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Nuclear Power Safety Reporting System

Implementation and Operational Specifications

Prepared by R. D. Newton, J. R. Ims, F. C. Finlayson

The Aerospace Corporation

Prepared for
U.S. Nuclear Regulatory
Commission

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ABSTRACT

This document presents the results of a study conducted by the U.S. Nuclear Regulatory Commission of a voluntary, third-party managed, nonpunitive data gathering system (the Nuclear Power Safety Reporting System -- NPSRS). The data to be gathered by the NPSRS are intended for use in identifying and quantifying the factors that contribute to the occurrence of significant safety problems involving humans in nuclear power plants. The NPSRS has been designed to encourage participation in the system through guarantees of reporter anonymity provided by a third party organization that is responsible for management of the system. Additional motivation for reporting through the system would also be provided through conditional waivers of disciplinary action for inadvertent violations of NRC regulations. This document presents the specifications for implementation and day-to-day operations of the NPSRS. In it, the elements, requirements and procedures of the system are outlined. A companion volume (NUREG/CR-4132; "Nuclear Power Safety Reporting System: Final Evaluation Results") has been prepared that provides an assessment of potential areas of concern related to the System.

The document provides a description of the System elements of the NPSRS, and the procedures and forms for the analysis of safety-related incidents that are submitted in reports to the NPSRS. A description is also presented of the procedures and forms for receiving and conducting the requisite initial processing and screening of the incoming reports. In the specifications, the procedures and forms are presented for analyzing incident reports for their significant features. A taxonomy is presented that defines key words and descriptors for analyzing and codifying the incoming reports for data processing purposes and ultimately for storage in a computer data bank. The procedures and forms are given for preparing Alert Reports on time-critical safety issues that may be found in the incoming reports. These and other reports that are intended to be prepared by the NPSRS staff for external distribution are described in this document. The specific forms and procedures for the System are presented as Appendices to the document.

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PREFACE

This document contains implementation and operational specifications for a Nuclear Power Safety Reporting System (NPSRS). The specifications have been prepared as a performance guide for an independent, third-party management organization to aid them in the implementation of the System. The existence of the specifications does not necessarily indicate that the NRC has reached a decision to sponsor an NPSRS. However, the NRC is examining the NPSRS concept and the specifications outlined in this document in order to evaluate the issues associated with implementation of such a system. A companion volume (NUREG/CR-4132; "Nuclear Power Safety Reporting System: Final Evaluation Results") has been prepared that provides an assessment of potential areas of concern related to the System. The authors hope that this report will be useful in aiding the NRC's decision making processes.

The authors wish to acknowledge the direction and support that has been provided by Dr. Thomas G. Ryan of the Human Factors Branch, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission. The contributions of Dr. Mason B. Watson, Principal Director of the Energy Systems Directorate of The Aerospace Corporation, should also be recognized. In particular, Dr. Watson provided valued reviews of the documentation for the program. We are grateful for the review of the drafts of the document provided by Thomas Kossiaras of the Federal Aviation Administration's ASRS Office, and William Reynard of the NASA-ASRS Office. We also wish to express our thanks to Alice Folkart, Ginny Jackson and Therese Mattijetz for their patience and care in preparing the text of the document.

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GLOSSARY

ASRS	-	Aviation Safety Reporting System
BWR	-	Boiling Water Reactor
FAA	-	Federal Aviation Agency
LER	-	Licensee Event Report
LPRM	-	Low-Power Reactivity Monitor
NASA	-	National Aeronautics and Space Administration
NPSRS	-	Nuclear Power Safety Reporting System
NRC	-	U.S. Nuclear Regulatory Commission
PRA	-	Probabilistic Risk Assessment
QC/QA	-	Quality Control/Quality Assurance
RPV	-	Reactor Pressure Vessel
TWA	-	Trans World Airlines

1.0 INTRODUCTION

This document describes the results of a study conducted by the U.S. Nuclear Regulatory Commission (NRC) of an unobtrusive voluntary, anonymous, nonpunitive, third-party managed human factors data gathering system (the Nuclear Power Safety Reporting System -- NPSRS). The data to be gathered by the NPSRS are intended for use in identifying and quantifying the factors that contribute to the occurrence of significant safety problems involving humans in nuclear power plants. The NPSRS has been designed to encourage the participation of industry personnel in the system through guarantees of reporter anonymity provided by a third party organization that is responsible for management of the system. Additional motivation for reporting through the system would also be provided through conditional waivers of disciplinary action to individuals for inadvertent violations of NRC regulations. An NPSRS evaluation has been conducted which included: (1) An analysis of the existing Federal Aviation Administration (FAA)/National Aeronautics and Space Administration (NASA) Aviation Safety Reporting System (ASRS) in order to determine whether it would be feasible to apply part (or all) of the ASRS concepts for collecting data on human factor related incidents to the nuclear industry; (2) the identification and definition of the basic elements and requirements of a NPSRS; (3) an evaluation of the feasibility of such a system; (4) performance of a system operability demonstration test; and (5) the development of implementation plans and system specifications. This document presents the NPSRS implementation plan and operational specifications in which the elements, requirements and procedures of the system are outlined. The specifications contained in this document are based upon a final evaluation of the NPSRS study results contained in Reference 1.

Data developed by the NPSRS will be used: (1) to support the quantification of the human reliability elements of probabilistic risk assessments (PRAs); (2) to evaluate the influence of various nuclear power plant systems on human error-proneness within the system; and (3) to aid in the development of design criteria for human-machine interfaces with safety systems in nuclear plants. NPSRS feasibility depends upon a number of issues such as:

(a) practicality (e.g., costs and logistical requirements); (b) acceptability to government, industry, and operational personnel; and (c) the usefulness of data developed by such a system (e.g., its relevance, biases, and applicability to NRC and nuclear community needs).

1.1 Aviation Safety Reporting System Summary

In December 1974, Trans World Airlines (TWA) Flight 514 crashed into a Virginia mountain side. The tragedy was subjected to the full glare of media publicity and contributed to forces that induced the FAA to implement a human error reporting system called the Aviation Safety Reporting System (ASRS). The effects of the TWA 514 crash on the FAA may be considered analogous to those of the Three Mile Island incident on the NRC. Specifically, both incidents resulted in a heightened concern with respect to human safety related incidents in each of the respective government organizations (Ref. 2).

In 1976, following a thorough review of the events of the TWA Flight 514 crash and some false starts in implementing human error reporting systems, the FAA instituted the Aviation Safety Reporting System. The ASRS was designed to encourage flight crew members, air traffic controllers and others in the national aviation system to voluntarily report any incident, situation, or occurrence which the reporter felt was related to air safety. Two provisions were included in the system as an inducement to motivate voluntary reporting. First, a neutral and independent third-party organization (NASA) was asked to manage and operate the program in order to isolate the report (and the reporter) from the FAA, thereby providing anonymity for the reporter. (Consequently, the FAA has no managerial connection with the ASRS, but is its primary financial supporter providing about $1.5 million per year to fund the system.) Second, the FAA extends an offer of limited immunity from regulatory disciplinary action to those individuals who submit reports of safety related incidents where Federal Air Regulations may have been violated. The offer of immunity is extended to an individual for a single, appropriately reported incident once in a five year period, as long as criminal offenses or actual accidents were not involved in the incident.

A steady influx of reports has been received over the nearly nine year period since the ASRS was established. Reports have been received at a rate of about 400 per month and over 40,000 have been received since the system was initiated. ASRS analysts routinely search the information in the data base for trends that may identify existing or potential problems within the U.S. aviation system. Several special technical reports describing findings and system results are issued each year by the ASRS staff. When critical problem areas are identified by a reporter, hazard notification reports are issued promptly to those with a specific need for the information. The ASRS program also publishes a monthly newsletter/safety bulletin (the "Callback") to provide a regular, relatively informal forum in which general-interest aviation system safety issues are highlighted.

The most recent performance evaluation for the ASRS was completed in April 1982. The official and unqualified conclusion of the NASA sponsored ASRS Advisory Committee was that the System was practical, useful, and widely accepted within the aviation community (Ref. 3). In September 1983, the administrators of the FAA and NASA implicitly recognized the value of the ASRS contributions by approving continuance of the ASRS through September 1987. The successful performance of the ASRS provides substantial support for a determination that a similar concept could be utilized and provide substantial benefits within the nuclear community.

1.2 NPSRS Concept Summary

The basic concepts of the NPSRS are shown in Figure 1. Like the ASRS, the NPSRS provides a simplified method for submitting initial reports of safety incidents. In the NPSRS, personnel involved in an actual or "near miss" safety-related incident in a nuclear power plant are to be encouraged to submit a brief, simple, single-sheet report form to the NPSRS. The ASRS experience has shown that guarantees of anonymity are an essential feature to the system's success in assuring reporters they will not incriminate themselves by sending information on safety incidents to the data collecting

