that work. The benefits of participation and methods to utilize the data base for the utility user need to be expounded.

The complexity of the NPRDS is magnified by the changes it is currently undergoing. The almost doubling of the reportable scope; the difficulty in locating necessary engineering data, changing to Energy Industry Identification System (EIIS) number designations; and the addition of application codes have all added complexity to an already complex system. The detail required on every report makes every component report a separate, unique problem. The addition of direct on-line access to the data base has helped reduce some of the apparent complexity.

The credibility of the NPRDS data base is questionable on the basis of input report screening and the number of utilities participating. The current screening program at INPO verifies comprehensibility and completeness of an input reports, but does not judge the validity of the report to be part of the data base. For example, a failure occurring while operating a reportable component outside a design limit taints the mean time to failure determination. Additionally, if a fault occurs in a reportable component by a failure in a non-reportable component, the NPRDS will indicate a failure of the reportable component. The concept of failure versus fault is not differentiated in NPRDS reporting.

The current number of users outside the utilities could be increased to help offset some of the utility costs in maintaining the NPRDS. The recommended primary users in Table 3-2 should be solicited to expand the users list.

The NRC has a definite need in the NPRDS reporting failures which supplement the new LER rulemaking. As noted in the Federal Register/Vol. 48 No. 144/Tuesday, July 26, 1983/Rules and Regulations,

> "However, the Commission wishes to make it explicitly clear that it is relaxing the reporting requirements (LER) with the expectation that sufficient utility participation, cooperation, and support of the NPRD system will be forthcoming. If the NPRD system does not become operational at a satisfactory level in a reasonable time, remedial action by the Commission in the form of additional rulemaking may become necessary."

Thus, it is clear that the NRC is actively reviewing the progress of the NPRDS.

6. RECOMMENDATIONS TO RESOLVE THE DIFFERENCES

Several methods are available to deal with the concerns expressed in the preceding section. The responsibility for any resolutions to NPRDS lies with INPO and the NPRDS Users Group. The consequences of any resolution need to be examined in the light of unnecessarily complicating the NPRDS. The resolutions to the differences are discussed in the following subsections in the order presented in Section 5.

A. Number of Utilities Participating

As previously noted, the number of participating utilities must increase for the NPRDS to remain a voluntary participation program. The first recommendation for increasing the level of participation is for the NPRDS Users Group declaring a moratorium on further system enhancements. The moratorium would give a "fixed target" to all of the utilities by stabilizing the reporting requirements. The Users Group needs to define what level of utility participation is adequate, then the moratorium should remain in effect until that level of participation is attained.

With a moratorium in effect, a phased implementation of the reportable scope could be examined. This phased implementation should logically commence with the category of failures which cause a reactor unit to enter a Limiting Condition for Operation (LCO). The results should be a higher level of utility participation.

The remainder of the phased implementation could be accomplished in several generic steps until the reportable scope is consistent with the latest revision of the scoping manual. It is recommended that the phased implementation be specified as a "minimum acceptable" plan and utilities which are current with engineering data could file failure reports for all reportable failures as they desire. Each step of the phased implementation program should be allowed at least six months duration before moving on to the next phase.

One of the significant concerns of the utilities is the resource commitment necessary to support NPRDS reporting at the site.

This apparent disadvantage of voluntary participation can be dealt with by three different methods. First, the benefits of participation could be expounded. This item is discussed in Section 6.B below. Second, the number of primary users could be increased to offset NPRDS Cost. Lastly, a rebate program could be initiated by INPO, where money is returned to the utility, based on participation in the NPRDS. The rebate is proposed to be non-punitive (i.e., "poor" participation would not result in an increased levy) and would be based on plant evaluation visits and NPRDS Department evaluation of level of effort. Thereby, the plant could realize an immediate fiscal benefit from "satisfactory" participation.

The complete list of data requested and the reporting forms should be reviewed in detail to determine which data are not necessary to the primary users. Simplification techniques and reduction of input data should not be delayed based on the moratorium. Anything which reduces the amount of data or simplifies the reporting should be resolved and implemented as soon as available. The NPRDS needs to be responsive to the needs of all the primary users, but at this juncture, should be particularly responsive to the needs of the utilities. Any method which increases user friendliness, where the utilities are concerned, should be pursued. For example, reducing the number of rejected reports would have very positive results.

B. Benefits of Participation

Methods need to be developed whereby the utilities realize benefits in participation. The problem of poor utility participation should then evaporate. Relevant and significant methods of data base manipulations have to be defined and refined. It is therefore recommended that a methods handbook should be developed by a reliability engineering group. This handbook is envisioned to be a step-by-step outline which explains with examples how to implement the various uses presented in Table 3-3. The explanations would utilize existing NPRDS interactive terminal commands for necessary searches and would give several examples that demonstrate possible solutions to some of the generic problems that result from the broad scope of the data base. Coincidentally, a training plan needs to be developed for teaching the methods handbook at the users' workshop meetings at INPO.

One additional benefit which needs to be presented is the continuation of a utility controlled NPRDS. If participation continues on a voluntary basis, the scope and mechanistic changes to NPRDS will remain with the NPRDS Users Group. IF the NRC implements mandatory participation through the Integrated Operating Event Reporting (IOER) System or some other mechanism, then the extent of the reportable scope and information collected is no longer under the control of the Users Group. Since the primary objective of the regulators is different than the utilities', there is a realistic probability that the primary uses would tend toward supporting research, licensing questions, and surveillance. Consequently, the NPRDS would become less sensitive to the needs of the utilities and other primary users. Thus, it is a benefit to the utilities to maintain voluntary participation.

C. Complexity

The concern with complexity cannot be totally resolved. The broad-based NPRDS is complex and will always be complex. The complexity that currently exists for a utility which is not actively participating can be partially resolved by the Users Group adopting a phased implementation program for the current reportable scope, as previously discussed in Section 6.A. The current changes the system is undergoing are very broad in application and add to the complexity.

D. Credibility

To satisfy the concerns regarding the credibility of the NPRDS data base, two issues need to be resolved. First, the level of utility participation and the number of utilities participating need to be increased. This issue has been discussed previously in Section VI, above., Second, the screening of input reports must be defined such that fault versus failure events and operator or operating failures are differentiated. For example, a failure caused by operating outside a design envelope should not appear in a reliability data base. The Users Group needs to establish acceptable report criteria to eliminate this class of polluting report. It is recommended that a screening committee within input be established to review input reports and approve them for entry into the data base. The current INPO screening of reports appears adequate for the limited scope of review that is performed, but the current screening should be expanded to decide the "validity" of the failure report for inclusion into the data base.

The issue of credibility resolution can be tested, for example, by a Technical Specification change which is justified by NPRDS data. If the NRC accepts the data as credible and satisfactory justification, the credibility of the data base will have progressed significantly.

7. LOGICAL SCHEDULE TO DEVELOP THE ENHANCED NPRDS

A schedule which shows the logic of implementing the recommendations in this plan is presented in Figure 1. The logic is shown in unity duration since the time to implement is based on the Users Group and INPO's resolution to the recommendations and the assigned action groups. The critical path item on this schedule is the phased implementation of the reportable scope engineering data and failure reports. The majority of the recommendations are logically independent activities that do not rely on a long series of work items to be accomplished. It is estimated that a reasonably conservative time frame of three years could envelope this schedule.

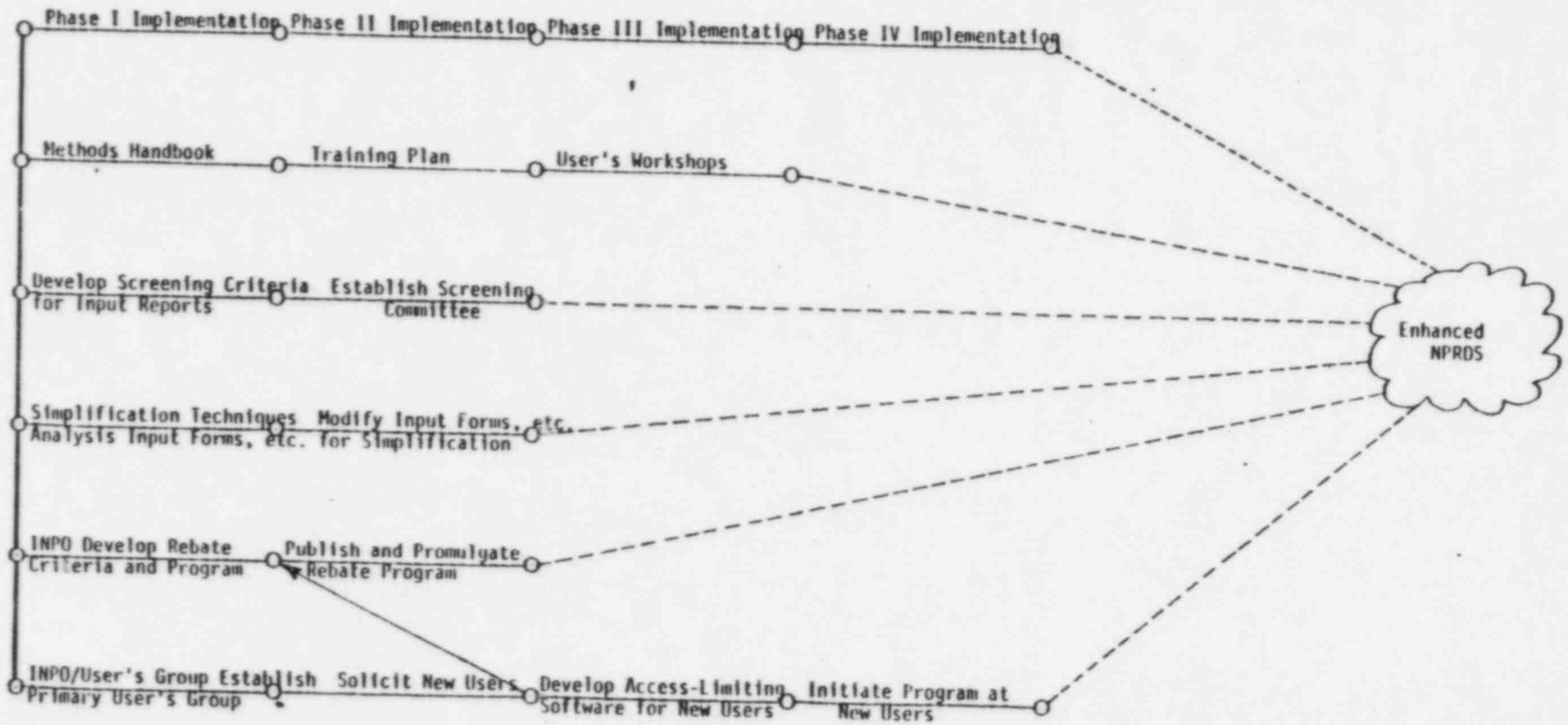

FIGURE 1. UNITY DURATION LOGIC DIAGRAM FOR ENHANCING THE NPRDS.

8. SUMMARY

The proper use and timely submission of failure reports can go a long way toward increasing the reliability and safety of the utilities' power plants. Timely reporting will not only enhance the overall credibility of the data base, but will broaden the scope of input information to the Significant Event Evaluation and integration Network (SEE-IN), thus increasing the likelihood of discovery of generic problems that could affect the majority of the utilities.

The scope and recommended changes in this long range action plan have been developed with a top-down approach and represent a broad-brush approach. The most significant concern which has been repeatedly discussed is the level of utility participation. Therefore, the principal recommendation that can be presented is the Users Group and INPO resolve to address this central issue in every action they are contemplating. By concerning themselves with this issue, and appreciation of the consequences of their action on the level of participation, the Users Group and INPO can develop the NPRDS into an even more valuable tool for the entire nuclear industry.

NPRDS STATUS

RESCOPING

DO ALL THE MAJOR BENEFITS FROM USE REQUIRE

ALL THE ENGINEERING DATA BEING COLLECTED?

- Letter from Northeast Utilities,
  W. G. Counsil dated October 23, 1983

APPROACH TO

ANSWERING BENEFIT/COST QUESTION

- Develop answers and make changes (if needed) in two stages

  - Look at data collecting that appears to provide marginal or no benefits. If confirmed, make changes to data collection in early 1984.

  - Examine remaining engineering data collection benefits and costs. If data simplification is appropriate, make changes in 1985.

NUMBER OF SEPARATE ENGINEERING DATA ITEMS

- o Mandatory - 32 - 40 items (Table 3 can have minimum of 1 and maximum of 9 items)
  - Only 11 items appear to be needed for qualitative use
  - Only 18 - 26 items appear to be needed for quantitative ? use
  - 14 items do not appear to be needed

ENGINEERING DATA ~~PROBABLY NOT NEEDED~~ / POOR DATA / TOUGH TO GET

- o PRESENTLY MANDATORY
  - operating mode with reactor critical
  - external environment
  - supplier/vendor identification
  - reference document number (drawing, manual)
  - percent operating time when reactor in standby condition (if not mandatory, would eliminate need for quarterly operating report)
  - testing information (9 data pieces)
- o TABLE 3 DATA ALSO BEING REVIEWED
- o IF NOT NEEDED, UTILITIES COULD REPORT AS OPTION

<u>CRITERIA BEING USED TO EVALUATE ENGINEERING DATA</u>

- o WHO USES DATA NOW?