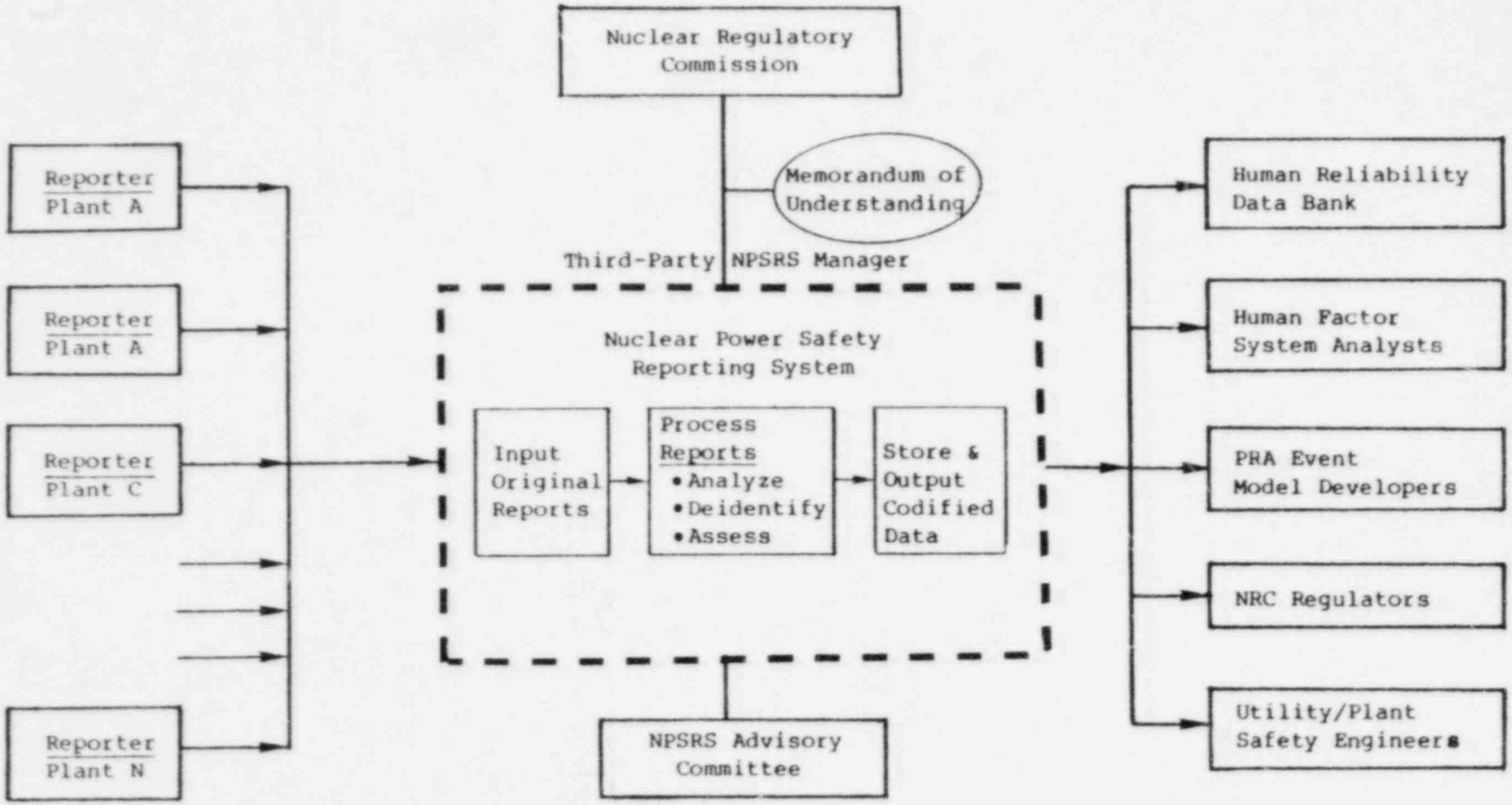

Figure 1. Functional Diagram of Operational Relationships and Processes of a Nuclear Power Safety Reporting System

system. Therefore, the NPSRS has followed the ASRS procedure of separating the name of the reporter from the information he submits to the system shortly after its receipt. To further ensure reporter anonymity, it will also be necessary to deidentify the specific nuclear plants involved in the incident and their parent utilities as well. This degree of isolation of the identity of the reporter from data in the NPSRS data bank is necessary in order to increase the confidence of reporters that their submissions will not inherently jeopardize their job security (Ref. 4).

Incident reports will frequently need to be followed up in order to ensure that problem areas have been properly defined and the methods that may have been used by operational personnel for corrective actions have been clearly and accurately described. Follow-up telephone calls will be made if they are needed to obtain more detailed information. After any needed interviews are completed, the reporter identification information will be separated from the report form and returned to the reporter. The dated, returned identification strip will provide tangible evidence to the NPSRS reporter that the report has been submitted in a timely manner and acted upon.

A number of factors may influence the motivation of individuals to report safety related incidents to the system such as professionalism, concern for personal and public safety, concern for the economic well-being of the organization for which they work, concern for their personal self-esteem with respect to their jobs given the public's emotional response to safety-related incidents in nuclear plants, as well as concern over possible job-related disciplinary action such as loss of operating licenses (or jobs) for errors that may have been committed leading to the incidents. Similar factors motivate members of the aviation industry (pilots, air-traffic controllers, etc.) to report incidents to the ASRS. However, a significant difference exists between the U.S. aviation system and the nuclear power industry with respect to the motivational effect of disciplinary actions taken against individuals. In the aviation system, disciplinary actions for violations of FAA regulations are normally taken against individual pilots, air traffic controllers, etc. However, in the nuclear power industry, utilities rather than individuals have, in the past,

usually been the recipients of discipline for violations of NRC regulations. In the U.S. aviation system, individual reporters are motivated to support the ASRS by the FAA's warranty of a limited waiver of disciplinary action for any unintentional regulatory misdeeds short of accidents and clearly illegal activities. (The FAA extends immunity to ASRS reporters for one incident per five year period.) If the NRC were to invoke identical measures for extending limited immunity to NPSRS reporters, the NRC's current regulatory procedures might not provide such an attractive "carrot" to nuclear power plant operational personnel because they would not necessarily feel such immediate concern (on an individual basis) over the possibility of being subject to NRC disciplinary actions. To raise the plant operational personnel's motivational level to report safety-related incidents, incentives are provided to utilities (as well as individuals) that will motivate the utilities to encourage employee participation in the NPSRS. The reports provided to utilities by the NPSRS represent one such incentive. Another is the availability of the NPSRS data base for industry research. Utilities have also indicated that they would be motivated to participate in and support the system if the NRC established a policy for mitigating penalties for incidents reported through the system. A precedent exists within the NRC for the mitigation of the penalties through self reporting and the possibility of a formal policy that would extend this consideration to utilities participating in the NPSRS is presently under review by the NRC. A policy such as this can be a strong incentive for encouraging utility participation in a program like the NPSRS.

An independent, neutral, third-party organization for managing the NPSRS is essential to its success. Specifically, the NRC, both the maker and enforcer of regulatory requirements, will need an NPSRS manager of this type to alleviate the concerns of power plant operational personnel and plant management with respect to potential self-implication consequences for reporting safety incidents.

Finally, the success of a NPSRS depends upon the support of all of the members of the nuclear power community, including representatives of operational personnel such as unions, utility management personnel, reactor manufacturers, technical societies, and government agencies. Like the

members of the aviation community, these nuclear industry participants need a representative body that can consider their interests and work out the compromises that are needed to make the NPSRS effective, mutually acceptable to all members of the community, and to monitor and evaluate the performance of the system. This body will be provided through an advisory committee to the NPSRS that is similar to the ASRS Advisory Committee. The committee's functions will include provisions for periodic evaluation of the practicality, acceptability, and usefulness of the system, and will include regular review of the NPSRS security system to ensure that individuals and power plant identities remain anonymous, and to verify that the immunity features of the system are not abused.

The NPSRS will provide a number of benefits to the nuclear community. It will provide an unrestricted source of data and reports on safety-related incidents involving humans in nuclear power plants. These reports will provide a basis for assessment of patterns of concentrations of problems and trends that occur in safety-related events that are of significance to human factors designers in plants. Observations of these problem concentration patterns and trends will also aid PRA systems analysts in their efforts to model human impacts on such safety-related incidents. The NPSRS taxonomy has been designed to identify the influences of performance shaping factors (such as control room design, the effectiveness of operating procedures, the influences of physio-psychological factors) on human actions. The collective results from the system will represent a rich, diverse source of additional data for input to the NRC's proposed Human Reliability Data Bank and other users of human reliability data. With this major new source of data, a better basis will be available for making judgments with respect to the probability of human error contributions to accident sequences in PRAs. The data will also provide a rich source of information on problem solving mechanisms used by humans when positive intervention is taken by them to reduce the probability and potential severity of accidents. This very significant safety mechanism has not been extensively incorporated into PRAs as a result of uncertainties in the methods to be used for modeling the role of positive human intervention in mitigating the effects of accidents.

This document provides a NPSRS implementation plan and system specifications. The elements of the system, its procedures and process flow, manpower and other resource requirements are described in Section 2 of this document. In Section 3, the detailed procedures and taxonomy of the system are presented along with an example of the way in which a simulated report is processed through the system.

2.0 FUNCTIONAL DESCRIPTION OF THE NUCLEAR POWER SAFETY REPORTING SYSTEM

2.1 Overview of System

The NPSRS is designed to provide a mechanism for collecting reports that can provide valuable nuclear safety information, for analyzing data contained in the reports, for assuring the completeness of incident reports, for cataloging and storing the data from the reports in computerized data banks, for extracting and analyzing the safety-related data, and for informing those who can do something about the safety problems that are revealed by the data. By acting as a central point for the collection of such data and for its dissemination, NPSRS analysts can also detect trends and situations which will serve to alert the nuclear power system to developing problems and provide useful results that may aid in the resolution of safety problems. The complete system for handling NPSRS reports can be seen in Figure 2. The NPSRS is described in detail in the following sections in accordance with the system description shown in Figure 2. The correlation between the system flow shown in Figure 2 and the corresponding procedures, forms, and documentation of the system description is shown in Table 2-1.

2.2 Submission of Incident Reports

Block 1 of Figure 2 shows the initial step of activity in the system: the submission of a report from a reporter in a nuclear plant. The NPSRS reporting form is presented in Appendix A.

2.2.1 System Subelement Description

The NPSRS solicits reports from all people in the nuclear power system/environment who witness or are involved in an occurrence or situation which they believe poses an actual or potential threat to nuclear safety. The NPSRS will accept data in any format in which it is reported.

NUCLEAR POWER SAFETY REPORTING SYSTEM

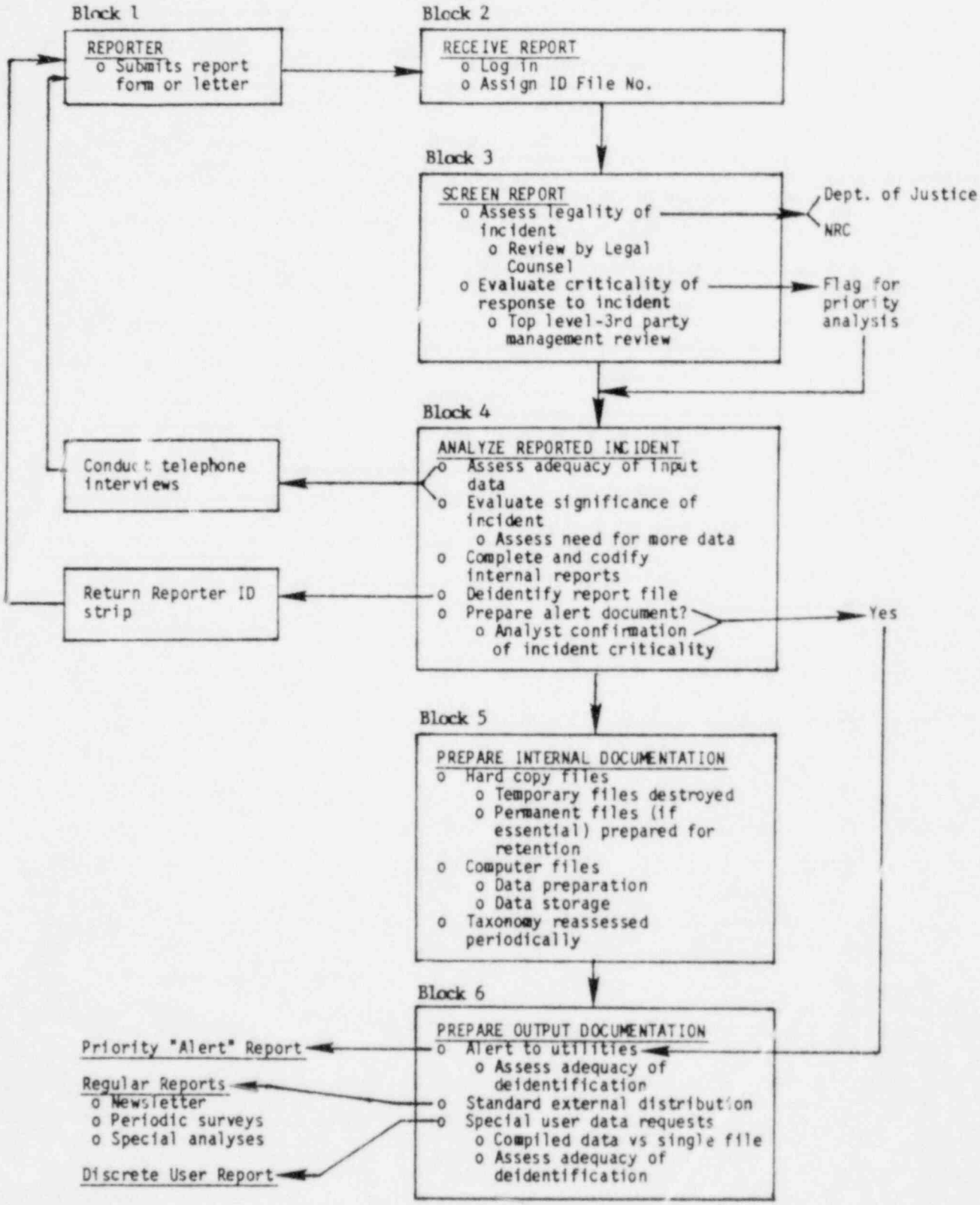

Figure 2.

Table 2-1. Correlation of System Flow, Procedures, Forms and Documentation

Flow Chart Element	Associated Description in Text	Referenced Procedures & Forms
Block 1 Reporter	Section 2.2 Submission of Incident Reports	Appendix A
Block 2 Receive Report	Section 2.3 Initial Receipt & Processing of Incident Report	Appendix B
Block 3 Screen Report	Section 2.4 Screening of Incident Report for Legality and Handling Priority	Appendix C
Block 4 Analyze Reported Incident	Section 2.5 Analysis of Reported Incident	Appendix D Appendix E Appendix F Appendix H
Block 5 Prepare Internal Documentation	Section 2.6 Preparation of NPSRS Internal File Documentation	Appendix E Appendix F Appendix G
Block 6 Prepare Output Documentation	Section 2.7 Preparation of NPSRS Documents for External Distribution	Appendix H

However, an NPSRS report form (cf, Appendix A) should be used for report submission whenever possible. Anonymous reports are not considered to be as reliable as those containing the identification of the reporter. The disposition of anonymous reports will be determined by the program manager.

Report forms will be made available to plant personnel through a designated non-management individual within each plant. This individual will be selected and supported by the utility owners of the plant. Utilities are required to submit to the third-party program manager (and keep current) the name and local telephone number of their designated representative so that the availability of supplies of report forms within each plant can be assured. Reports will be made available to plant personnel by means of appropriately located report supply stands or distributions boxes. They will also be made available by NPSRS offices.

The report form consists of a single-sheet questionnaire that is self-addressed and postage-guaranteed, for mailing to the NPSRS. The report form includes: the submitter's identification that is located on a detachable portion of the top of the report form; a checklist of descriptive parameters for a top-level summary of a number of generally applicable factors related to the incident; and space for a first-hand narrative description of the incident. The checklist of descriptive parameters is designed for quick and easy completion, and it includes terms such as plant type, plant operational status, time of day, and job or task being performed. The detachable identification section, containing the reporter's address and home phone number, is returned as a receipt to the sender. The identification section is contained on the form because the maximum information from a report will often be realized only when an experienced data analyst can interview directly (by telephone) the person who submitted the report. Whenever the NPSRS staff analysts believe that supplementary information is needed about a report or that it could be made more useful by such interaction, they conduct needed interviews with the reporter before final processing of the report.

2.2.2 Personnel Requirements

None. Volunteers submit reports.

2.2.3 Resource Needs

Report forms (See Appendix A) that are self addressed and would be folded for mailing are required for system operation. Approximately 200,000 reports should be printed and prepared for initial distribution to all operational personnel prior to and immediately following NPSRS initiation. This represents about the number of report forms required to supply the potential reporters in the industry with a single, initial copy of the form and to subsequently replace the report forms submitted by reporters over a period of about a year. Initial publicity efforts for the system will include development of and in-plant presentations of training sessions for all nuclear plant operational personnel. These training sessions will be repeated on an annual basis. Report forms and descriptive material for the system will be distributed to all operational personnel at the training sessions. With the efforts described to publicize the system and encourage participation in it, the annual report form replacement requirements are expected to be about 60,000 per year.

2.3 Initial Receipt and Processing of Incident Report

Block 2 of Figure 2 shows the system's functions in connection with the administrative procedures associated with receiving and providing identification for reports. The procedures and forms for this activity are presented in Appendix B.

2.3.1 System Subelement Description

Upon receipt of an incoming report, an NPSRS administrative clerk logs the report into the system by assigning it a file identification and accession number. The file identification number is used for internal control and tracking of the report as well as to identify the final data storage location

of the report. The clerk is responsible for maintaining a processing status file for individual reports as they are processed through the system.

2.3.2 Personnel Requirements

This position requires a secretary/clerk capable of performing routine clerical jobs, typing, answering phones, and filing.

2.3.3 Resource Needs

The following resources are required:

a. Private office for security during report handling
b. A desk, two chairs, and a table
c. Telephone
d. Log sheets with tickler file forms for identifying status/location of the report in the system
e. A file cabinet capable of being secured
f. Typewriter and terminal connected to the system computer storage system.

2.4 Screening of Incident Report for Legality and Handling Priority

Block 3 of Figure 2 outlines the screening processes associated with individual reports. The procedures for these activities are presented in Appendix C.

2.4.1 System Subelement Description

As seen in Figure 2, after the report is received and logged into the system, the NPSRS program manager then screens the report for information that indicates that the incident may involve a criminal offense, or be of sufficient significance to require preparation of an Alert Report. The program manager may need the support of an attorney who is familiar with criminal law, the

nuclear power industry and NRC regulations in order to properly assess some of the reports that may involve potential criminal offenses. If the program manager is not an attorney, it will probably be necessary to retain a lawyer as a consultant for evaluating the legal implications of these reports.

If the reported incident is associated with a criminal offense, it will be forwarded without further NPSRS processing to the NRC and/or state or local law enforcement agencies, as appropriate. However, the program manager will not screen safety reports for violations of NRC regulations. To do so could seriously compromise the willingness of plant operational and maintenance personnel to report conditions or situations which might pose a threat to nuclear safety.

Concurrent with the screening process for criminal offenses, the system program manager examines each incoming report for incidents containing time-critical information that is judged to be of major specific or generic significance to nuclear utilities, or for incidents that are forerunners of potentially high public-risk events. Most reports containing such information will also be submitted independently to the NRC through the local utility associated with the event in accordance with the NRC's established communications channels. For reports that are deemed "time-critical" by the NPSRS, the program manager will request the NRC to provide the NPSRS with a listing of all accidents submitted to the NRC through their established channels in the time period immediately prior to and following the reported NPSRS incident. The NPSRS report which is judged to be of critical safety significance will be compared with the NRC listing to see whether the NPSRS report has been submitted in parallel to the NRC through other channels. If the reported incident has been submitted through normal channels to the NRC, no further communication on the subject NPSRS report will be required with the NRC. Under these conditions, responsibility for further dissemination of information to the industry about the incident will be assumed to reside with the NRC. If the incident has not been reported to the NRC, the NPSRS program manager will contact the individual submitting the report and discuss the

implications of possible resultant NPSRS or reporter actions with him. In general, the program manager will encourage the reporter to submit an additional report on the incident directly to the NRC or to his own plant management through an established communication channel, thereby obtaining immunity (if possible) directly from the NRC for circumstances related to the incident. If the reporter cannot be convinced to do this, the program manager will negotiate directly with the NRC in regard to the report, attempting to establish a mutually acceptable channel for publicizing the critical information while retaining the anonymity of the reporter. Deidentified "Alert Reports" will be prepared by the NPSRS with a level of detail that will attempt to preserve the reporters' anonymity, and yet provide sufficient data so that the risks associated with failure to introduce the information to the nuclear power community will be reduced.