  Review of past searches

  Review of periodic NPRDS reports

- o WHAT WAS INTENDED USE OF DATA?

- o WHAT IS QUALITY OF DATA ALREADY COLLECTED?

- o CAN DATA ACTUALLY BE USED AS INTENDED?

  Were assumptions correctly stated.

- o WHAT IS DIFFICULTY OF COLLECTION?

- o WHAT WILL BE IMPACT TO DATA BASE STRUCTURE?

OPTIONAL REPORTING

- o PRESENTLY 5 ITEMS ARE OPTIONAL

- o PROPOSED CHANGE WOULD MAKE 19 ITEMS OPTIONAL

- o PAST EXPERIENCE INDICATES MANY UTILITIES HAVE MADE ALL OPTIONS MANDATORY IN THEIR COMPANY

- o INPO WILL EMPHASIZE UTILITIES SHOULD EXERCISE OPTIONS CAREFULLY. OPTIONS WILL ONLY PROVIDE BENEFITS TO THEIR OWN COMPANIES, NOT TO INDUSTRY

- o INPO COULD PROVIDE LIST OF PROS AND CONS FOR EACH OPTION TO ASSIST DECISION MAKING

TABLE 3 - DATA REVIEW

- Difficult to review because of past use to differentiate within a component category

- Use of application codes may help reduce need for some Table 3 data

- Increased emphasis on accurate manufacturer and model may also help effort

AREAS USERS GROUP COULD ASSIST IN EVALUATION

- What is difficulty of collecting individual data items?
  - Needed for determining cost
  - Needed to compare with results of quality review

- What would be major losses to user if data not collected?

- Users desiring to assist would be mailed questionnaire
  - Utility volunteers especially needed to provide cost input as well as use needs
  - NRC and SPs needed for uses

OTHER OPTIONS BEING STUDIED

- o Make more components reportable only on failure
  - concentrate failure rate determinations on key components
  - e.g. remote and automatic valves instead of all valves

- o Demand failure rate collection
  - Stoller and SwRI studies;
    e.g., Stoller approach reduces engineering effort significantly with modest increase in failure reporting effort.

OUT OF SERVICE REPORTS

- o Guidance states submit when component permanently removed from service

- o Interpreted as meaning submit for
  - replacement with identical component
  - replacement with different type component
  - elimination by modification with no replacement

- o See no need for out of service when replacement with identical component
  - hours of service will be unchanged
  - failure report will capture when failure is reason for replacement
  - distinguishing maintenance practices not objective of NPRDS

- o Will clarify to reporters in Rev. 10 and possibly NOTEPAD

HOW CAN NPRDS BE USED?

- Much industry emphasis on reporting
- INPO efforts still focusing on data collection but shifting to use
- Long range success dependent on NPRDS providing utilities tangible benefits
- Suggest Users Group assist INPO in answering question for utilities

INSTRU SCOPING

APPLICATION CODES

GENERIC COMPONENT TYPE	NPRDS SYSTEM	SPECIFIC MAJOR/KEY COMPONENT	10 - DIGIT 1 - STEP DATA SEARCH APPLICATION CODE	6 - DIGIT MORE THAN 1 - STEP SEARCH APPLICATION CODE
PUMP	CBA (GE)	Reactor Coolant Recirculation Pump	RCRCIRCP	RECIRP
	CBA (GE)	Jet Pump	JETPMP	JETPMP
	CBD (B&W)	Reactor Coolant Pump	RCPMP or RCP	RCPMP
	CBG (CE)	" " "	"	"
	CBH (W)	" " "	"	"
	CFA (GE)	Residual Heat Removal (RHR) Pump/Decay Heat Removal Pump	RHRPMP	RHRPMP
	CFC (B&W)	" " " " " " " " "	"	"
	CFD (CE)	" " " " " " " " "	"	"
VALVE	HBA (B&W)	Main Steam Relief Valve	MSRELV	MSRELV
	HBB (CE)	" " " "	"	"
	CCA (GE)	" " " "	"	"
	HBC (W)	" " " "	"	"
VALVE	CBD (B&W)	Pressurizer Power Operated Relief Valve	PZPORV	PZPORV
	CBG (CE)	" " " " "	"	"
	CBH (W)	" " " " "	"	"

GENERIC COMPONENT TYPE	NPRDS SYSTEM	SPECIFIC MAJOR/KEY COMPONENT	10 - DIGIT 1 - STEP DATA SEARCH APPLICATION CODE	6 - DIGIT MORE THAN 1 - STEP SEARCH APPLICATION CODE
VALVE	CFC (B&W)	Residual Heat Removal (RHR)/Decay Heat Removal Flow Control Valve	RHRFLOCONV	FLCONV
	CFD (CE)	" " " " " " " "	"	"
	CFA (GE)	" " " " " " " "	"	"
	CFF (W)	" " " " " " " "	"	"
VALVE	CFC (B&W)	RHR Heat Exchanger Outlet Isolation Valve	RHRHXOISV	HXOISV
	CFD (CE)	" " " " " "	"	"
	CFA (GE)	" " " " " "	"	"
	CFF (W)	" " " " " "	"	"

KEY/MAJOR COMPONENT

APPLICATION CODE OBJECTIVES

1. Utilize previous efforts

2. Mnemonic codes used (wherever possible)

3. Keep size of list small (300-400 maximum components)

4. Provide listing in RSM and RPM

5. Provide unambiguous data retrieval on selected items

6. Ensure component listing is application oriented.

APPLICATION CODES KEY/MAJOR COMPONENTS

A. RATIONALE

- o Safety
- o Significant Failure
- o Reliability

B. IDENTIFICATION PROCESS

- o Previous/Concurrent Assessments
  - SwRI/Sandia
  - S. M. Stoller Corp.
  - NUG Function/Application Code Study
- o Knowledgeable Experts
- o Failure Report Data
  - NPRDS
  - LER
  - OPEC
  - GADS
  - WORKSHOPS

C. SELECTION PROCESS

- o Safety
- o Significant Failure
- o Reliability

D. REVISION PROCESS

- o Aperiodic
- o Failure/Demand Oriented
  - Frequency Prompted
  - Performance Assessment

- o User Requests
  - Special Problems
  - Retrieval Justified
  - Minimize Ambiguity

HUMAN ERROR

NUTAC RESPONSE

III.B Recommended Enhancements To Existing Programs

Some areas of the present NPRDS system do not address all intended uses and applications of VETIP. The following areas are identified for resolution by INPO and the NPRDS User's Group. Solutions to these problems should be developed and implemented to meet the needs of VETIP.

III.B.1 Enhancements to NPRDS

a) The present definition of component in NPRDS (extracted from IEEE Std 603-1980) is more applicable to electrical components. The definition should be improved to better describe mechanical components.

b) The present failure reporting guidance needs improvement in the following areas:

   i Guidance is needed to provide better information for analyzing the role of piece parts as a factor in causing component failures.

ii The guidance should be revised to indicate that information is needed when inadequate vendor information was identified as a causal factor in a failure.

iii Present failure reports are often sketchy in providing details of failure analysis conducted by utilities. The guidance should emphasize the importance of providing the results of failure analysis when one is conducted. Although detailed failure analyses are not always conducted for every failure, when they are conducted they should be provided in NPRDS failure reports. Only in this way can the SEE-IN program and other utilities benefit from the work of each utility.

iv INPO's NPRDS screening procedures should be broadened to identify information inadequacies revealed by the failure analysis.

c) Because of the difficulties for INPO in detecting failure to meet this guidance, utilities should develop internal methods to determine that the above guidance is being appropriately followed.

d) A past deficiency of NPRDS has been long delays in reporting the occurrence of failures. While in some failures it may not be possible to provide a <u>complete</u> failure description within the time frames for reporting to NPRDS, utilities should still submit partial failure reports within the required time frames. Utilities should revise these reports when the necessary information is available. However, the present system does not provide methods for utilities to indicate that reports will be later revised. NPRDS should be modified so that such a feature exists. The modifications should permit each utility to readily identify which of their reports still require follow-up information. Timely notification to NPRDS is considered to be important in VETIP if users of NPRDS are to have confidence that all failures are being reported within a certain time. Since analysis of the causes of failures will use information from many failure reports, the timeliness of submitting complete information is not as critical as the notification that a failure has occurred.

e) Because of low participation in the past in NPRDS, many failures from past years have gone unreported. If NPRDS is to be credible within a meaningful time frame, there must be a certain number of years of data for which users can be confident most failures have been reported. The ability of utilities to achieve this objective will vary depending on the availability of records and resources to support this effort. In addition, many utilities are devoting considerable resources to NPRDS in order to properly report engineering data by January 1, 1985.

In considering the above, the NUTAC recommends that utilities and INPO work together to achieve submittal and review of LERs identified as having occurred after January 1, 1981 or after the start of commercial operation, which ever is later.

If this objective is achieved by January 1, 1985, NPRDS should be capable of being used for the purpose of VETIP since four years of failure report data would be available for quantitative analysis.

f) The present scope of NPRDS reporting may not meet all the needs of individual utilities for monitoring the reliability of safety-related components. Each utility that decides that additional systems and components should be added to their basic scope of NPRDS systems and components should request INPO accept these systems by the date identified in Section IV.B. INPO will identify the resources needed to handle these requests and notify utilities when it is able to accept additional information. Such requests are not necessary if the total number of all systems and components being reported will not exceed 7000 engineering reports per unit.

S/P ACCESS

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November 11, 1983

Mr. Jean-Marie Lecocq
Service Engineering
Framatome
Tour Fiat - Cedex 16
92084 Paris la Defense
FRANCE

Dear Mr. Lecocq:

The Nuclear Plant Reliability Data System (NPRDS) collects engineering data and failure information on key nuclear plant systems and components. This information is provided to you by quarterly published reports and is available through on-line access to the NPRDS data base on the INPO computer.

In the past INPO has restricted supplier participant access into those data fields which identify specific units by name. You have, however, been able to retrieve all data fields for units in which you had direct design or construction involvement.

In the interest of increasing the value of NPRDS and improving the safety and reliability of commercial nuclear plants, we are now removing these unit-specific restrictions subject to the following provisions:

1. NPRDS data will not be used for marketing purposes. For example, marketing material should not use or identify NPRDS as a source of data which purports to show one vendor's design or product superior to another's.

2. Information that identifies a utility or plant will not be provided to others without the utility's permission.

3. Information that identifies a utility or plant will not be given to sub-tier vendors without the utility's permission.

4. Information given to any sub-tier vendor will be limited to equipment made or sold by that vendor. It should be noted that NPRDS published reports are available to any interested party by payment of a subscription fee.

Upon your agreement to these provisions, all unit-specific NPRDS access restrictions will be removed. Please indicate your agreement by signing below and returning this letter to me.

Sincerely,

Zack T. Pate

Zack T. Pate
Executive Vice President

ZTP:jaa

By signature below, Jean Marie LECOCQ agrees to the provisions in this letter regarding the uses of NPRDS data.

Signature:

Date: 22 nov 83.

RPM STATUS

NPRDS REPORTING PROCEDURES MANUAL (REV. 10)

- Target date for mailing is March 1, 1984
- Will contain Guidance/Field Definitions section
  - Working Group recommendations
  - Auditing experience
  - Response line questions
  - Changes due to INPO assumption of system
- Major changes to data base/RPM content
  - New codes for failure reporting and engineering fields
  - Redefinition of required/optional fields
  - Submission of Quarterly Operating Reports
  - Addition of EIIS codes and Function Identifiers?
- New RPM structure
  - Guidance section added
  - IDE instructions incorporated
  - Batch procedures rewritten
  - Tables updated
  - Foldout page with failure codes included

NPRDS REPORTING PROCEDURES MANUAL
PROPOSED TABLE OF CONTENTS

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THE GUIDANCE SECTION

- Required/optional status changes in engineering reports Rev 11
- Requirements for Out-of-Service Report submission Not in Rev 10 Same in Rev 9
- Reporting human error and command faults.
- Reporting incipient failures.
- Failure code changes. In Rev 10
- Application code/EIIS function identifiers ~~Rev 11~~
- Failure Date/Time field names and definitions ~~Rev 10~~

REV 10

NPRDS COMPONENT FAILURE REPORT CODES SHEET

STATUS CODE

SYSTEM LEVEL

A SYSTEM IN SERVICE (OPERATING/STANDBY)
B SYSTEM IN TEST
C SYSTEM IN MAINTENANCE
D SYSTEM OUT-OF-SERVICE (NOT IN MAINTENANCE)

CHANNEL LEVEL

E SUBSYSTEM/CHANNEL IN SERVICE (OPERATING/STANDBY)
F SUBSYSTEM/CHANNEL IN TEST
G SUBSYSTEM/CHANNEL IN MAINTENANCE
H SUBSYSTEM/CHANNEL OUT-OF-SERVICE (NOT IN MAINTENANCE)

~~TYPE OF~~ FAILURE ~~CODE~~ SEVERITY

J - IMMEDIATE K - DEGRADED L - INCIPIENT

FAILURE SYMPTOM CODE

One code

A PHYSICAL FAULT
B OUT OF SPECIFICATION
C DEMAND FAULT
D ABNORMAL CHARACTERISTIC
E RELEASED LEAKAGE
F CONTAINED LEAKAGE

FAILURE DETECTION CODE

Rev 5 [illegible]

A OPERATIONAL ABNORMALITY
B INSERVICE INSPECTION
C SURVEILLANCE TESTING
D PREVENTATIVE MAINTENANCE
E SPECIAL INSPECTION
F AUDIOVISUAL ALARM
H ROUTINE OBSERVATION
J INCIDENTAL OBSERVATION
X OTHER

CAUSE CATEGORY CODE

A ENGINEERING/DESIGN
B INCORRECT PROCEDURE
C MANUFACTURING DEFECT
D INSTALLATION ERROR
E OPERATING ERROR
F MAINTENANCE/TESTING
H [redacted] WEAROUT
J [redacted] DEVICES
K ~~UNKNOWN~~ OTHER

SYSTEM EFFECT CODE

A LOSS OF SYSTEM FUNCTION
B DEGRADED SYSTEM OPERATION
C LOSS OF REDUNDANCY
D LOSS OF SUBSYSTEM/CHANNEL
E SYSTEM FUNCTION OR OPERATION UNAFFECTED

CORRECTIVE ACTION CODE

One

AA RECALIBRATE/ADJUST
AC TEMPORARY MEASURES
AE MODIFY/SUBSTITUTE
AG REPAIR COMPONENT/PART
AH REPLACE PARTS
AK REPLACE COMPONENT

CAUSE CODES

MECHANICAL CAUSES

AB FOREIGN/INCORRECT MATERIAL
AC PARTICULATE CONTAMINATION
AD (AB) NORMAL WEAR
AE LUBRICATION PROBLEM
AF WELD RELATED
AG ABNORMAL STRESS
AV CONNECTION DEFECTIVE
AZ MATERIAL DEFECT
BB MECHANICAL DAMAGE/BINDING
BC OUT OF MECHANICAL ADJUSTMENT
BD AGING/CYCLIC FATIGUE
BE DIRTY
BF BLOCKED/OBSTRUCTED
BG CORROSION

ELECTRICAL CAUSES

AG ABNORMAL STRESS
AS SHORT/GROUNDED — AR INSULATION BREAKDOWN
AT OPEN CIRCUIT
AU CONTACTS BURNED/PITTED/CORRODED
AV CONNECTION DEFECTIVE
AW CIRCUIT DEFECTIVE
AX BURNED/BURNED OUT
AY ELECTRICAL OVERLOAD
AZ MATERIAL DEFECT
BE DIRTY
BG CORROSION

ADJUSTMENT/HUMAN RELATED

AA FOREIGN/WRONG PART
AL SETPOINT DRIFT
AM PREVIOUS REPAIR/INSTALLATION STATUS
AN INCORRECT PROCEDURE
BC OUT OF MECHANICAL ADJUSTMENT
BH OUT OF CALIBRATION
BJ INCORRECT HUMAN ACTION

PLANT EFFECT CODES (COMPONENT REPORTS ONLY)

2

A RESULTED IN REDUCED POWER OPERATION
B RESULTED IN UNIT OFF-LINE
C RESULTED IN REACTOR TRIP
D RESULTED IN PERSONNEL INJURY
E RESULTED IN OFF-SITE RADIATION
F RESULTED IN DAMAGE TO OTHER EQUIPMENT
G RESULTED IN NO SIGNIFICANT EFFECT

DOCUMENTATION CODES

Multiple

A FAILURE REPORTED TO ARCHITECT/ENGINEER
B FAILURE REPORTED TO NSS SUPPLIER
C FAILURE REPORTED TO CONSULTANT
D FAILURE REPORTED TO COMPONENT MANUFACTURER
E FAILURE ANALYSIS RECOMMENDED
F FAILURE ANALYSIS PERFORMED
G PHOTOGRAPHS WERE MADE
H LER SUBMITTED
Z FAILURE WAS NOT DOCUMENTED

5. REPORTING GUIDANCE/FIELD DEFINITIONS

This section is designed to provide the NPRDS reporter with guidance on reporting requirements and to clearly define all fields of each report. The inexperienced reporter should read this section carefully before collecting data and should use the guidance and tables herein in completing reports. The experienced reporter should review this section periodically to ensure that report quality remains high. Since the INPO interpretation of each report and its associated fields is provided in the following pages, this section should be used as the official reference whenever reporting questions are raised.

There are seven parts to this section, one for each report type. Each part describes, in detail, conditions that necessitate the submission of the report type being considered. Each field of that report type is then defined, and guidance is provided to assist the reporter in choosing the correct values. A foldout page listing all of the failure report code choices is included. This page can be removed and used in conjunction with this section.

The following guidance is designed to assist the reporter in completing report forms. Since batch submittal is the preferred method of inputting engineering data, the field definitions for the engineering sections are in card-image order. Most failure reporting is done interactively; thus, the field definitions for the failure sections are listed in the order of the interactive data entry prompts. Although some entry-related information is included, the Batch Entry and Interactive Data Entry, Sections 6 and 7 respectively, should be referenced for data entry guidance.

5.1 Report of System Engineering Data (Form BCH2S or IDE2S)

A system engineering report should be submitted for each of the systems listed in the NPRDS Reportable System and Component Scope Manual (RSM) for appropriate unit type. Reports should be submitted for all reportable systems by commercial operation date. Reporting is optional for several systems. Tables 1a-1e list all acceptable system codes. If a system is shared by more than one unit, only one report should be submitted for that system, with the owning unit being the one that has the lowest unit number.

Either the batch or interactive data entry methods may be used to enter, make changes to, or delete system engineering records.

Field Definitions

5.1.1 Utility/Plant/Unit (required) *

The seven-character code identifying the unit in the NPRDS data base. See Table 8 for a list of codes.

5.1.2 NPRDS System Code (required) *

The three- or six-character code identifying the system being reported. The RSM identifies each reportable system and defines the contents. Codes for both reportable and optional systems are listed on Table 1.

5.1.3 Data Start Date (required)

The date that NPRDS reliability data begins accruing. All failures of the system that occur after this date are reportable. This date must be greater than or equal to the Initial Critical Date listed on the Nuclear Unit Information Report (Form 1) submitted for the unit. It also must be equal to or greater than the In-Service Date (5.1.9) for the system being

---

*Changes cannot be made to this field except through deletion and resubmission of the record.

reported. All failures that occur after this date are reportable to NPRDS. Entry must be made in the following format:

<u>YR</u> <u>MO</u> <u>DY</u>

YR = Two digit year

MO = Two digit month

DY = Two digit day

5.1.4 Utility System Code (required)

The system identification code used internally by the plant. This code can be an abbreviation (CVCS, RPS), a numeric identification code (005, 007), or any other set of characters the plant may use to identify the system. The length of the code can be no greater than six characters.

5.1.5 Safety Class (optional)

Classification of the nuclear safety significance of the system, as defined by ANSI and IEEE. Valid codes are 1, 2, 3, 4, IE, and SR. Determination of safety class can be performed with the use of the following documents:

PWR - Safety classes 1, 2, and 3 for PWR systems are defined in ANSI/ANS - 51.1 - 1983.

BWR - Safety classes 1, 2, and 3 for BWR systems and protection systems are defined in ANSI/ANS - 52.1 - 1983.

General - Safety class 1E power systems and protection systems are defined in IEEE 308-1980 and IEEE 279-1971, respectively.

Additionally, Regulatory Guide 1.26 equates quality groups A, B, C, and D to ASME, Section III, classes 1, 2, and 3, and Section VIII, Division 1, respectively. If Regulatory Guide 1.26 is a part of the unit's license requirements, the system should be classified according to Regulatory Guide 1.26. Systems not addressed should be classified according to the ANSI/IEEE sections listed above. Alternatively, the code

"SR" for non-code class safety-related systems can be entered in this case. The code "4" is entered to identify non-safety-related systems.

5.1.6 Mode Code (required)

The mode of operation the system normally exhibits when the reactor is critical. Valid codes are OPC, SBC, SDC.

OPC - The system is operating and performing its designed function.

SBC - The system is in a standby condition.

SDC - The system is in a shutdown condition.

For additional guidance, see Table 4.

5.1.7 Internal Environment Codes (optional)

Codes indicating the condition of the system's internal environment when the system is operating. Up to three of the codes listed in Table 5 may be selected.

5.1.8 External Environment Codes (required)

Codes indicating the condition of the system's external environment when the system is operating. Up to two of the codes listed in Table 5 may be selected.

5.1.9 In-Service Date (required)

The actual date the system went into service. This date must be less than or equal to the Data Start Date (5.1.3). Entry must be made in the following format:

YR MO DY

YR = Two digit year

MO = Two digit month

DY = Two digit day

5.1.10 Manufacturing Standard (optional)

The fabrication, construction, or manufacturing code or standard for the system. ASME, ANSI, API, AWW, IEEE and NEMA are examples of tne possible sources of codes and standards. The code sources, section, class, and date should be entered, for example: ASME Section 3-71. There are no format requirements for this field.

5.1.11 Vendor Code (optional)

The code indicating the organization to which the purchase order for the system was issued. Valid codes are listed in Table 9. In the event that no code is listed for the desired vendor or supplier, the data reporter should contact INPO.

5.1.12 Vendor Identification Number (optional)

The identification number used by the supplier of the system indicated in Section 5.1.11. There are no format requirements for this field.

5.1.13 Drawing or Document Number (required)

The identification number of the drawing or document designating the location or design of the system. This is generally a Piping and Instrumentation diagram (P&ID) or an electrical drawing but may be a vendor or manufacturer design manual or technical manual. There are no format requirements for this field.

5.1.14 Estimated Percent Critical (required)

The estimated percentage of time that the system is operating or functioning when the reactor is critical. The value must be entered as an integer from 0 to 100.

5.1.15 Estimated Percent Standby (required)

The estimated percentage of time that the system is operating or functioning when the reactor is in a standby condition. The value must be entered as an integer from to 0 to 100.

5.1.16 Estimated Percent Shutdown (required)

The estimated percentage of time that the system is operating or functioning when the reactor is in a shutdown condition. The value must be entered as an integer from 0 to 100.

5.1.17 Check-Testing Frequency (required)

The number of times per the interval chosen (5.1.18) that the system behavior is inspected during normal operation. This value must be an integer greater than or equal to 0. A "0" indicates that check-testing is not performed.

5.1.18 Check-Testing Interval Code (required if testing is performed)

The code indicating the time interval associated with the Check-Testing Frequency field (5.1.17). One of the following codes must be chosen:

DA - Day	2A - Two Years
WK - Week	3A - Three Years
MO - Month	4A - Four Years
QT - Quarter	5A - Five Years
SA - Semi-Annual	XA - Ten Years
AN - Annual	00 - not performed (batch entry only)

5.1.19 Check-Testing Out-of-Service Hours (required if testing is performed)

Enter "0" for this field since check-testing is performed while the system is in service.

5.1.20 Functional Testing Frequency (required)

The number of times per interval chosen (5.1.21) that the system is operated manually or initiated to verify its operation. A "0" indicates that functional testing is not performed.

5.1.21 Functional Testing Interval Code (required if testing is performed)

The code indicating the time interval associated with the Functional Testing Frequency field (5.1.20). The applicable codes are listed in Section 5.1.18.

5.1.22 Functional Testing Out-of-Service Hours (required if testing is performed)

The estimated number of hours that functional testing of the system to be requires the system out of service. The value must be greater than or equal to 0.

5.1.23 Calibration Testing Frequency (required)

The number of times per interval chosen (5.1.24) that the calibration of the system is checked. A "0" indicates that calibration testing is not performed.

5.1.24 Calibration Testing Interval Code (required if testing is performed)

The code indicating the time interval associated with the Calibration Testing Frequency field (5.1.23). The applicable codes are listed in Section 5.1.18.

5.1.25 Calibration Testing Out of Service Hours (required if testing is performed)

The estimated number of hours that a calibration check of the system requires the system to be out of service. The value must be greater than or equal to 0.

5.2 Report of Component Engineering Data (Form BCH2C or IDE2C)

A component engineering report should be submitted for each of the reportable components in each system outlined by the NPRDS Reportable System and Component Scope Manual (RSM). For a new unit, these reports may be submitted at any time prior to commercial operation. By the commercial operation date, all of the components in the reportable scope for that unit should have engineering reports in the data base. Components shared by more than one unit at a site should be assigned to the lowest numbered unit.