Finally, it should be noted that the NPSRS program manager's initial assessment of the need for an Alert Report is a top-level evaluation. Further detailed assessment by a system analyst is also required. Reports that were not initially flagged as candidates for Alert Reports by the NPSRS manager may, after further analysis, be determined to warrant this kind of special handling.

2.4.2 Personnel Requirements

A system program manager is required (from the third-party organization that operates the system) who has senior management capabilities as well as nuclear power experience. In addition to providing overall daily management and direction to the NPSRS, the person will be the liaison between the NPSRS and the NRC.

An attorney-at-law that has nuclear power experience and familiarity with NRC regulations will be needed on a consultation basis if the program manager is not an attorney.

A senior secretary is required to support the system program manager for handling program correspondence; maintaining system security procedures; performing system receptionist functions, etc.

2.4.3 Resource Needs

The following resources are required:

a. A private office for the system program manager for security in handling reports and internal office affairs

b. Sufficient office space for a secretary in an outside bay (or separate office)

c A conference room and furnishings of sufficient size to host staff meetings

d. Two desks, three tables, two bookcases, six chairs, one credenza, etc.

e. Two telephones including one master console for the receptionist

f. Two four-drawer file cabinets capable of being secured

g. Typewriter/terminal connected to system computer

h. Proximity to clerk responsible for initial logging and tracking of status of reports

i. Dictaphone or tape recorder.

2.5 Analysis of Reported Incident

Block 4 of Figure 2 outlines the steps associated with NPSRS analysis of reported incidents. The associated forms and procedures related to the Block 4 activities are presented in Appendices D, E, F, and G.

2.5.1 System Subelement Description

Following the initial processing for criminal offenses or Alert Report requirements, as shown in Figure 2, the report is assigned on a routine basis to an analyst for detailed assessment and processing. Analysts are selected on the basis of their expertise in various facets of nuclear power operations and in accordance with the technical requirements of the report that they are assigned to analyze. The analyst assesses the input data in the report and reevaluates the safety significance of the reported incident. The analyst then reviews any differences in his evaluation of the report significance or

priority (if any) with the system program manager. If after examining a report, an analyst believes that further information is needed to clarify the contents of the report, the analyst will contact the reporter at his home by telephone (or mail - if the reporter cannot be reached by phone outside of his workplace). No attempts will be made by the NPSRS to contact the reporter at his place of work, because of the risk of violating his anonymity. Additional analyst supplied interview data would be appended to the internal data files as required by the interview results.

Results of the analysis are codified against the NPSRS taxonomy as part of the internal report preparation process. When the analyst decides that sufficient detail is available to complete the analysis of the report, or when further information cannot be obtained, the original report is deidentified by removal of the identification strip and obliteration of other identifying information in the body of the report. As indicated in Figure 2, the identity slip is returned to the addressee as his proof of submission of the report to the NPSRS program.

The remainder of the report form is documented for computer processing along with the results of the analyst's investigation. Internal report forms will not contain any direct identification data from reporters. Information related to the makes and models of systems and equipment are critical to understanding and evaluating the NPSRS data. However, if necessary, the NPSRS analyst will purge critical references to the specific nuclear plants involved in the incident as well as their parent utilities from NPSRS generated internal reports in order to preserve reporter anonymity. Original documents are then destroyed after the analysis results are codified for computer input.

If a report contains information that requires preparation of an Alert Report, as previously noted, the reporter will be contacted and attempts will be made to persuade him or her to report the incident directly to the NRC through more conventional channels. Failing that, the program manager and the NRC liaison office will work together to prepare an Alert Report that will protect the identity of the reporter and they will jointly determine the distribution of the Report. In the event that an acceptable Alert Report

cannot be generated and the reporter's identity would be put at risk if one were distributed, then the NPSRS Program Manager and the NRC must jointly determine the disposition of the matter. It should be noted that NPSRS Alert Reports are sent to the NRC, utilities, and individual nuclear power plants for information purposes only. No action is inherently required on the part of the recipients of the Alert Report. Action may be taken voluntarily on the part of the utility recipients. It is the responsibility of the NRC to make any decisions requiring action based upon Alert Reports which may be imposed upon individual recipients of the reports.

2.5.2 Personnel Requirements

Three to four full-time equivalent staff analysts are required for this portion of the program. Analysts should have broad experience in nuclear power plant operation and maintenance. Full and part-time analysts may be needed that have particular specialties. In addition, analysts should be personable and capable of performing telephone interviews in a manner that will convince reporters that they are dealing with knowledgeable and sympathetic individuals that recognize and are responsive to the reporters concerns.

2.5.3 Resource Needs

The following resources are required:

a. Four to six offices for the analysts (Temporary work loads may require extra part-time staff analysts in excess of the average number of three to four full-time equivalent personnel.)

b. One desk, table, bookcase, two chairs per office

c. One telephone per office

d. One file cabinet (capable of being secured) for each analyst

e. Proximity to clerk(s) that prepares internal file documentation

f. Tape recorder/dictaphone

g. Computer terminal for data entry

h. Technical library and librarian for resource data on technical details of power plants involved in reports.

2.6 Preparation of NPSRS Internal File Documentation

Block 5 of Figure 2 lists the internal documentation resulting from the NPSRS analyst's evaluations of incident reports. The associated forms and procedures for preparing the internal documentation are presented in Appendices E,F, and H.

2.6.1 System Subelement Description

In the final steps outlined in Figure 2, following report deidentification, the report is prepared for computer processing. An analyst makes the needed judgments regarding the coding of information in the report and passes a resultant temporary file of data and information to a data processer for computer entry (or, with an appropriately designed system, the analyst may enter the data to the computer directly). The original deidentified report is subsequently destroyed. However, a verbatim transcript of the deidentified narrative portion of the original report is entered into the data bank as part of the final computerized incident report.

Although some reports may contain information that is obviously critical to nuclear power safety, many other reports contain information that in isolation may not clearly identify a hazard. Several such reports, however, may help to identify a hazard or show a trend that points the way to a problem. For this reason the reports must be analyzed not only for what they contain on an individual basis, but also for what they contain in relationship to the content of other reports. Individual reports will be codified in terms of the NPSRS taxonomy and added to the system data base. The structure of the data base will include parameters such as human behavioral attributes (distraction, forgetting, failure to monitor, complacency); nuclear power system attributes that may be associated with problem reports (degraded information exchange processes, ambiguous procedures, equipment failure); and incident descriptors (plant type, status, time of occurrence).

The taxonomy of the NPSRS information system provides an extensive indexing subsystem to facilitate retrieval and analysis of reports. The taxonomy is designed to permit a large number of reports to be summarized and described in terms of a relatively smaller number of descriptive parameters. The descriptive parameters used in the taxonomy for the NPSRS are expected to be quite dynamic. Thus, the parameter list in the taxonomy will evolve periodically over the life of the NPSRS system in order to adequately summarize the expected large volume of NPSRS reports.

2.6.2 Personnel Requirements

One to two data processing clerks are required for data entry and data recovery from the computer data base and to support the report preparation process (discussed in Section 2.7 below).

One computer operations specialist is required who will be responsible for maintaining and improving operations of the computer system hardware and software to meet NPSRS needs. A computer science background is required for this individual.

2.6.3 Resource Needs

The following resources are required:

a. One private office for the computer operations specialist

b A partitioned work area sufficiently large to accommodate the data processing personnel

c. Three or four desks, two tables, two credenzas for supply storage, six chairs

d. Three computer work stations (including a hard copy printer), netted to both the program manager's work stations (for document control purposes) and to a main-frame (or mini) computer for permanent data storage and retrieval

e. Dedicated mini-computer or time-share access to large mainframe computer system

f. Two large file cabinets for storage of work in process

g. Three telephones

h. Proximity to the NPSRS staff analysts.

2.7 Preparation of NPSRS Documents for External Distribution

In Block 6 of Figure 2, the external reports and outgoing documents prepared by the NPSRS are outlined and categorized. The procedures and forms for Alert Reports are presented in Appendix H.

2.7.1 System Subelement Description

As indicated in the previous sections, the information in the NPSRS data base is routinely searched for trends that may identify an existing or developing problem. Special technical reports describing findings and system results are to be issued on occasion by the NPSRS staff. Alert Reports on time-critical safety issues are issued promptly to those with a specific need for the information as they are required. The NPSRS will also publish a periodic newsletter/safety bulletin to provide a regular forum in which important aspects of nuclear power safety are reviewed. The topics presented in the newsletter will generally be derived from the NPSRS analysis process and will be designed to be of general interest to operational personnel in nuclear power plants. The newsletter publication provides a mechanism for reviewing safety-related topics prior to formal publication of generic studies on problems. The newsletter is also designed to increase recognition of the NPSRS among nuclear power personnel so that the system may achieve greater utilization by potential reporters.

In addition to research requests received from the NRC or studies initiated by the NPSRS staff, requests are occasionally expected for special studies of interest to support specific industry organizations or universities. Within the limit of its resources, the NPSRS staff may design and conduct such data bank searches and/or special analyses. The results will generally be provided in terms of uninterpreted output from searches of the data bank.