The batch system is the preferred method of submitting component engineering reports, although provisions have been made to enable the entry of small numbers of these reports through interactive data entry. The batch system is much more efficient at processing large numbers of reports, especially when the mass-add feature is used correctly. Mass-add is described in Section 6.4.4.

The following are possible sources of the data needed to prepare a component engineering report:

Plant Drawings
Visual Verification (Component Markers, Tags, Etc.)
Vendor Drawings
Bill of Materials
Component Tag Tabulations
Contracts (Receiving Reports, Purchase Specifications, Test Reports, Vendor Manuals, Correspondence)
Design Drawings
Plant Maintenance Files
Technical Specifications
Valve Indices
Engineering Change Notices
Design Change Requests
Maintenance Supervisors
Instrumentation Equipment Files
Surveillance Instructions

Limitorque Lists
Initial Startup Test Data
Training Lesson Plans
System Descriptions
Construction Test Data
Maintenance Instructions
Surveillance Schedules
Maintenance Schedules
Equipment Master Lists
FSAR
Nameplates
Industry Codes (ASME, IEEE, ANSI, Etc.)

Since there are several different vintages of plants with varying types of information sources, it is recognized that those suggested here are not appropriate for all plants. Some plants will find the data in sources not shown here and some plants will not need all these sources to find their data. If these sources are available at the plant, they may contain the needed data.

Field Definitions

5.2.1 Utility/Plant/Unit (required) *

The seven-characters code identifying the unit in the NPRDS data base. See Table 8 for a list of codes.

5.2.2 NPRDS Component Code (required) *

The code identifying the component type. Valid codes are listed in Table 2. Note that even though many of the codes are clear text (i.e., PUMP for pump) many, such as the code for accumulator (ACCUMU), are not.

*Changes cannot be made to this field except through deletion and resubmission of the record.

5.2.3 Utility Component ID (required) *

The code identifying the component within the plant. Generally, this value should correspond to the component numbers listed on the appropriate P&ID.

The Utility Component ID is limited to 11 characters when using batch and 25 characters when entering data interactively. Imbedded spaces are not allowed. When submitting engineering data on frequently relocated components, such as control rod drive mechanisms, it is acceptable to identify each by entering some established location code, such as core position.

5.2.4 Data Start Date (required)

The date that NPRDS reliability data begins accruing. All failures of the component occurring after this date are reportable. This date must be greater than or equal to the Initial Critical Date listed on the Nuclear Unit Information Report (Form 1) submitted for the unit. It must also be equal to or greater than the In-Service Date (5.2.10) for the component being reported. All failures that occur after this date are reportable to NPRDS. Entry must be made in the following format:

<u>YR</u> <u>MO</u> <u>DY</u>

YR = Two digit year

MO = Two digit month

DY = Two digit day

5.2.5 NPRDS System Code (required)

The three- or six-letter code identifying the system in which the component, according to the Reportable Scope Manual, is located. System codes are listed in Tables 1a-1e.

---

*Changes cannot be made to this field except through deletion and resubmission of the record.

5.2.6 Utility System Code (required)

The identification code used internally by the plant to indicate the system in which the component is located. This code may be an abbreviation (CVCS, RPS), a numeric identification code (005, 007), or any other set of characters the plant may use to identify the system. The length of the code can be no greater than six characters.

This code can be an effective way of recording the subsystem in which the component is located. For example, the starting air compressors for the #2 diesel generator might be assigned the Utility System Code "EPS-2", in which "EPS" denotes the emergency power system and "-2" indicates that the component is part of the #2 diesel system.

5.2.7 Safety Class (required)

Classification of the nuclear safety significance of the component, as defined by ANSI and IEEE. Valid codes are 1, 2, 3, 4, IE, and SR. Determination of safety class can be performed with the use of the following documents:

PWR - Safety classes 1, 2, and 3 for PWR components were defined in ANS51/ANE - 51.1 - 1983.

BWR - Safety classes 1, 2, and 3 for BWR components are defined in ANSI/ANS - 52.1 - 1983.

General - Safety class 1E power system components and protection system components are defined in IEEE 308-1980 and IEEE 279-1971, respectively.

Additionally, Regulatory Guide 1.26 equates quality groups A, B, C, and D to ASME, Section III, classes 1, 2, and 3, and Section VIII, Division 1, respectively. If Regulatory Guide 1.26 is a part of the unit's license requirements, the component should be classified according to Regulatory Guide 1.26. Components not addressed should be classified according to the ANSI/IEEE sections listed above. Alternatively, the code "SR" for non-code class safety-related components can be entered for this case. The code "4" is entered to identify non-safety-related components.

5.2.8 Mode Code (required)

The mode of operation the component normally exhibits when the reactor is critical. Valid codes are OPC, SBC, SDC.

OPC - The component is operating and performing its designed function.

SBC - The component is in a standby condition.

SDC - The component is in a shutdown condition.

For additional guidance see Table 4.

5.2.9 Internal Environment Codes (optional)

Codes indicating the condition of the component's internal environment when the component is operating. Up to three of the codes listed in Table 5 may be selected.

5.2.10 External Environment Codes (required)

Codes indicating the condition of the component's external environment when the component is operating. Up to two of the codes listed in Table 5 may be selected.

5.2.11 In-Service Date (required)

The actual date the component went into service. This date must be less than or equal to the Data Start Date (5.2.4). Entry must be made in the following format:

<u>YR</u> <u>MO</u> <u>DY</u>

YR = Two digit year

MO = Two digit month

DY = Two digit day

5.2.12 Manufacturing Standard (optional)

The fabrication, construction, or manufacturing code or standard for the component. ASME, ANSI, API, AWW, IEEE, and NEMA are examples of the possible sources of codes and standards. The code sources, section, class, and date should be entered, for example, ASME Section 3-71. There are no format requirements for this field.

5.2.13 Manufacturer Code (required)

The code indicating the company that manufactured the component. Valid codes are listed in Table 9. In the event that no code is listed for the desired manufacturer, the data reporter should contact INPO.

5.2.14 Manufacturer Model Number (required)

The number used by the manufacturer indicated in Section 5.2.13 to identify the component. For cases in which there is no model number, some other method of identification should be provided. Do not include the words "Model," "Number," or the character "#" in the entry. There are no format requirements for this field.

5.2.15 Manufacturer Serial Number (optional)

The serial number provided by the manufacturer indicated in Section 5.2.13 to identify the individual component. There are no format requirements for this field.

5.2.16 Vendor Code (required)

The code indicating the organization to which the purchase order for the component was issued. Valid codes are listed in Table 9. In the event that no code is listed for the desired vendor or supplier, the data reporter should contact INPO.

5.2.17 Vendor Identification Number (optional)

The identification number used by the supplier of the component indicated in Section 5.2.16. There are no format requirements for this field.

5.2.18 Drawing or Document Number (required)

The identification number of the drawing or document designating the location or design of the component. This is generally a P&ID or an electrical drawing but may be a vendor or manufacturer design manual or technical manual. There are no format requirements for this field.

5.2.19 Engineering Codes A - F (required)

Six codes used to indicate a variety of engineering information such as type, application, ratings, construction materials, etc. Each category is component-specific. Valid codes for each component type are listed in Table 3. Note that not all components have been assigned possible values for all six categories. Accumulators (ACCUMU), for example, have codes for categories A, B, and C but not D, E, and F. Entry is mandatory for each of a component's defined categories; those undefined should be left blank. The "X" code may be used for cases in which none of the codes provided apply; however, the entry of an "X" always results in an INPO follow-up.

5.2.20 Engineering Values G, H, and J (required)

Numbers indicating the values of three various engineering parameters such as temperature, RPM, horsepower, etc. The categories for each component type are defined in Table 3. Like engineering codes A - F (5.2.19), all three categories are not defined for all components. Entry is required for those categories defined for the component being reported. The entry must be numeric. A decimal should be used to indicate fractional values instead of a slash. Exponential notation is not allowed. The value must correspond to the units code provided (Section 5.2.21).

5.2.21 Engineering Units G, H, and J (required)

The codes indicating the units corresponding to the numbers entered for engineering values G, H, and J (Section 5.2.20). Valid codes for each category and component type are listed in Table 3. A complete list of codes is provided in Table 7.

5.2.22 Estimated Percent Critical (required)

The estimated percentage of time that the component is operating or functioning when the reactor is critical. The value must be entered as an integer from 0 to 100.

5.2.23 Estimated Percent Standby (required)

The estimated percentage of time that the component is operating or functioning when the reactor is in a standby condition. The value must be entered as an integer from to 0 to 100.

5.2.24 Estimated Percent Shutdown (required)

The estimated percentage of time that the component is operating or functioning when the reactor is in a shutdown condition. The value must be entered as an integer from 0 to 100.

5.2.25 Check-Testing Frequency (required)

The number of times per the interval chosen (5.2.26) that the component behavior is inspected during normal operation. This value must be an integer greater than or equal to 0. A "0" indicates that check-testing is not performed.

5.2.26 Check-Testing Interval Code (required if testing is performed)

The code indicating the time interval associated with the Check-Testing Frequency field (5.2.25). One of the following codes must be chosen:

DA - Day	2A - Two Years
WK - Week	3A - Three Years
MO - Month	4A - Four Years
QT - Quarter	5A - Five Years
SA - Semi-Annual	XA - Ten Years
AN - Annual	00 - not performed (batch entry only)

5.2.27 Check Testing Out-of-Service Hours (required if testing is performed)
Enter "0" for this field since check-testing is performed while the component is in-service.

5.2.28 Functional Testing Frequency (required)
The number of times per interval chosen (5.2.29) that the component is operated manually or initiated to verify its operation. A "0" indicates that functional testing is not performed.

5.2.29 Functional Testing Interval Code (required if testing is performed)
The code indicating the time interval associated with the Functional Testing Frequency field (5.2.28). The applicable codes are listed in Section 5.2.26.

5.2.30 Functional Testing Out-of-Service Hours (required if testing is performed)
The estimated number of hours with the component out-of-service that functional testing of the component requires. The value must be greater than or equal to "0".

5.2.31 Calibration Testing Frequency (required)
The number of times per interval chosen (5.2.32) that the calibration of the component is checked. A "0" indicates that calibration testing is not performed.

5.2.32 Calibration Testing Interval Code (required if testing is performed)

The code indicating the time interval associated with the Calibration Testing Frequency field (5.2.31). The applicable codes are listed in Section 5.2.26.

5.2.33 Calibration Testing Out-of-Service Hours (required if testing is performed)

The estimated number of hours with component out of service that a calibration check of the component requires. The value must be greater than or equal to "0".

5.3 Report of System Failure (Form BCH4S or IDE4S)

A system failure report is submitted when a reportable system fails to operate properly due to the failure of one or more reportable components. System function must be lost or severely degraded for the event to be reportable. Reports for the failed components responsible for a system failure are also required.

Interactive data entry is the preferred method of reporting system failures except in cases where the reporting utility has incorporated NPRDS into their in-house computer system. A system engineering report must be on file before a failure to that system will be accepted. If the engineering record is not present, one should be prepared and submitted prior to or along with the failure report.

Field Definitions

5.3.1 Utility/Plant/Unit (required)*

The seven-character code identifying the unit in the NPRDS data base. See Table 8 for a list of codes.

5.3.2 NPRDS System Code (required)*

The code indicating the failed system. Valid codes are those three-and six-character NPRDS system codes listed in Tables la-le.

5.3.3 Discovery Date (required)*

The date on which the failure was discovered. Since a failure cannot be discovered before it occurs, the date must be equal to or greater than the Date of Failure (5.3.9).

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*Changes cannot be made to this field except through deletion and resubmission of the record.

5.3.4 Discovery Number (required)*

A number indicating which failure is being reported in cases where more than one failure of a particular system is discovered on a given day. "1" is entered if only one failure is discovered or to indicate the first failure found. "2" is entered on the report for the second failure of the system discovered that same day. "3" is entered for the third, etc.

5.3.5 Discovery Time (required)

The time (24-hour clock) that the failure was discovered. Entry must be made in the following format:

HR MN

HR = Two digit hour, 00 to 24

MN = Two digit minutes, 00 to 59

5.3.6. Report Date (required)

The date that the NPRD form was completed. Entry must be in the following format:

YR MO DY

YR = Two digit year

MO = Two digit month

DY = Two digit day

5.3.7 LER Report Number (required if LER submitted)

The number of the LER in which the failure is discussed. The number must be entered in the format DOC-YR NUM-R. The dashes must be included when using IDE but are not included when using batch. If no revisions have been issued to the LER, the last dash and character are omitted.

*Changes cannot be made to this field except through deletion and resubmission of the record.

DOC = Three digit plant docket number

YR = Two digit year greater than 72

NUM = Three digit sequential LER number

R = One digit revision number

5.3.8 Related Component Type (required)

The code indicating the component type primarily responsible for the system failure. The failed system may or may not contain the component itself. If the system failure was caused by the failure of a reportable component, a component failure report must be completed for the failed component. Valid component codes are listed in Table 2.

5.3.9 Date of Failure (required)

The date or estimated date that the system first became unable to operate at an acceptable level. This date is generally equal to the discovery date <u>only</u> when the failure is discovered through an operational abnormality. A failure discovered during testing is assumed to have occurred at the midpoint date between the last known date the system was operating satisfactorily and the date the failure was discovered. If the last date of satisfactory operation is unknown, the last test date should be used in estimating the date of failure.

5.3.10 Failure End Date (required)

The date that repairs correcting the failure are completed, i.e., either the date the system is placed back into service or that the system became available for service. Entry must be made in the following format:

<u>YR</u> <u>MO</u> <u>DY</u>

YR = Two digit year

MO = Two digit month

DY = Two digit day

5.3.11 Failure End Time (required)

The t me that repairs correcting the failure are completed, i.e., either the time that the system is placed back into service or that the system became available for service. Entry must be made in the following format:

<u>HR</u> <u>MN</u>

HR = Two digit hour, 00-24

MN = Two digit minutes, 00-59

5.3.12 Status Code (required)

The status at the time of the failure of the system or subsystem in which the component primarily responsible for the failure lies. If the component is located within a redundant subsystem/channel, a choice is made from codes E through H. If the component is unique to the system, a choice is made from codes A through D. Code translations are as follows:

<u>System Level</u>

A System in service (operating/standby)

B System in test

C System in maintenance

D System out of service (not in maintenance)

<u>Channel Level</u>

E Subsystem/channel in service (operating/standby)

F Subsystem/channel in test

G Subsystem/channel in maintenance

H Subsystem/channel out of service (not in maintenance).

5.3.13 Type of Failure Code (required)

The code indicating the failure severity level. Choose one of the following codes:

J Immediate - A failure that is both sudden and complete.

K Degraded - A failure that is both gradual and partial; the system degrades to a level that, in effect, is a termination of the ability to perform its required function. This code should be chosen when a system does not satisfy the minimum acceptable performance criteria for a specific function or when a system either is removed from service or isolated in order to perform corrective maintenance.

L Incipient - An imperfection in the state or condition of a system such that a degraded or immediate failure is imminent if corrective action is not taken. This code indicates an optional report, since failure has not occurred, per se.

5.3.14 Failure Symptom Code (required)

The code indicating the first effect of the failure, by which the failure was discovered. Choose one of the following:

A Physical Fault - Failure is characterized by a changed physical condition, physical configuration, fracture or damage, often resulting in a loss of integrity or ability to hold a contained fluid or electrical current. This category includes blocked or stopped flow, cracks, fractures or breaks, collapses, physical distortion or displacement, electrical arcing, open circuit, shorts or degraded insulation. Leaks are considered a special category due to the number of reported items.

B Out of Specification - Failure is characterized by operation but is outside the permissible range of expected output or response. This category includes out of limits, low or high output or flow, erratic output, premature response, off frequency, off voltage, intermittent operation or failure to synchronize or control.

C Demand Fault - Failure is characterized by the responsible system's failure to actuate, move, or change operating mode upon request, either operator-initiated or from an automatic signal. This category includes failure to stop, close, open, release, run, start/move, operate per demand, respond or record or instances of no output when an input of some sort demands one.

D Abnormal Characteristic - Failure is characterized by a type of response or an operating characteristic not considered normal or expected. This category includes such attributes as overheating, unusual noise or vibration, chatter, corrosion products, discoloration and false response (such as non-zero output with zero input).

E Released Leakage - Failure is indicated by leakage of the process fluid from within the pressure boundary to the environment, usually through packing glands, mechanical seals, or gasketed joints. This category includes leaks of steam, water, oil, gas or other fluids beyond amounts normally expected or limited by specifications.

F Contained Leakage - Failure is characterized by a leakage of the process fluid from one side of a valve plug or disc to another, or from the shell or tube side of a heat exchanger to the other side, where both sides are essentially within closed systems. This category includes flow leaks within a system beyond those established as permissible or limited by specifications.

5.3.15 Failure Detection Code (required)

The code that identifies how the failure was recognized or brought to the attention of the plant staff. Choose one code from the following:

A Operational Abnormality - A failure detected from indications received during normal operation of the system.

B In-Service Inspection - A failure detected during a scheduled in-service inspection, e.g., performing ASME Boiler & Pressure Vessel Code, Section XI.

C Surveillance Testing - A failure detected through routine periodic testing (calibration, trip-point checks, functional checks, etc.).

- D Preventive Maintenance - A failure detected while performing preventive maintenance.
- E Special Inspection - A failure detected during the performance of an inspection that is not routinely scheduled or required.
- F Audiovisual Alarm - A failure detected by an alarm that either can be heard or seen.
- H Routine Observation - A failure detected as a result of normal log taking, log review, or daily/weekly inspections. Usually this would be within the normal duties or job function performed by plant personnel.
- J Incidental Observation - A failure detected by casual observation or chance witnessing by individuals not assigned duties involving the system.
- X Other - A failure in which the method of detection cannot be assigned to any of the above categories. (Failure narrative should be explanatory.)

5.3.16 Cause Category Code (required)

The code categorizing the cause of the failure. Additional guidance in choosing this code is provided in Section 5.4.6.

- A Engineering/Design - A failure attributable to the inadequate design of the responsible component or system.
- B Incorrect Procedure - A failure attributable to incorrect procedures that were correctly followed.
- C Manufacturing Defect - A failure attributable to inadequate assembly or initial quality of the responsible component or system.
- D Installation Error - A failure caused by improper installation of equipment.
- E Operating Error - A failure caused or aggravated by personnel errors, including failure to properly follow procedures.

F Maintenance/Testing - A failure that is a result of improper maintenance, lack of maintenance or personnel errors that occur during maintenance or testing activities performed on the responsible component or system.

H Random/Wearout - A failure thought to be the consequence of expected wear or acceptable random variations among material and component properties and manufacturing variability.

J Associated Devices - A failure attributable to a failure or misoperation of another component or system.

K Unknown - A failure in which the cause cannot be assigned to any of the above categories.

5.3.17 Cause Description Codes (required)

Codes identifying the cause of, or contributing factors to, the failure. For cases in which a definite cause is not established, codes indicating the suspected cause should be chosen and the suspected cause discussed in the Cause of Failure narrative. Additional guidance is included in Section 5.4.6. Up to three codes are chosen from the following:

MECHANICAL CAUSES

AB Foreign/Incorrect Material - Material not as specified or internal environment containing an unanticipated material (e.g., water).

AC Particulate Contamination - Internal contents include unexpected buildup of divided solids.

AD (Ab)Normal Wear - Loss of function due to a gradual loss of configuration or material.

AE Lubrication Problem - Frictional failure directly attributable to lack of proper lubrication.

AF Weld Related - Weld fracture, crack, or heat affected zone failure attributable to the welding process.

AG Abnormal Stress - Material stress attributable to abnormal load, vibration, temperature, pressure or flow in the system.

AV Connection Defective - Loose mechanical parts or fasteners.

AZ Material Defect - Material type as specified, but with integrity compromised due to a flaw or leak.

BB Mechanical Damage/Binding - Loss of proper mechanical configuration due to excessive forces.

BC Out of Mechanical Adjustment - Loss of proper mechanical alignment, movement, limits or configuration not due to damage. Loose setscrews, locknuts, mechanical stops, and setpoints of adjustable fixtures are included.

BD Aging/Cyclic Fatigue - Time-related degradation of mechanical properties without significant loss of material (as through wear). Includes radiation damage, embrittlement, fatigue cracking of material subjected to stress reversals.

BE Dirty - Loss of function due to deposition of extraneous material on operating surfaces such as electrical contacts, pilot valve seats, etc.

BF Blocked/Obstructed - Loss of flow function due to lodged foreign objects or an unexpected buildup of solids. May also be loss of movement due to mechanical interference other than binding.

BG Corrosion - Failure attributable to loss of material or buildup of chemical reaction products from electrochemical or stress-aided corrosion.

ELECTRICAL/ELECTRONIC CAUSES

AG Abnormal Stress - Loss of function due to stress-related causes attributable to voltage spikes, oscillations, etc.

AR Insulation Breakdown - Loss of electrical circuit integrity including shorts, arcs, burned out windings, etc., attributable to failure of insulation itself.

AS Short/Grounded - Loss of electrical circuit integrity due to a shorted or grounded circuit.

AT Open Circuit - Inoperability of electrical circuit due to a break in conductor or contacts not made up.

AU Contacts Burned/Pitted/Corroded - Inoperability of electrical circuit due to degradation of electrical contacts.

AV Connection Defective - Electrical terminal connection loose, intermittent, or containing high electrical resistance.

AW Circuit Defective - Electrical or electronic circuit fault not attributable to any one subcomponent, component or part, including unknown electronic faults or failures not reproducable.

AX Burned/Burned Out - Loss of electrical circuit integrity including insulation breakdown due to local combustion, overload and/or electrical fire.

AY Electrical Overload - Loss of function specifically attributable to unanticipated high electrical current.

AZ Material Defect - Material type as specified, but with integrity compromised by a flaw.

BE Dirty - Loss of function due to deposition of extraneous material on operating surfaces such as electrical contacts.

BG Corrosion - Failure attributable to loss of material or buildup of chemical reaction products from electrochemical corrosion.

ADJUSTMENT/HUMAN RELATED

AA Foreign/Wrong Part - Part does not belong in responsible component or systems. This includes poor designs and misapplications.

AL Setpoint Drift - Electronic drift attributable to poor control setpoint stability. Relief valve setpoint changes during operation due to pilot valve seat bleed rate changes may be included, but not changes due to previous repair or mechanical adjustment.

AM Previous Repair/Installation Status - Inadequate repair condition resulting from lack of proper previous maintenance, installation, or restoration to operational status.

AN Incorrect Procedure - Failure directly attributable to an inadequate or improper instruction or approved procedure.

BC Out of Mechanical Adjustment - Loss of proper mechanical alignment, movement, limits, or configuration not due to damage. Loose setscrews, locknuts, mechanical stops, and settings of adjustable fixtures are included.

BH Out of Calibration - Electrical/mechanical setpoint or response settings (lead, lay, or reset) not in the specified position or range.

BJ Incorrect Action - Loss of proper function directly due to human error.

5.3.18 Plant Effect Code (required)

The code that indicates what happened to plant operation as a result of the system failure. Choose one of the following:

A Resulted in Reduced Power Operation - The unit had to reduce power output or was limited below the moninal output level due to the failed system.

B Resulted in Unit Off-line - The unit was removed from service due to the failure of the system.

C Resulted in Reactor Trip - The reactor tripped automatically or was manually tripped as a result of the failed system.

D Resulted in Personnel Injury - Plant personnel were injured as a result of the system failure.

E Resulted in Off-site Radiation - An uncontrolled release to the environment occurred as a result of the system failure.

F Resulted in Damage to Other Equipment - The system failure caused damage to other plant equipment.

G Resulted in No Significant Effect - The plant was not significantly affected by the failed system.

5.3.19 Corrective Action Code (required)

The code indicating the action taken to remedy the failure. Choose one of the following:

AA Recalibrate/Adjust - To reset a device mechanically or electrically to a prescribed value or position.

AC Temporary Measures - Actions taken to bypass, maintain or restore the system to operation for an interim period.

AE Modify/Substitute - To alter or eliminate a component/part or to replace the component/part with a different model.

AG Repair Component/Part - A component is refurbished and/or reinstalled.

AH Replace Parts - A piece of a component is removed and replaced in kind.

AK Replace Components - An entire component is replaced in kind.

5.3.20 Documentation Codes (required)

The codes indicating non-NPRDS records that give account of the failure. These records may be available for study or may have been forwarded to other organizations for use in evaluation. Choose one or two of the following:

A - Failure reported to architect/engineering firm.

B - Failure reported to NSSS Supplier.

C - Failure reported to consultant.

D - Failure reported to component manufacturer.

E - Failure analysis recommended.

F - Failure analysis performed.

G - Photographs were made.

H - LER submitted.

Z - Failure was not documented.

5.3.21 Failure Description Narrative (required)

A narrative describing the occurrence of the failure. The operating condition of the plant and the responsible component should be provided, as well as an account of how the failure was discovered. The severity of the failure and its effects should also be explained. Be sure to identify the component (include its application) that caused the system failure and its intended function within the narrative.

There is no length restriction to this field when using IDE, but 300 characters should be considered a nominal limit, as the output programs are limited to a total of about 900 characters for all three narrative fields. Punctuation should be sparse, and all marks should be separated from the text on both sides by one space. Abbreviations, except for those commonly understood, should be avoided.

5.3.22 Cause of Failure Narrative (required)

A narrative stating the cause, or suspected cause, of the failure. If the root cause is not determined, a "best judgment" cause reflecting the observations of the individuals evaluating and/or correcting the failure should be described. Transient stresses such as abnormal pressure, temperature, vibration, etc. should be noted.

There is no length restriction to this field when using IDE, but 300 characters should be considered a nominal limit, as the output programs are limited to a total of about 900 characters for all three narrative fields. Punctuation should be sparse, and all marks should be separated from the text on both sides by one space. Abbreviations, except for those commonly understood, should be avoided.