In summary, several different kinds of outputs from the NPSRS will be prepared for external distribution to a variety of system users. These publications include:

a) Alert Reports to Utilities

These reports are prepared by analysts based upon consideration of the safety significance of a reported incident. Final clearance for the adequacy of the deidentification of the incident reports is provided by the System Program Manager. The generic nature of the incident will generally determine which utilities will receive the alert. However, in all cases, the Report will be sent to more than one utility, in order to safeguard reporter anonymity. All Alert Reports will be automatically distributed to the NRC oversight office by the NPSRS for internal NRC distribution. It should again be noted that NPSRS Alert Reports are sent to the NRC, utilities, and individual nuclear power plants for information purposes only. No action is inherently required on the part of the recipients of the Alert Reports. Action may be taken voluntarily on the part of utility recipients. It is the responsibility of the NRC to impose any actions upon Report recipients that may be required as a result of the nature of the reported incident.

b) Newsletter

This periodic (perhaps quarterly or monthly) newsletter will contain popular, nontechnical reports of generic results derived from the data base. The newsletter articles will be designed for widespread distribution to operational personnel of nuclear plants in order to establish a dialogue in the interest of nuclear power safety. The newsletter will contain a summary of the results of NPSRS report processing activities and safety suggestions received by the NPSRS, news of trends noted by the NPSRS staff, briefs of unusual occurrences and selected excerpts from Alert Reports.

c) Periodic Reports and Analyses

These are technical analyses of characteristics of input data received in reported incidents. Such reports would include data on the frequency of occurrence for selected taxonomy descriptors as well as analyses of the significance of trends from nuclear power safety incidents.

d) Other External Reports

In response to special, discrete user data requests, individual reports of specific sets of compiled data will be prepared and distributed to system users. In order to avoid potential loss of reporter anonymity, single report files from NPSRS data storage will not be released to external users. Special efforts will be made to assure that adequate deidentification is made on responses to all discrete data requests from external users.

2.7.2 Personnel Requirements

When the NPSRS reaches maturity, the following individuals will be needed for documentation tasks:

a) An editor to prepare the newsletter and other output reports. This individual will also aid in NPSRS safety report analyses. The person should have experience in nuclear power operations and/or maintenance as well as experience in writing for publication.

b) A researcher to design and conduct research studies of the NPSRS data will also be needed. The person should have experience in human factors and nuclear power.

At the time of System initiation, the NPSRS program manager and analysts may be able to temporarily fill the needs of these staff requirements in addition to their other tasks. However, as the data bank increases in size and the flow of reports to the System increases, it will be necessary to provide additional personnel to staff the positions discussed above.

2.7.3 Resource Needs

The following basic resources are required:

a) An office for copy preparation

b) A Xerographic copy machine for reports with limited distribution requirements

c) A postage metering unit for mailing reports and correspondence

d) A table for copy preparation and collation of reports

e) Cabinets for supply storage

f) Two private offices

g) A desk, two chairs, a telephone, and a bookcase for each office

h) Two file cabinets for storage of work in process

i) One computer terminal netted to computer storage system

j) Proximity to the rest of the NPSRS staff.

2.8 Other System Features

2.8.1 NPSRS Advisory Committee

2.8.1.1 Functions

The NPSRS Advisory Committee advises the system program manager regarding the design and performance of the system, and advises an NRC project officer for the NPSRS (who is responsible for correlating the program within the NRC) of the Committee's evaluation of the program, its performance, and effectiveness. A security subgroup shall function within the committee to advise the NPSRS program manager and the nuclear community regarding the success of the NPSRS program in maintaining the confidentiality of its reports. The security subgroup will examine the system periodically to ensure that confidentiality is maintained and reporter anonymity is protected.

2.8.1.2 Personnel Requirements

The NPSRS Advisory Committee shall consist of five or more members who will be appointed by the third party organization responsible for the NPSRS. The NPSRS program manager (in cooperation with the NRC project officer) will be responsible for recommending the original makeup of the committee and any replacement members. The membership shall consist of leaders from the nuclear energy community with backgrounds in nuclear power safety, plant operations, maintenance, and management. Appointees may include representation from technical and professional societies, engineering organizations, unions, manufacturing and perhaps consumer interest groups. The NRC shall also be represented on the NPSRS Advisory Committee in a non-voting capacity.

2.8.1.3 Resource Needs

The following resources are occasionally needed and may be obtained on a temporary, as required basis:

a) A meeting room large enough to accommodate about 25 people

b) Access to phones

c) Tables and chairs

d) Proximity to NPSRS analysts is not required In fact, a neutral location (not on NPSRS premises) would be desirable for Advisory Committee meetings.

2.8.2 Data Base and Taxonomy

2.8.2.1 Long-Term Data Base

As indicated in Section 2.6.1, some reports may contain information that is obviously critical to nuclear safety, many other reports contain information that in isolation may not clearly identify a hazard. Several such reports, however, may help to identify a hazard or show a trend that points the way to a problem or a solution to a problem. For this reason the reports must be analyzed not only for what they contain on an individual basis, but also for what they contain in relationship to the contents of other reports. The capability to perform these types of trend comparisons (particularly if the comparisons involve several thousand reports per year) requires a long-term data base. The structure of the NPSRS data base will be maintained in the form of a taxonomy.

2.8.2.2 Evolving Taxonomy

The taxonomy (i.e., the set of descriptive words and phrases that are outlined in Appendix D and used to categorize the subject matter of the reports) is one of the system's most important aspects. The purpose of the taxonomy is to provide a structured format for analyzing and codifying the

NPSRS reports in terms of a relatively small set of recurring associated parameters that are generally related to the causal factors of the incident. The taxonomy also provides a method for indexing and cross-indexing the data in order to assess the importance of one or several contributions of any of these parameters.

As data accumulate within the NPSRS it will become more and more difficult to cross-index reports unless there are adequate categories under which subsets of the reports may be lumped together. As indicated, these category descriptions may be related to the causal factors for the incident. However, the perceived causal factors for incidents that occur early in the NPSRS evolution are likely to be refined with experience. Thus, in order to avoid a situation in which the structure of the taxonomy is unable to represent the relevant causal parameters associated with the data, the NPSRS taxonomy will need to evolve as time passes. Implementation of the long-term data base using a structured taxonomy on a mini-computer or a secure, time-shared mainframe computer system will provide the flexibility for the evolution of the taxonomy.

2.8.2.3 Taxonomic Revisions and Additions

The evolution of the taxonomy must be a guided one. Suggestions for changes to the taxonomy will be accepted from all staff members. The NPSRS program manager will make the final decision regarding the implementation of these suggestions. This is necessary to prevent the taxonomy from growing unnecessarily large from the addition of unneeded or redundant terms or becoming incomplete because of the deletion of needed entries. Each suggested change must be reviewed in the context of the problem that initiated the recommendation for the change. Other methods of dealing with the problem must first be explored before any changes to the taxonomy are considered. In many instances, it is anticipated that revisions to the glossary describing the meaning of terms will be more appropriate than the actual addition of new terms. Whatever the action needed, the implementation process must be performed by a single person to ensure the uniform and appropriate growth of the NPSRS taxonomy.

2.8.3 Training Programs

A training program, suitable for presentation at annually scheduled in-plant training sessions for utility operational personnel, will be developed and prepared by the third-party management organization. The program for these training sessions will serve a dual purpose. The training sessions will provide a continuing base for publicizing the System and explaining its objectives and functions to potential reporters. The sessions will also provide an important method for periodically distributing blank report forms to utility operational personnel in a non-threatening environment.

The training sessions will give a basic overview of the NPSRS, its fundamental purposes and objectives, and its functional form. The sessions will describe the functional process flow of the NPSRS system in detail. A detailed description of the basic NPSRS report form and how to complete it will be provided to the students in the meeting. The local utility staff will describe the sources for obtaining report forms within the plant to the operational personnel. At the conclusion of the lesson period, each student will be provided with a blank NPSRS report form for his own use and retention.

The System's description elements of the training sessions will be prepared on video tape under NPSRS direction for presentation by utility training personnel. In support of the training program concept, the NRC will provide written direction to the utilities requesting that the session be conducted with plant operational personnel on an annual basis.

2.9 Summary of Personnel Requirements and Resource Needs

2.9.1 Personnel Requirements

Based upon the previous descriptions of system elements, the following personnel are required:

a) NPSRS Program Manager: senior management experience, nuclear power and human factors experience; familiarity with NRC regulations and legal aspects of nuclear power desirable

b) Attorney at Law: nuclear power experience and familiarity with NRC regulations. (Part-time consultation services required)

c) Secretary/Receptionist: Experienced receptionist, file handling, correspondence, typing.

d) Secretary/Clerk: Routine clerical jobs, typing, and filing.

e) Six to Eight Analysts: About three full-time and several part-time personnel with broad experience in nuclear power plant operations and maintenance but with particular specialities. Should be personable and capable of performing telephone interviews. Approximate staffing level is four full-time-equivalent staff members.

f) One to Two Data Processing Personnel: for report preparation, data entry and data recovery from the computer data base.

g) Computer Operations Supervisor: computer science background. Responsible for computer operations.

h) Editor: Experience in nuclear power operations and/or maintenance as well as experience in writing for publication.

i) Researcher Analyst: Experience in human factors and nuclear power.

j) Technical Librarian.

2.9.2 Resource Needs

To support the staff requirements above, the following other resources are required:

Building Space:

a. Private Offices: 10-16

b. Large work areas (work bays for from one to three or more individuals): 2

Equipment, including:

c. Desks, 12-15; chairs, 26-30; and bookcases, 8-10

d. Telephones (including one master console): 12-14

e. File cabinets, four-drawer: 11-13

f. Tables: 11-13

g. Credenzas and cabinets: 5

h. Computer terminals: 10

i. Mini computer with printer (or access to secure time sharing system on larger mainframe): 1

j. Xerographic copy machine: 1

k. Postage metering machine: 1

l. Typewriters: 2

m. Access to commercial printers and mailing services for report printing and distribution

n. Tape recorders or dictaphones: 12 - 14

o. Technical library.

2.10 System Logistics and Costs

The logistical requirements for the system are heavily dependent upon the volume of reports that might be received and processed by the NPSRS. The primary costs of the system will be associated with the size of the required staff needed to receive, process, codify, and perform the required analysis of the reports, along with the other direct and overhead costs needed to support the system.