5.3.23 Corrective Action Narrative (required)

A narrative describing the action taken to correct the failure. Both short-term and long-term corrective actions should be included. Actions taken by the repairing organization should be described. If tests or recalibrations are made to verify that the repairs are successful, they should be noted.

There is no length restriction to this field when using IDE, but 300 characters should be considered a nominal limit, as the output programs are limited to a total of about 900 characters for all three narrative fields. Punctuation should be sparse, and all marks should be separated from the text on both sides by one space. Abbreviations, except for those commonly understood, should be avoided.

5.4 Report of Component Failure (Form BCH4C or IDE4C)

A component failure report is submitted for each failure of a reportable component. Interactive data entry is the preferred method of reporting component failures except for cases in which a utility has incorporated NPRDS into their in-house computer system. A component engineering report must be on file before a failure of that component will be accepted. If the engineering record is not present, one should be prepared and submitted prior to or along with the failure report. A failure should not be charged to the wrong component simply because the failed component's engineering record has not yet been submitted.

The criteria for reportability of a component failure is the termination of the ability of the component to perform its intended function. Since a component may perform at varying levels and still maintain its ability to perform its intended function, guidance is needed to assist the data reporter in properly identifying events as component failures.

Sections 5.4.1 - 5.4.4 are intended to introduce the data reporter to a general failure description, with subsequent introductions to component functions, performance criteria, and failure definitions. Since maintenance is linked so closely with component failures, the relationship between preventive and corrective maintenance is reviewed as it pertains to the failure determination. Section 5.4.5 provides an explanation of which component should be charged with a failure for cases in which determination of the failed component is not obvious. Section 5.4.6 includes a discussion of cause scenarios and provides the reporter with guidance in choosing cause codes and completing the Cause of Failure narrative. Section 5.4.7 provides field definitions and code interpretations.

5.4.1 General Failure Description

The first step in the process of identifying a component failure is to identify the function of the component and to establish a minimum acceptance criteria for performance relative to the function. The event then is reviewed comparing actual performance against the criteria, and a determination of failure is made.

For the purposes of this discussion, it is assumed that a component operating at an acceptable level will degrade with time due to the effect of operational and environmental stresses to which the component is exposed, i.e., temperature, pressure, humidity, radiation, vibration, operating cycles, etc. Theoretically, therefore, a component operating at an acceptable performance level will, without maintenance, eventually degrade to a condition that no longer satisfies the minimum criteria for that component function. Figure 5.4.1-1 illustrates this theoretical degradation.

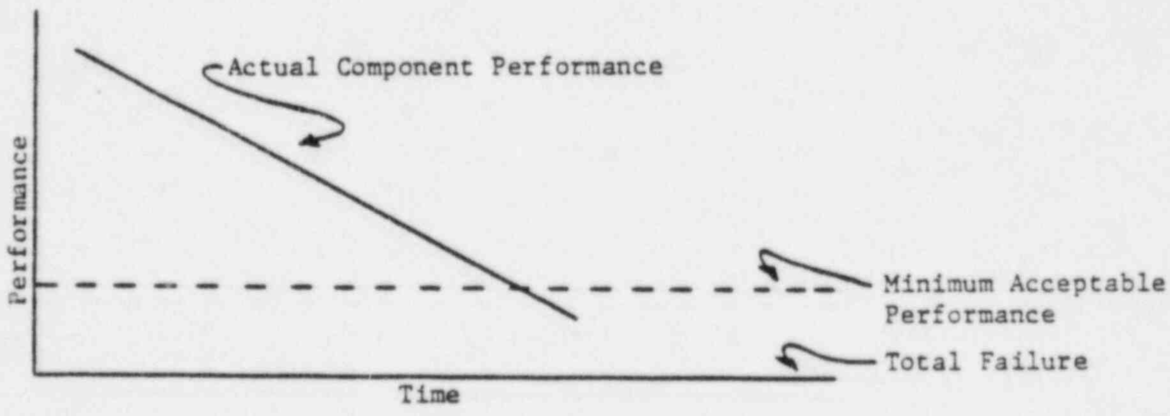

Figure 5.4.1.1: Component Performance Level Degradation

As long as the component's performance is at or above the minimum acceptable level, the component is satisfying its intended function; performance below that criteria constitutes a failure.

5.4.2 Component Functions And Performance Criteria

Before a determination can be made of whether or not a component has failed, the function of the component needs to be identified and performance criteria defined. Realizing that a component is not limited to serving a single function, but often several, each function needs to be considered. Some of the functions and associated criteria will be based upon a design nuclear safety consideration; others will be strictly operational.

For example, consider a bistable trip device in the reactor protection system having a specified trip setting of 103 percent, +3, -3. The high setting of 106 percent is based upon a nuclear concern (overpower); the lower setting of 100 percent is operational and allows the plant to achieve full power. A bistable trip either less than 100 percent or greater than 106 percent would constitute a failure.

When preparing the failure report, it is important that the narrative and coded information properly describe the failed function(s).

5.4.2.1 Component and piece part relationship

When considering functions and criteria, it is important that the criteria be developed with regard to the function of the component, not a piece part of the component. A single piece part failure may render a component inoperable, which would be a reportable event, but a part failure also may reduce only the performance of a component to a level that is still acceptable.

For example, consider a single cell in a multicell battery that develops a low voltage condition below the minimum acceptable. The battery exhibits less than full capability, but the capability is above the minimum acceptable and would not, therefore, constitute a reportable failure.

5.4.2.2 Quantitative vs. qualitative criteria

The criteria should be quantified wherever possible. In many cases, though, limits are not specified, or performance is not practically measured; therefore, the performance criteria will be qualitative.

For example, consider an isolation valve. The valve serves to isolate flow when closed, to permit flow by opening on demand and as a containment device preventing external leakage.

- Isolation function

  Operational criteria should specify an acceptable level of flow (seat) leakage. Although the valve may have a design specification regarding seat leakage at rated conditions, in practice this criteria is often qualitative. Once in-service, isolation valves are not necessarily routinely leak-tested and failures are frequently not detected until the leakage becomes excessive as determined by the operating staff (through the inability to adequately isolate systems or components). The same valve, however, if it serves in a primary containment isolation function, is routinely leak-tested against established quantitative criteria.

- Closing function

  Operationally, the valve may only be required to close fully in a "reasonable amount of time." Typically, this is determined by the operating staff during an evolution such as isolation of a system. The same valve, however, to satisfy a nuclear safety concern may have a prescribed minimum stroke time.

- Opening function

  Again, operationally, the valve may be required to open to allow flow in a "reasonable amount of time." For the nuclear safety concern, however, opening criteria may not be pertinent, as the valve may only be required to close for isolation.

- Containment function

  This refers to the valve serving the basic function of a pipe--that is, to limit external leakage (stem packing, body to bonnet seal, through wall, etc.). The operational criteria may be qualitative, based upon stem leakage which the operating staff considers acceptable or excessive. On the other hand, the criteria may be quantitative, such as an unidentified leakage specification or, in the case of a primary containment isolation valve, a local leak rate limit. Inspection criteria defined as part of the In-service Inspection Program may also apply. Therefore, the criteria is derived from nuclear safety concerns as well as operational considerations. The criteria may be either qualitative or quantitative.

Note: These examples are provided using the assumptions that the failure is attributable to the valve and not to an associated component. In actuality, the opening and closing functions may be dependent upon the operator, control circuit, power source, etc. and a failure to open or close may not be reportable as a valve failure, but rather as a failure of one of these other components.

5.4.3 Failure Determination

An event involving a component is reportable as a failure when the component is not able to perform its intended function; this definition can be further subdivided into three severity levels:

Immediate - A failure that is both sudden and complete.

Degraded - A failure that is both gradual and partial whereby the component degrades to a level which, in effect, is a termination of the ability to perform its required function.

Incipient - an imperfection in the state or condition of a component such that a degraded or immediate failure is imminent if corrective action is not taken.

Incipient failure is not a failure per se; it is a condition that implies that a failure is imminent if the condition is not corrected. This category of failure is not required to be reported, but as these events may be indicative of a generic concern, or of other safety or operational significance, reporting is optional.

5.4.4 Component Maintenance : Corrective vs. Preventative

For a particular component function, if the minimum acceptable performance can be quantified and the actual performance measured, the determination of whether or not the component failed is straightforward. In cases where the criteria is qualitative, or performance measurement is not practical, the determination becomes subjective and to some extent is made by the operating staff (operators, technicians, engineers, etc.). Since the data reporter does not necessarily communicate with the individual who identified the event, and because much of the information concerning equipment events is available as maintenance documents (work orders, trouble reports, history, records, etc.), it may be helpful to evaluate that event in terms of maintenance performed.

5.4.4.1 Preventive maintenance

Basically, maintenance is categorized as either preventative or corrective. For the purposes of this discussion, preventative maintenance includes any maintenance performed to preclude a component from reaching a failed condition.

Probably the most familiar aspect of a preventative maintenance program is the prescheduled periodic maintenance of components, i.e., the inspection, cleaning, replacement of consumable parts, refurbishment of material, etc. Referring to the general failure description (the gradual, predictive degradation of a component's performance), this type of maintenance is performed between the component's operating cycle to upgrade its performance and thereby maintain it in satisfactory operating condition. There are, however, other aspects of a preventative maintenance program as well.

The less obvious aspects involve maintenance initiated as a result of ongoing testing and surveillance and routine observation of the equipment.

For example, a instrument bistable under test may be found to trip within its allowable tolerance, but, due to instrument drift, it is likely to exceed the allowable specification prior to the next surveillance. To preclude reaching this condition, the trip point would be reset to a nominal value.

An operator may identify a valve which has a minor packing leak. The leak does not exceed any operational limits and is not serious enough for the operator to consider the valve failed. To preclude the leak from worsening, or reaching a failed condition, appropriate maintenance is performed.

Although not prescheduled, these examples are indicative of preventative maintenance.

5.4.4.2 Corrective maintenance

Corrective maintenance, on the other hand, is maintenance performed to restore a component to an acceptable level of performance. Using the previous examples, corrective maintenance would be necessary if the trip point was found out of tolerance during the test, or if the packing leak exceeded an operational limit or was considered serious enough by the operator as to require the valve to be isolated or removed from service.

If the maintenance performed is preventative, it is not reportable as a component failure. If corrective maintenance is performed, the failure is reportable.

Note that in cases where preventative maintenance was performed, it may be appropriate to report the event as an incipient failure, which is optional.

5.4.5 Failure Reporting

Previous sections have discussed in detail the reportability of a failure based on degradation of component performance. There are, however, other reasons why a component may fail to function at an acceptable level.

5.4.5.1 Associated devices

Non-reportable components and other devices designed to support or feed information to a reportable component may, upon failure, severely degrade the component's operability. In many cases, repair or replacement of the associated device is all that is required to remedy the situation.

For example, consider the air accumulator and check valves designed to regulate the performance of a reportable valve operator. These are non-reportable items, per se, but failure of one of them can render the valve operator useless.

Non-reportable devices supporting or feeding information to a single reportable component should be treated as piece-parts of the component. In the case of the valve operator, a failure report would be submitted for the operator and a description of the cause of the failure (accumulator or check valve leakage) included in the narrative. Note that accumulator or check valve leakage is not reportable, however, unless it causes operator performance to drop below the minimum acceptable level.

5.4.5.2 Environmental stresses

Section 5.4.1 describes the degradation of a component due to environmental stresses. The discussion, however, assumes that the stresses are reasonably constant and that they do not affect the component's ability to function (except for long-term aging or wear). There are cases, however, where a component may fail to function satisfactorily due to an unforseen change to its environment, which may or may not cause damage to the component itself.

For example, a reportable electronic component may suddenly fail to operate properly due to the electronic noise generated by the degradation of a nonreportable, associated device. Although the problem may be solved by replacing the nonreportable device, a failure report is still required for the reportable component that failed to operate properly.

5.4.5.3 Inter-related failures and command faults

The failure of a single component or device frequently results in the failure of a chain or series of components to operate correctly. In such cases, a single component failure report should be submitted for the reportable component most closely related to the cause of the failure event. It is important that the failure description narrative be complete when describing this type of failure.

For example, consider a reportable relay that does not operate properly upon demand, resulting in the failure of a reportable valve operator to operate and causing a reportable valve to remain closed. In this case, a failure report is required for the relay but not for the valve or the operator. If a non-reportable, associated device had caused the event instead of the relay, however, the report would be required for the valve-operator since it would be the reportable component most closely related to the cause of the event.

An exception to this is the case where failure of one component causes damage to another. A failure report is required whenever a reportable component sustains damage that renders it inoperable or severely degraded, regardless of the cause.

If the failure of a component or series of components renders a system inoperable, a system failure report is required.

5.4.6 Cause Scenarios

In many cases, cause is difficult to specify because the evidence is after the fact. Frequently, the root cause or initiator of the chain of events leading to a failure may have to be inferred from the relative success of repair or from observed effects or damage. The model in Figure 5.4.6.1 illustrates this problem.