At this time, it is difficult to provide a definitive estimate of the annual number of reports that a NPSRS might receive. However, the experience of the Aviation Safety Reporting System (ASRS) provides some background for estimating the logistics and costs of a NPSRS. The logistical requirements of the ASRS for receiving and processing reports should represent a reasonable first order model for those of a NPSRS. The annual budget for the ASRS is about $1.5 million. This covers the costs of labor, other direct charges, and overhead charges (including building space, computer costs, etc.) Within this budget, the ASRS receives and processes about 400 reports per month from the aviation community. Considering the numbers of commercial aircraft flights and the manpower involved in them in comparison to the numbers of nuclear power plants together with the licensed nuclear power plant operators,

unlicensed operators, and maintenance personnel who would be potential NPSRS reporters, the base for reports from the two systems would apparently be quite similar.

By way of additional comparison, about 300 to 400 events per month are submitted and processed as Licensee Event Reports (LERs) in accordance with NRC mandatory requirements. The number of mandated LERs submitted to the NRC gives some insight into the prospects for the reporting volume of a voluntary system. About one-third to one-half of the LERs have been found to be related to human factors or operational procedures in some way. Thus an average volume of between 100 and 200 human factor related reports per month are obtained through LERs. As a first approximation, a successful, voluntary NPSRS program would be expected to produce at least as many reports as the involuntary LER system, on the basis of the professional attitudes and concern for plant safety exhibited by licensed and non-licensed operational personnel in nuclear power plants.

Thus, the LER and ASRS experience suggests that a volume of about 400 reports per month might be expected for a NPSRS. Consequently, as a first order estimate of NPSRS logistics and costs, it is projected that the System's logistical requirements would approximately equal those of the ASRS. Therefore, a projected rough estimate of the annual costs of operation of a NPSRS is between $1 to $2 million. A budget of this magnitude would support a staff of 10 to 15 full-time equivalent staff members. This would appear to be adequate for the anticipated volume of NPSRS reports and the breakdown of staff requirements shown above.

3.0 NPSRS FORMS AND PROCESS FLOW

The Nuclear Power Safety Reporting System provides a means for nuclear power plant personnel to report safety problems associated with operating or maintaining nuclear power systems that are encountered during their work activities. All operational personnel of the U.S. nuclear power production community, including operators, maintenance personnel engineering staff members, and plant management personnel, are invited to participate in this cooperative safety-related incident reporting program. Any actual or potential situations or incidents that operational personnel have experienced involving the safety of nuclear power operations may and should be reported. All elements of nuclear power plant operations are covered by this program including actual and near-miss incidents that have been experienced or observed by the reporter that are associated with normal or abnormal conditions of power production in the plants; discrepancies or deficiencies attributable to preoperational design and construction problems that may interfere with safe operation of the plants; difficulties with maintenance and operational procedures; problems with equipment, instruments, plant operational communications; or any other factors that may have contributed to unsafe or hazardous working conditions relative to the incident upon which the report is filed. For example, the NPSRS is designed to process problems that are associated with man-machine interface deficiencies, human error inducing conditions, physical work space deficiencies, improper work procedures, or inadequate communication channels. The primary purposes of the NPSRS are to identify the above problems through reported incidents received by the system, to alert the nuclear power work force to incidents that might pose a threat to safety, to identify positive steps taken (or recommended) by reporters to resolve or reduce the probability of similar future incidents, and to record the reported problems for later analysis of patterns of problem concentration and safety trends within the industry.

3.1 Forms and Procedures

The NPSRS is designed to process human engineering problems from the time that an initial problem report is received through data entry of the problem into a computerized data bank. Data processing is accomplished by the

use of reporting and data entry forms. Specifically, the set of forms includes: the Nuclear Power Safety Reporting System Incident Report, Administrative Log, NPSRS Taxonomy Data Collection Form, Call-Back Form, Analyst's Summary and Conclusions Form and Alert Report forms. These forms and the procedures by which they are to be completed are presented in detail in the Appendices to this document. The Nuclear Power Safety Reporting System Incident Report is a short, user friendly form by which the safety incident is initially reported by nuclear power plant personnel to the NPSRS. In the Administrative Log, a unique numerical identifier is assigned to the incident report for tracking after it has been deidentified and for later referencing. The Administrative Log form is also used to identify the NPSRS personnel assigned to process the report and to verify the status of the analysis steps through which the report has passed. The NPSRS Taxonomy Data Collection form is used to transform information from the NPSRS Incident Report Form into a format suitable for computer input to the NPSRS data bank. The Call-Back form is used to record the information obtained from the reporter of the incident concerning critical elements of the report that may have been missing from the original incident report. The Analyst's Summary and Conclusions form is a brief, one-page resume containing the analyst's perception of the significant features of the reported incident. It contains a brief review by the analyst of the significant elements of the incident, a summary of the reporter's recommendations for methods by which future similar incidents might be avoided, and the analyst's evaluation of the factors that led to the reported incident and the actual and potential impacts of such occurrences on personnel and plant operation. An Alert Report is prepared when it is necessary to transmit time-critical, safety-related information concerning an incident along with recommended corrective actions to those nuclear power plants and personnel that might be directly impacted by the incident.

3.1.1 NPSRS Incident Report Form

The NPSRS Incident Report form is composed of three sections: (1) the identification strip, (2) the incident checklist, and (3) the narrative description. These three sections contain all the prompting cues necessary for the reporter to accurately portray the incident as it occurred in the

nuclear power plant. An example of the NPSRS Incident Report Form is provided in Appendix A.

The identification strip contains the name, address, and phone numbers by which the reporter can be reached for further information about the incident. Once the incident report has been throughly analyzed and readied for computer input, the report is deidentified by removing the identification strip from the NPSRS Incident Report form.

The function of the incident checklist portion of the report form is to prompt the reporter to provide certain baseline information needed to generically describe an incident. The checklist is composed of the following items: (1) the plant type, (2) its electrical generating capacity, (3) the location within the plant at which the incident occurred, (4) the plant operational status, (5) the reporter's occupational capacity, (6) the reporter's overall experience both in nuclear power and in his current position, (7) the time of the occurrence of the incident, (8) the shift hours worked by the reporter prior to the incident, (9) the shift hours worked by the reporter in the week prior to the incident, (10) any related problem areas impacted by the incident, (11) an estimate of the frequency of occurrence of the precursor action(s) that caused the incident, (12) the reporter's estimate of the criticality rating of the incident, and (13) the estimated importance of taking corrective actions to resolve the conditions leading to the incident.

The Narrative section of the report form is the heart of the NPSRS information gathering process. In this section, the reporter provides information on how the incident occurred, how the problem was discovered, what actions were taken to resolve the problem, the potential hazards that were connected with the incident, the factors that contributed to the incident, and the corrective actions that are proposed in order to reduce the probability of similar incidents occurring in the future.

3.1.2 Administrative Log

The Administrative Log (shown in Appendix B) provides the mechanism for tracking the status of each incident report. It identifies the NPSRS personnel assigned to analyze the incidents as the reports enter the reporting system and as they continue through the system to the final computer data base entry of the results of the analysis of the incident.

The following information is noted on the Administrative Log: (1) the accession number of the report, (2) the date the report was received, (3) the name of the plant and/or the utility involved in the incident, (4) whether NPSRS action is required in connection with the reported incident, (5) the name of the person assigned to analyze the incident, (6) the date that the assignment was made, (7) the date when the call-back (if any) was performed, (8) the date when the summary was prepared, (9) the date when the report was deidentified, (10) the date when the program manager's review and administrative sign-off of the NPSRS processing was completed, (11) the date that the data were entered into the computer data base, and (12) the date that the NPSRS internal documents were destroyed. The portion of the Log showing the action requirements for the report identifies whether a decision was made to file an Alert Report in connection with the incident or whether the incident report was sent to the NRC as part of a legal investigation.

3.1.3 Screening Procedures

After the report is logged in by the NPSRS administrative clerk, the Program Manager conducts an initial screening to determine whether the report contains evidence of legal irregularities. The screening procedures are presented in Appendix C. If evidence of legal irregularities is determined to be present, the reports are submitted to the NRC and appropriate legal authorities without removing the identification strip from the report. If such action is taken, reporters are contacted by telephone and advised that legal or administrative action may be expected in connection with their report, since it contained evidence of actions that were beyond the scope of the anonymity and immunity limits of the system. As part of the process for screening incoming

reports for evidence of significant safety hazards that require prompt attention, the procedures also describe the mechanisms for initiating the preparation of Alert Reports describing incidents of these types. The procedures and forms for documentation of Alert Reports are described in Section 3.1.7 and Appendix H.

3.1.4 NPSRS Analysis Taxonomy

The NPSRS Analysis Taxonomy (presented in Appendix D) consists of 55 fixed field descriptors used to categorize and record the information contained in the NPSRS Incident Report. The procedures and description of the taxonomy used to transcribe the data from the report to data processing forms are presented in Appendix E. The purpose of the taxonomy is to provide NPSRS analysis personnel with a structured format for analyzing and codifying NPSRS incidents. The Analysis Taxonomy is composed of four major elements: (1) a section containing incident administrative data and background information, (2) the incident/participant(s) description, (3) a command/control and communications problems description section, and (4) a section containing the reporter's estimate of the significance of the incident and the importance of taking steps to reduce its probability of occurrence. All the information entered into the NPSRS Analysis Taxonomy is derived from the incident report or from information obtain by calling back the reporter for additional data to clarify the events surrounding the incident. A detailed, descriptive listing of the NPSRS Analysis Taxonomy consisting of data entry requirements and coded incident descriptors is given in Appendix D.

The incident background information consists of 11 fixed field entries. The background fixed fields and their functional descriptions are listed in Table 3-1. In the incident/participant(s) description section of the form, Fields 12 and 13 are used to describe the principal problem associated with the incident and to record the reporter's estimate of the frequency with which operational personnel would normally be called upon to perform the task that caused the incident. This latter information is needed to aid probabilistic risk assessment (PRA) analysts to estimate human reliabilities associated with the performance of critical tasks.