Most component damage occurs at an intermediate or final stage of the scenario instead of at the beginning. A case in point is illustrative: A cover plate left loose on a motor operator housing after torque or limit switch setting may expose electrical contacts, motor windings, etc. to water intrusion, resulting in degradation of contacts or insulation, which then results in burnout or shorts when an electrical overload is experienced as a result of difficulty in unseating the valve. The root cause may never be apparent, as other causes or damage mask its existence.

For the data base to be useful, however, it is more constructive to identify an intermediate cause where the root cause is either unknown or not apparent from the evidence.

The cause codes thus provide for instances where the immediate cause of the failure to operate is damage to the equipment but where the initiating factor cannot be determined. Reporters are encouraged to consider coding the intermediate cause or apparent cause and making whatever qualifications are necessary in the narrative.

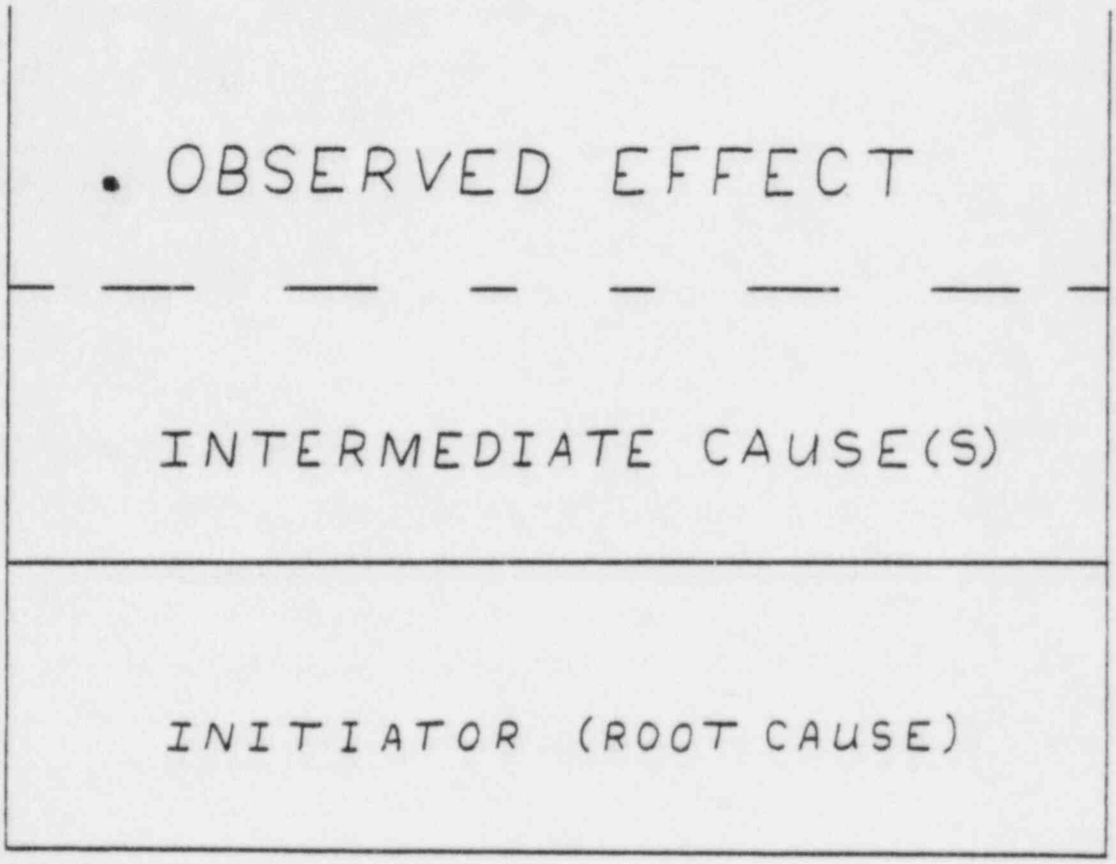

Figure 5.4.6-1 Cause Layer Model

5.4.7 Field Definitions

5.4.7.1 Utility/plant/unit (required)*

The seven-character code identifying the unit in the NPRDS Database. See Table 8 for a list of codes.

5.4.7.2 NPRDS component code (required)*

The code indicating the component type that failed. Note that although many of the codes are clear text (PUMP for pump), some are not (ACCUMU for accumulator.) Valid codes are listed in Table 2.

5.4.7.3 Utility component ID (required)*

The set of characters used by the utility to identify the failed component. This field must be identical to that of the component engineering report on file. The batch system cannot be used to report a failure on a component whose utility component ID has more than 11 characters.

5.4.7.4 Discovery date (required)*

The date on which the failure was discovered. Since a failure cannot be discovered before it occurs, the date must be equal to or greater than the Date of Failure (5.4.7.9).

5.4.7.5 Discovery number (required)*

A number indicating that failure is being reported in cases where more than one failure of a component is discovered on a given day. "1" is entered if

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*Changes cannot be made to this field except through deletion and resubmission of the record.

only one failure is discovered or to indicate the first failure found. "2" is entered on the report for the second failure discovered for that same day. "3" is entered for the third, etc.

5.4.7.6 Discovery time (required)

The time (24-hour clock) that the failure was discovered. Entry must be made in the following format:

<u>HR</u> <u>MN</u>

HR = Two digit hour, 00 to 24.

MN = Two digit minutes, 00 to 59.

5.4.7.7 Report date (required)

The date that the NPRD form was completed. Entry must be in the following format:

<u>YR</u> <u>MO</u> <u>DY</u>

YR = Two digit year

MO = Two digit month

DY = Two digit day

5.4.7.8 LER report number (required if LER submitted)

The number of the LER discussing the failure. The number must be entered in the format <u>DOC</u>-<u>YR</u> <u>NUM</u>-<u>R</u>. The dashes must be included when using IDE but are not included when using batch. If no revisions have been issued to the LER the last dash and character are omitted.

DOC = Three digit plant docket number

YR = Two digit year greater than 72

NUM = Three digit sequential LER number

R = One digit revision number

5.4.7.9 Related system type (required)

The code indicating the system primarily affected by the component failure. The failed component may or may not be part of the system itself. Valid codes are those three- and six-character NPRDS system codes listed in Tables 1a-1e.

5.4.7.10 Date of failure (required)

The date or estimated date that the component first became unable to operate at an acceptable level. This date is generally equal to the discovery date only when the failure is discovered through an operational abnormality. A failure discovered during testing is assumed to have occurred at the midpoint date between the last known date the component was operating satisfactorily and the date the failure was discovered. If the last date of satisfactory operation is unknown, the last test date should be used in estimating the date of failure.

5.4.7.11 Failure end date (required)

The date that repairs correcting the failure are completed, i.e., the date the component or its replacement is placed back into service, or when the component or its replacement became available for service. Entry must be made in the following format:

YR MO DY

YR = Two digit year

MO = Two digit month

DY = Two digit day

5.4.7.12 Failure end time (required)

The time that repairs correcting the failure are completed, i.e., either the time that the component or its replacement are placed back into service or that the component or its replacement became available for service. Entry must be made in the following format:

<u>HR</u> <u>MN</u>

HR = Two digit hour, 00-24

MN = Two digit minutes, 00-59

5.4.7.13 Status code (required)

The status of the flow train in which the component lies at the time of the failure. If the component is located within a redundant subsystem/channel, a choice is made from codes E through H. If the component is unique to the system, a choice is made from codes A through D. Code translations are as follows:

<u>System Level</u>

A System in service (operating/standby)

B System in test

C System in maintenance

D System out of service (not in maintenance)

<u>Channel Level</u>

E Subsystem/channel in service (operating/standby)

F Subsystem/channel in test

G Subsystem/channel in maintenance

H Subsystem/channel out of service (not in maintenance).

5.4.7.14 Type of failure code (required)

The code indicating the failure severity level. Choose one of the following codes:

J Immediate - A failure that is both sudden and complete.

K Degraded - A failure that is both gradual and partial; the component degrades to a level which, in effect, is a termination of the ability to perform its required function. This code should be chosen when a component does not satisfy the minimum acceptable performance criteria for a specific function or when a component is removed from service or isolated in order to perform corrective maintenance.

L Incipient - An imperfection in the state or condition of a component such that a degraded or immediate failure is imminent if corrective action is not taken. This code indicates an optional report, since failure has not occurred, per se.

5.4.7.15 Failure symptom code (required)

The code indicating the first effect of the failure, by which the failure was discovered. Choose one of the following:

A Physical Fault - A failure is characterized by a changed physical condition, physical configuration, fracture or damage often resulting in a loss of integrity or ability to hold a contained fluid or electrical current.
This category includes blocked or stopped flow, cracks, fractures or breaks, collapses, physical distortion or displacement, electrical arcing, open circuit, shorts or degraded insulation. Leaks are considered a special category due to the number of reported items.

B Out of Specification - A failure is characterized by operation but is outside of the permissible range of expected output or response. This category includes out of limits, low or high output or flow, erratic output, premature response, off frequency, off voltage, intermittent operation or failure to synchronize or control.

C Demand Fault - A failure is characterized by the component's failure to actuate, move, or change operating mode upon request, either operator-initiated or from an automatic signal. This category includes failure to stop, close, open, release, run, start/move, operate per demand, respond, record, or instances of no output when an input of some sort demands one.

D Abnormal Characteristic - A failure is characterized by a type of response or an operating characteristic not considered normal or expected. This category includes such attributes as overheating, unusual noise or vibration, chatter, corrosion products, discoloration and false response (such as non-zero output with zero input).

E Released Leakage - A failure is indicated by leakage of the process fluid from within the pressure boundary to the environment, usually through packed glands, mechanical seals or gasketed joints. This category includes leaks of steam, water, oil, gas or other fluids beyond amounts normally expected or limited by specifications.

F Contained Leakage - A failure is characterized by a leakage of the process fluid from one side of a valve plug or disc to another, or from the shell or tube side of a heat exchanger to the other side, where both sides are essentially within closed systems. This category includes flow leaks within a system beyond those established as permissible or limited by specifications.

5.4.7.16 Failure detection code (required)

The code which identifies how the failure was recognized or brought to the attention of the plant staff. Choose one code from the following:

A Operational Abnormality - A failure detected from indications received during normal operation of the component.

B In-service Inspection - A failure detected during a scheduled in-service inspection, e.g., performing ASME Boiler & Pressure Vessel Code, Section XI.

C Surveillance Testing - A failure detected through routine periodic testing (calibration, trip-point checks, functional checks, etc.).

D Preventive Maintenance - A failure detected while performing preventive maintenance.

E Special Inspection - A failure detected during the performance of an inspection that is not routinely scheduled or required.

F Audiovisual Alarm - A failure detected by an alarm that either can be heard or seen.

H Routine Observation - A failure detected as a result of normal log taking, log review, or daily/weekly inspections. Usually, this would be within the normal duties or job function performed by plant personnel.

J Incidental Observation - A failure detected by casual observation or chance witnessing by individuals not assigned duties involving the component or owning system.

X Other - A failure in which the method of detection can be assigned to any of the above categories. (Failure narrative should be explanatory.)

5.4.7.17 Cause category code (required)

The code categorizing the cause of the failure. Additional guidance in choosing this code is provided in Section 5.4.6.

A Engineering/Design - A failure attributable to the inadequate design of the component or system.

C Manufacturing Defect - A failure attributable to inadequate assembly or initial quality of the component.

D Installation Error - A failure caused by improper installation of equipment.

B Incorrect Procedure - A failure attributable to incorrect procedures that were correctly followed.

E Operating Error - A failure caused or aggravated by personnel errors, including failure to properly follow procedures.

F Maintenance/Testing - A failure that is a result of improper maintenance, lack of maintenance or personnel errors that occur during maintenance or testing activities performed on a component or system.

H Random/Wearout - A failure thought to be the consequence of expected wear or acceptable random variations among material and component properties and manufacturing variability.

J Associated Devices - A failure attributable to a failure or misoperation of another component or system.

K Unknown - A failure in which the cause cannot be assigned to any of the above categories.

5.4.7.18 Cause description codes (required)

Codes identifying the cause of, or contributing factors to, the failure. For cases in which a definite cause is not established, codes indicating the suspected cause should be chosen and the suspected cause discussed in the Cause of Failure narrative. Additional guidance is included in Section 5.4.6. Up to three codes are chosen from the following:

MECHANICAL CAUSES

AB Foreign/Incorrect Material - Component material not as specified or internal environment containing an unanticipated material (e.g., water).

AC Particulate Contamination - Internal contents include unexpected buildup of divided solids.

AD (Ab)Normal Wear - Loss of function due to a gradual loss of configuration or material.

AE Lubrication Problem - Frictional failure directly attributable to lack of proper lubrication.

AF Weld Related - Weld fracture, crack, or heat affected zone failure attributable to the welding process.

AG Abnormal Stress - Material stress attributable to abnormal load, vibration, temperature, pressure or flow in the system.

AV Connection Defective - Loose mechanical parts or fasteners.

AZ Material Defect - Material type as specified, but with integrity compromised due to a flaw or leak.

BB Mechanical Damage/Binding - Loss of proper mechanical configuration due to excessive forces.

BC Out of Mechanical Adjustment - Loss of proper mechanical alignment, movement, limits or configuration not due to damage. Loose setscrews, locknuts, mechanical stops, and setpoints of adjustable fixtures are included.

BD Aging/Cyclic Fatigue - Time-related degradation of mechanical properties without significant loss of material (as through wear). Includes radiation damage, embrittlement, fatigue cracking of material subjected to stress reversals.

BE Dirty - Loss of function due to deposition of extraneous material on operating surfaces such as electrical contacts, pilot valve seats, etc.

BF Blocked/Obstructed - Loss of flow function due to lodged foreign objects or an unexpected buildup of solids. May also be loss of movement due to mechanical interference other than binding.

BG Corrosion - Failure attributable to loss of material or buildup of chemical reaction products from electrochemical or stress-aides corrosion.

ELECTRICAL/ELECTRONIC CAUSES

AG Abnormal Stress - Loss of function due to stress-related causes attributable to voltage spikes, oscillations, etc.

AR Insulation Breakdown - Loss of electrical circuit integrity including shorts, arcs, burned out windings, etc., attributable to failure of insulation itself.

AS Short/Grounded - Loss of electrical circuit integrity due to a shorted or grounded circuit.

AT Open Circuit - Inoperability of electrical circuit due to a break in conductor or contacts not made up.

AU Contacts Burned/Pitted/Corroded - Inoperability of electrical circuit due to degradation of electrical contacts.

AV Connection Defective - Electrical terminal connection loose, intermittent, or containing high electrical resistance.

AW Circuit Defective - Electrical or electronic circuit fault not attributable to any one sub-component, component or part including unknown electronic faults or failures not reproducable.

AX Burned/Burned Out - Loss of electrical circuit integrity including insulation breakdown due to local combustion, overload and/or electrical fire.

AY Electrical Overload - Loss of function specifically attributable to unanticipated high electrical current.

AZ Material Defect - Material type as specified, but with integrity compromised by a flaw.

BE Dirty - Loss of function due to deposition of extraneous material on operating surfaces such as electrical contacts.

BG Corrosion - Failure attributable to loss of material or buildup of chemical reaction products from electrochemical corrosion.

ADJUSTMENT/HUMAN RELATED

AA Foreign/Wrong Part - Part does not belong in component. This includes poor designs and misapplications.

AL Setpoint Drift - Electronic drift attributable to poor control setpoint stability. Relief valve setpoint changes during operation due to pilot valve seat bleed rate changes may be included, but not changes due to previous repair or mechanical adjustment.

AM Previous Repair/Installation Status - Inadequate repair condition or resulting from lack of proper previous maintenance, installation, or restoration to operational status.

AN Incorrect Procedure - Failure directly attributable to an inadequate or improper instruction or approved procedure.

BC Out of Mechanical Adjustment - Loss of proper mechanical alignment, movement, limits, or configuration not due to damage. Loose setscrews, locknuts, mechanical stops, and settings of adjustable fixtures are included.

BH Out of Calibration - Electrical/mechanical setpoint or response settings (lead, lay or reset) not in the specified position or range.

BJ Incorrect Personnel Action - Loss of proper function directly due to human error.

5.4.7.19 System effect code (required)

The code which identifies the effect on the system caused by the component failure. Choose one of the following:

A Loss of System Function - A component failure that by itself results in the system being unable to perform its intended function (i.e., all trains, channels, etc. inoperable).

B Degraded System Operation - The system is capable of fulfilling its intended function, but some feature of the system is impaired.

C Loss of Redundancy - Loss of one system functional path.

D Loss of Subsystem/Channel - A partial loss of a system functional path.

E System Function or Operation Unaffected - Failure narrative should be explanatory.

5.4.7.20 Plant effect codes (required)

The code that indicates what happened to plant operation as a result of the failed component. Choose one of the following:

A Resulted in Reduced Power Operation - The unit had to reduce power output or was limited below the nominal output level due to the failed component.

B Resulted in Unit Off-line - The unit was removed from service due to the failure of the component.

C Resulted in Reactor Trip - The reactor tripped automatically or was manually tripped as a result of the failed component.

D Resulted in Personnel Injury - Plant personnel were injured as a result of the component failure.

E Resulted in Off-site Radiation - An uncontrolled release to the environment occurred as a result of the component failure.

F Resulted in Damage to Other Equipment - The component failure caused damage to other plant equipment.

G Resulted in No Significant Effect - The plant was not significantly affected by the failed component.

5.4.7.21 Corrective action code (required)

The code indicating the action taken to remedy the failure. Choose one of the following:

AA Recalibrate/Adjust - To reset a device mechanically or electrically to a prescribed value or position.

AC Temporary Measures - Actions taken to bypass, maintain or restore the component or owning system to operation for an interim period.

AE Modify/Substitute - To alter or eliminate the component/part or to replace the component/part with a different model.

AG Repair Component/Part - The component is refurbished and/or reinstalled.

AH Replace Parts - A piece of the component is removed and replaced in kind.

AK Replace Components - The entire component is replaced in kind.

5.4.7.22 Documentation codes (required)

The codes indicating non-NPRDS records which resulted from the failure. These records may be available for study or may have been forwarded to other organizations for use in evaluation. Choose one or two of the following:

A - Failure reported to architect/engineering firm.

B - Failure reported to NSSS Supplier.

C - Failure reported to consultant.

D - Failure reported to component manufacturer.

E - Failure analysis recommended.

F - Failure analysis performed.

G - Photographs were made.

H - LER submitted.

Z - Failure was not documented.

5.4.7.23 Failure description narrative (required)

A narrative describing the occurrence of the failure. The operating condition of the plant, affected systems, and the component should be provided, as well as an account of how the failure was discovered. The severity of the failure and its effects should also be explained. Be sure to identify the failed component and its intended function within the narrative.

There is no length restriction to this field when using IDE, but 300 characters should be considered a nominal limit, as the output programs are limited to a total of about 900 characters for all three narrative fields. Punctuation should be sparse, and all marks should be separated from the text on both sides by one space. Abbreviations, except for those commonly understood, should be avoided.

5.4.7.24 Cause of failure narrative (required)

A narrative stating the cause, or suspected cause, of the failure. If the root cause is not determined, a "best judgment" cause reflecting the observations of the individuals evaluating and/or correcting the failure should be described. Transient stresses such as abnormal pressure, temperature, vibration, etc. should be noted.

There is no length restriction to this field when using IDE, but 300 characters should be considered a nominal limit, as the output programs are limited to a total of about 900 characters for all three narrative fields. Punctuation should be sparse, and all marks should be separated from the text on both sides by one space. Abbreviations, except for those commonly understood, should be avoided.

5.4.7.25 Corrective action narrative (required)

A narrative describing the action taken to correct the failure. Both short term and long term corrective actions should be included. Actions taken by the repairing organization should be described. If tests or recalibrations are made to verify that the repairs are successful, they should be noted.

There is no length restriction to this field when using IDE, but 300 characters should be considered a nominal limit, as the output programs are limited to a total of about 900 characters for all three narrative fields. Punctuation should be sparse, and all marks should be separated from the text on both sides by one space. Abbreviations, except for those commonly understood, should be avoided.

5.5 Unit Information Report (Form 1)

A unit information report is submitted before any other data on that unit is loaded into the NPRD System. The report, which is submitted to INPO in written form (Form NPRD-1), contains information specific to the unit reporting. The data is keyed into the system from the form by INPO. Changes to unit information can be requested by a utility's NPRDS Supervisor either by phone or by mail.

Samples of completed NPRD-1 forms are included in Section 5.5.2. Blank forms for utility use are included in Appendix A.

5.5.1 Field Definitions (All fields are required.)

5.5.1.1 Utility/plant/unit

The seven character code identifying the unit in the NPRDS database. See Table 8 for a list of codes.

5.5.1.2 NRC docket number

The last three digits of the unit's NRC docket number.

5.5.1.3 Utility name

The name of the utility company. A consistent name should be used for all reporting units operated by a utility.

5.5.1.4 Station name

The name of the station (plant). A consistent name should be used for all reporting units present at the station.

5.5.1.5 Unit name/number

The unit name and number as listed in Table 8.

5.5.1.6 Utility contact 1

The name of the unit's primary NPRDS contact in the following order: first name, middle initial, last name.

5.5.1.7 Utility contact 1 (phone)

The phone number of the unit's primary NPRDS contact. Include the area code and extension number.

5.5.1.8 Utility contact 2

The name of the unit's alternate NPRDS contact in the order: First Name, Middle Initial, Last Name.

5.5.1.9 Utility contact 2 (phone)

The phone number of the unit's alternate NPRDS contact. Include the area code and extension number.

5.5.1.10 NSSS code

The code indicating the plant type. Chose from the following:

A - Babcock & Wilcox
B - Combustion Engineering
C - General Electric
D - General Atomic
E - Westinghouse (PWR)
F - Westinghouse (LMFBR)

5.5.1.11 Turbine gen. mfg. code

The code indicating the turbine/generator manufacturer. Refer to Table 9 for a list of valid codes.

5.5.1.12 A/E code

The code indicating the architect/engineer that designed the unit. Refer to Table 9 for a list of valid codes.

5.5.1.13 Construction firm code

The code indicating the construction firm that built the unit. Refer to Table 9 for a list of valid codes.

5.5.1.14 Cooling method code

The code indicating the method of main condenser cooling. Choose one of the following codes:

AC - Natural draft tower, wet
AN - Natural draft tower, dry
BC - Mechanical draft tower, wet
BN - Mechanical draft tower, dry
CC - Mechanical/natural tower, wet
CN - Mechanical/natural tower, dry
NA - Natural lake
NB - Reservoir
NC - River
ND - Canal
NE - Saltwater

5.5.1.15 Reactor rating (MWt)

The reactor thermal rating in MWt.

5.5.1.16 Unit rating (MWe)

The unit rating in MWe.

5.5.1.17 Initial critical date

The date the unit first went critical.

5.5.1.18 Commercial service date

The date the unit first went into commercial service.

5.5.1.19 Mail address (street or box)

The unit's mailing address. Enter either the street address or the P. O. box number.

5.5.1.20 Mail address (city, state, zip)

The city, state and zip code of the unit's address.

5.5.1.21 Station location

The unit's geographic location. Enter the city/township, county, state name, two-character post office state abbreviation and zip code.

5.6 Out-of-Service Report (Form BCH2B or IDE2B)

An out-of-service report is submitted whenever a reportable component is either removed permanently from service and not replaced or when a component is replaced with a component having a different manufacturer and/or model number. This report is not required when a component is replaced in kind. Since not all replacements are initiated by component failure, the reporting organization must also monitor preventative maintenance and design changes to be sure that out-of-service records are kept current.

An out-of-service report does not delete data from the data base. Instead, it identifies all records associated with the removed component and prepares the computer to accept new engineering data for the replacement. Both engineering and failure records for components removed from service can be identified by the asterisk and date appended to the Utility Component ID field. The date corresponds to the date the component was originally placed into service. Records for components taken out of service can be accessed through IDE by appending the asterisk and in-service date to the Utility Component ID field.

In addition to appending the in-service date to the utility component ID, an out-of-service report completes the Out-of-Service Date field in the component's engineering record. The Out-of-Service Date is used within statistical programs that calculate values such as total component in-service hours.

Since out-of-service reports do not directly result in the formation of new records, they are not retrievable.

Out-of-service reports can be submitted either interactively or through the batch system. The IDE program allows for simplified entry of the engineering data for the replacement component (Section 7.7). A new engineering record for the replacement must be submitted when using the batch system.

The Data Start Date and In-Service Date for the replacement component must be at least one day after the Out-of-Service Date reported in the Out-of-Service Report.

Field Definitions (all Fields are required)

5.6.1 Utility/Plant/Unit

The seven-character code identifying the unit in the NPRDS data base. See Table 8 for a list of codes.

5.6.2 NPRDS Component Code

The component code for the component to be removed from service. See Table 2 for a list of codes.

5.6.3 Utility Component ID

The set of characters used by the utility to identify the component to be removed from service. This field must be identical to that of the component engineering report. The batch system cannot be used to remove a component whose ID has more than 11 characters from service.

5.6.4 Data Start Date

The date that NPRDS reliability data began accruing for the component taken out of service. This date must be identical to that of the component engineering record. Entry must be made in the following format:

YR MO DY

YR = Two digit year

MO = Two digit month

DY = Two digit day

5.6.5 Out-of-Service Date

The date that the component is permanently removed from service. The date must be at least one day after the Data Start Date and In-Service Date of the component. Entry must be made in the following format:

YR MO DY

YR = Two digit year.

MO = Two digit month.

DY = Two digit day.

5.7 Quarterly Operating Report