Table 3-1

(Appendix D)

Background Information Descriptors

Fixed Field	Function
001	Incident Report Accession Number Identifier
002	Date of Incident
003	Day of Week of Incident
004	Time of Day of Incident
005	Classification of Reporter (Participant, Observer)
006	Reports Relating to Same Incident
007	Call-Back Made to Reporter
008	Alert Report Generated on Incident
009	Type of Nuclear Plant
010	Nameplate Electrical Generating Capacity of Plant
011	Operational Status of Nuclear Plant during Incident

Table 3-2

(Appendix D)

Incident/Participant Descriptors

Fixed Field	Function
012	Dominant Problem Code Representing Incident
013	Estimated Frequency of Repetition for Critical Task of Incident
014	Number of Participants Involved in the Incident
015-024	Description of Participants Involved in the Incident Using Prefixes and Labels of Fields 025-039.
025	Job Classification Code
026	Months of Job Experience
027	Time Incident Took Place
028	Hours on Shift Prior to Incident
029	Weekly Shift Hours Prior to Incident
030	Participant Location in Plant at Time of Incident
031	Activity Engaged in by Participant
032	Error Responsible for Incident
033	Principal Plant System Involved in Incident
034	Other Plant System(s) Involved in Incident
035	Principal System Component(s) Involved in Incident
036	Other System Component(s) Involved in Incident
037	Factor(s) Contributing to Incident
038	Result of Human Error
039	Behavioral Factor(s)

Table 3-3

(Appendix D)

Command/Control and Communications Problem Descriptors

Fixed Field	Function
040-049	Problems Associated with Command/Control, Information Transfer, or Communications, as Described by Using Prefixes and Labels of Fields 050-053.
050	Origin of Message
051	Type of Message
052	Message Problem
053	Message Medium

Table 3-4

(Appendix D)

Criticality Rating Descriptors

Fixed Field	Function
054	Rating of Incident's Importance
055	Rating of Need for Corrective Action

A total of ten participants who were associated with the incident can be described in the incident/participant description section. The participants must have been associated with the incident or directly contributed to its occurrence. Fixed Fields 015-024 are used to denote the participants. Fixed Fields 025-039 are used to identify the participants and their role in the incident. Table 3-2 lists the incident/participant descriptors and their functions.

Inadequate interpersonal communications are often contributors to human errors. The command/control and communication problem descriptor section permits NPSRS personnel to identify (when appropriate) ten command/control and/or communication message related problems that directly contributed to or influenced the outcome of the incident. The Fixed Fields for these descriptors are given in Table 3-3.

The final section of the NPSRS analysis taxonomy is the incident criticality rating section. This section contains the rating the reporter originally entered on the NPSRS Incident Report form concerning the seriousness of the incident and the need for taking corrective action to limit the probability of incident reoccurrence. The Fixed Fields associated with the incident criticality rating section are shown in Table 3-4.

The Taxonomy Data Collection form shown in Appendix E is a worksheet of the taxonomic descriptors for the NPSRS upon which the analysts can record their assessments of incidents, codify the key elements of the information contained in the Incident Report form, and delineate the results of their interviews with reporters. If information from the Incident Report is insufficient for completion of Fields 001-005, 009-015, 025-032, 037-039, or 54-55 the analyst will (if possible) conduct a telephone interview with the reporter of the incident in order to obtain the necessary information.

3.1.5 Call-Back Summary

The Call-Back Summary form is used to summarize the results of interviews (if any) conducted with the reporter by NPSRS personnel in regards

to missing or ambiguous information connected with the incident. The accession number of the incident is listed on the form along with the time and date of the call-back. A summary of the reporter's comments in the interview is given in the main body of the form. The Call-Back Summary form is presented in Appendix F.

3.1.6 Analyst's Summary File

The Analyst's Summary File is composed of three brief sections assessing the incident: (1) the Analyst's Synopsis of the incident, (2) the Reporter's Recommendations, and (3) the NPSRS Analysis of the human performance involved in the incident. The file is identified by the accession number of the incident. The Synopsis section represents a brief, but concise summary description of the incident. The Reporter's Recommendation section contains a brief account on how the incident could have been avoided. The NPSRS Analysis section presents the analyst's assessment of the incident and identifies the dominant and contributing factors that were associated with the incident. Each of the brief descriptions should be about 100 words or less in length. The Analyst's Summary File form is presented in Appendix G.

3.1.7 Alert Reports

An Alert Report is generated when the incident, in the opinion of NPSRS personnel, represents a potentially significant safety hazard that is important to the plant in which it occurred, that is applicable to other operating nuclear power plants, and has not been reported to the NRC through other procedures. If it appears that the reported event was significant and its probability of recurrence could be reduced by publication of an Alert Report, the NRC and the pertinent power plants will be notified of the incident and of the recommended actions that might be taken to reduce the probability of its recurrence. The procedure and form for generation of an Alert Report is presented in Appendix H. There are three main sections to the Alert Report: (1) Attention, (2) Hazard Description and (3) Prevention Methods. The Attention section identifies the utilities and appropriately selected plants that need to be notified about the incident. The Hazard section describes the

conditions leading up to the incident and the resulting dangers. The Prevention section describes how the probability of the incident recurring can be reduced.

3.2 NPSRS Incident Report Example

The following section presents an illustrative example of an NPSRS Incident Report that might have been submitted voluntarily by a reporter. The example shows the methods by which the relevant system procedures, analysis forms, and taxonomy would be used to document the incident report. The example of the incoming NPSRS Incident Report (cf, Appendix A for the basic report form) submitted by the simulated reporter is shown in Figure 3.

The report shown in Figure 3 describes an error made during a routine low-power reactivity monitor (LPRM) device replacement operation during refueling operations at a plant. This operation must be performed in the cramped confines of the space beneath the reactor pressure vessel amidst a very large number of instrumentation and control leads and device stubs, many of which look very similar to one another. Under these conditions, at the end of a long (12 hour) working day, the reporter, a non-licensed plant operator, inadvertently but erroneously, selected and prepared the wrong LPRM string for removal. Prior to any attempt to remove the LPRM string (an action that would be performed by other operators located at the top side of the reactor pressure vessel), the reporter was joined by the operator who was to relieve him. The relief operator noticed the error and the two of them reassembled the attachments for the improperly selected LPRM and set up on the correct one before any adverse consequences occurred. If the error had not been corrected prior to the attempted removal of the designated LPRM string, the operational crew performing the LPRM removal operation could have been subjected to a potentially serious radiation hazard created by tearing apart an LPRM not prepared for removal and thereby releasing the radioactive material contained within the LPRM string.

Figure 3

NUCLEAR POWER SAFETY REPORTING SYSTEM INCIDENT REPORT

Identification Strip. Please fill in all the blanks. This section will be returned to you promptly. Your name, address and phone numbers will not be retained in connection with any records kept of this incident.

We may need to call you to clarify certain elements of this event. Will you please provide us with telephone numbers away from work where we may reach you if we need to obtain further details. Also, please provide a mailing address in the event that we are unable to contact you by phone.

Area code (109) Number 695-0965 Best time(s) 1:00 PM TO 3:00 PM

Area code ( ) Number Best time(s)

Name JACK JAMESON Date of Incident JAN - 9 - 1985 (Mo. - Day - Year)

Address 5127 S. CANTABRIAN COURT
ANDALUSIA, AR 36027

ACCESSION NO. 0010
JAN 15 1985

Time of Incident (24 hour clock) 19:30

Power Plant Name JUBILEE-1

Except for reports of criminal activities and deliberate misconduct or gross negligence, all identities contained in this report will be removed to assure complete confidentiality.

For the following questions, please indicate your response by placing an "X" in the box beside your answer or by filling in the blank(s) where appropriate. Please try not to skip any of the questions.

1. Plant Type: [X] General Electric [ ] Westinghouse [ ] Combustion Engineering [ ] Babcock & Wilcox

2. Electrical Capacity: [ ] Less than 100 MW [ ] 100-500 MW [X] 500-1000 MW [ ] Over 1000 MW

3. Location in plant where incident was observed: UNDER REACTOR VESSEL

4. Operational Status

Power Operation	Hot Standby	Hot Shutdown	Cold Shutdown
[ ] Startup	[ ] Grid Request	[ ] Grid Request	[ ] Grid Request
[ ] Steady State	[ ] Maintenance Outage	[ ] Maint. Outage	[ ] Maint. Outage
[ ] Load Changes	[ ] Technical Spec. Req.	[ ] Refueling	[ ] Tech. Spec. Req.
[ ] Stretch Out		[ ] Tech. Spec. Req.	[X] Refueling

5. Reported by:

Management	Maintenance
[ ] Plant Management	[ ] Mechanical
[ ] Quality Assurance	[ ] Electrical
[ ] Engineering Staff	[ ] Instrumentation/Controls

Support Personnel	Operator
[ ] Health	[ ] Shift Supervisor
[ ] Contractor/Consultant	[ ] Licensed Control Room Operator
[ ] Chemistry	[X] Non-Licensed Operating Personnel
[ ] Outside Inspectors	[ ] None of the above

6. Experience in Nuclear Power: 1 years 2 months
Experience in present position: 1 years 2 months

7. Hours on Shift Prior to Incident: [ ] 0-2 hours [X] 8-12 hours [ ] 2-6 hours [ ] 12-16 hours [ ] 6-8 hours [ ] More than 16

8. Hours on Shift in Week Prior to Incident: [ ] 0-40 hours [X] 40-60 hours [ ] 60-80 hours [ ] More than 80 hours

9. If a work related task led to the incident, estimate the number of times the task is performed (in a month, in a year, etc.) by everyone who has the responsibility for performing such tasks in the plant. 1 times per YEAR (REFUELING)

10. How important do you think the incident was? (Circle one #)

Not Important 1 2 3 (4) 5 Critical

11. How important is it that something be done about the incident? (Circle one #)

Not Important 1 2 3 4 (5) Critical

12. Narrative Description. Please describe the incident as clearly as possible. Include information on: what happened, how the problem was discovered, what actions were taken; and potential hazards that existed. What factors contributed to the incident? Why do you believe the incident happened? Please give suggestions as to how to prevent a recurrence. (Use additional space on reverse side if needed.)

DURING THIS REFUELING OUTAGE, I WAS TASKED WITH PERFORMING THE UNDER VESSEL OPERATIONS ASSOCIATED WITH LPRM REPLACEMENT. I WAS TOLD BY MY SUPERVISOR TO SET UP ON LPRM 26, 43. THIS SETUP PROCESS INVOLVES REMOVING THE LPRM RETAINER NUT AND SEAL AND HOOKING UP A DRAIN RIG. I ACCIDENTALLY PERFORMED THIS SETUP PROCESS ON LPRM 26, 35 WHICH IS LOCATED NEXT TO LPRM 26,43. JUST AS I COMPLETED THE SETUP, MY RELIEF GOT THERE AND I TOLD HIM I HAD JUST SET UP ON 26,43. MY RELIEF NOTICED MY MISTAKE AND WE BOTH RETURNED 26,35 TO NORMAL AND CORRECTLY SET UP ON 26,43. LUCKILY, I HADN'T INFORMED THE REFUELING FLOOR SUPERVISOR THAT I WAS SET UP AND HE WAS NONE THE WISER.

(OVER)

Additional Narrative:

I THINK THE INCIDENT WAS CAUSED BY TWO THINGS:

1) INSUFFICIENT LPRM IDENTIFICATION UNDER THE REACTOR VESSEL.
2) INATTENTIVENESS ON MY PART FOR NOT DOUBLE-CHECKING MYSELF.

AS A CORRECTIVE ACTION, I SUGGEST THAT SOME SORT OF TAGS SHOULD BE PROVIDED FOR IDENTIFYING LPRM'S UNDER THE VESSEL.

NUCLEAR POWER SAFETY REPORTING SYSTEM
P.O. Box 9876
EREHWEMOS, U S 50505

A number of factors contributed to the human errors associated with this embroyonic problem. The LPRM strings were poorly identified in the cramped space beneath the reactor pressure vessel where the set up was being carried out. The preparation space was small, and awkward to work in, and the correct LPRM lead was difficult to identify under the best of conditions. The operator making the error had been putting in 40-60 hour weeks and (as previously noted) had been on duty about twelve hours at the time of the incident. The procedural guidelines provided to the reporter for performing this operation did not include a map of the coordinates of the LPRM locations, or call for quality control and quality assurance checks -- a feature which was fortuitously provided by the arrival of the reporter's replacement counterpart for the next shift.

In this instance, had the person carrying out the LPRM set up not been joined by an alert relief person, the incident most likely would have had a much less desirable outcome. In the example, the reporter suggested several actions which might make this kind of incident less likely in the future. Employing a positive means of identifying the LPRMs (i.e., etching coordinate numbers on the reactor pressure vessel next to the LPRM stubs) was presented as one potential step in that direction. It was also recommended that the procedural guidelines be amended to make them more comprehensive and that QC/QA checks be built into the guidelines. In the illustrative example, a recommendation is attributed to the NPSRS analyst for limiting the amount of time workers must work in poor environments like the space beneath the reactor pressure vessel as a means of reducing the likelihood that mistakes of this nature would occur in the future.

As shown in Figure 3, the example NPSRS Incident Report identification strip contains the reporter's name address and the telephone numbers where he can be reached. The date and time of the incident are also entered by the reporter on the identification strip. The date that the incident report was received by the NPSRS is stamped on the identification strip along with its assigned accession number.

On the example report forms, the incident checklist has been completed by the simulated reporter. The checklist covers the background information on both the plant and the reporter that is pertinent to the example incident. The narrative section of the incident report contains the reporter's description of the incident and describes preventive measures that the reporter believes might be useful to minimize the probability of a similar incident occurring in the future.

An example of how an NPSRS analyst might conduct a call-back to the reporter in order to gain a better understanding of the incident has also been prepared. A representative Call-Back Summary associated with the example report is presented in Appendix J. An example of an Analyst's Summary File that might be prepared for this incident is presented in Appendix K. In the simulated process of NPSRS analysis of the example incident, it has been assumed that the incident merited the release of an Alert Report because the same conditions might exist in other plants and because of the potential for radioactivity releases that might result from an accident of this type. An example of an Alert Report that might result from this incident is presented in Appendix L.

The information contained on the example NPSRS Incident Report form of Figure 3 has been transcribed onto the NPSRS Taxonomy Data Collection Form, as shown in Appendix I. The procedures that were followed in performing this step of the analysis and the basic, blank Taxonomy Data Collection Forms are presented in Appendices D and E.

The Accession No. (Field No. 001) for the illustrative report has been entered on the example data collection form as 0010. The date of the incident (January 9, 1985) is entered in Field No. 002 (01/09/85). The day of the week in which the incident occurred is circled in Field No. 003 as WED, representing Wednesday. The time of the incident (7:30 p.m.) is referenced to the twenty-four hour clock, and has been entered in Field No. 004 (i.e., 1930). The Reporter classification in Field No. 005 is identified as "primary," since the reporter was the principal participant in the incident. The entry NAP is made in Field No. 006, indicating that there is no other report of this nature in the NPSRS

data base. CBC is circled in Field No. 007, denoting that a call-back was completed. ALR is circled in Field No. 008, indicating that the incident was deemed to require the initiation of an Alert Report. Field No. 009 indicates the type of plant (General Electric) in which the event occurred. The nameplate electrical generating capacity of the nuclear power plant is circled in Field No. 010 as MED, indicating that the plant was designed to produce between 500 and 1000 MW of electrical power. The operational status of the nuclear power plant at the time of the incident is circled in Field No. 011 as CSRO, indicating a refueling outage. The Primary Problem Code in Field No. 012 is circled as EOC, representing a human performance problem of a plant operator outside the control room. The repetition frequency for the critical task associated with the incident (replacement of an LPRM string) is given in Field No. 13 as 01 time per yr. The number of active participants described in the incident (two in the example incident) is entered in Field No. 014 as 02.

Fields 015-024 are used to describe up to ten active participants in the incident. For this incident, two people were reported as being involved, consequently Fields 15 and 16 were used in describing it. Field 015 identifies the reporter and his actions. The relief operator's contributions are presented under Field 016. The prefixes and codes of Fields 025-039 are employed to describe the salient aspects of the incident as they are related to the appropriate participants.

PRP01 is entered in Field No. 015 denoting that what follows pertains to the primary participant, who was the reporter in this case . In Field No. 025, the descriptor ONI has been circled, indicating that the reporter was a Nonlicensed Operator. The number of months of experience that the reporter had in this position is entered in Field No. 026 as 014. In Field No. 027, the category for the time of day when the incident occured is circled as EVEN, representing the evening hours, 1600-2000. The number of hours that the participant had worked in his shift up to the time of the incident is circled as OVER in Field No. 028, indicating that the worker had worked continuously for between eight and twelve hours. The total current weekly shift hours spent on the job category is circled as OVER in Field No. 029, indicating that the reporter had worked between 40-60 hours that work week. The location of the participant at

the time of the incident, Field No. 030, is circled as NCN, identifying the participant's location as being in the containment area. In Field No. 031, the activity the participant was engaged in at the time of the incident is circled as MEM, indicating that he was engaged in the execution of maintenance. The participant's error responsible for the incident, Field No. 032, is circled as ININ, meaning that the error was due to insufficient information.

For the second participant, PRP02 was entered in Field No. 016, indicating that this was the second participant in the example incident. ONL was circled in Field No. 025 for the second participant , indicating that he was also a Non-licensed Operator. In Field No. 026, 080 was entered, indicating that the second participant had 80 months of experience in the position. "Even" was circled in Field No. 027, indicating that the incident took place during the evening hours. "Begin" is circled for Field No. 028, indicating that the incident occurred at the beginning of the second operator's shift. "UNK" is circled for Field No. 029, because the reporter did not know how many hours the second participant had been on duty during the week prior to the incident. "NCN" is entered for Field No. 030 because the incident took place in the containment area. The activity occurring at the time of the incident was maintenance, therefore, MEM is circled in Field No. 031. Owing to the fact that the second participant resolved the problem, OTH is circled in Field No. 032. This is a field in which the participant's error is to be listed, but because the second participant resolved the problem rather than contributing to it, "other" is circled for this entry.

The most important system that was involved in the incident (Field No. 033) is circled as INI referring to incore instrumentation. Additional systems of importance that were involved in the incident are circled in Field No. 34 as NAP. This indicates that no other systems were involved. The principal system component which caused or led to the incident (Field No. 035) is circled as NUC indicating a nuclear sensor or control instrument. The next most important system component involved in the incident is circled in Field No. 036 as MAT indicating manual tools (i.e., incomplete reference materials) were involved. The major environmental factor that was judged to have shaped

the performance of the participant (Field No. 037) is circled as IPG indicating insufficient procedural guidelines. The result of the participant's error (Field No. 38) is circled as NON indicating no consequences resulted. Under Field No. 39, FATG was circled indicating that the NPSRS analyst concluded that fatigue was the dominant performance shaping factor in this incident .

Fields Nos. 040-049 identify communication and/or command and control (COMM) problems which caused or contributed to the incident. Up to ten COMM problems can be codified. The prefixes and fixed fields from 050 through 053 are used to describe the characteristics of the COMM problem. In the example incident only one such problem was identified. The absence of tags or identifying markings on the LPRM string ends was construed as a communication problem, one in which the information was absent. COMM01 is entered in Field No. 040 identifying a command/control or communication problem associated with the incident. The COMM origin (Field No. 50) is circled as OTHE for "Other". This indicates that the message originated from some place other than the control room, outside control room personnel, or the reactor's remote shutdown panel and was not a system generated message. The type of COMM message that contributed to the problem is defined in Field No. 051 as DATA indicating a communication problem involving data, text, or instrument readings. The message problem (Field No. 52) is circled as ABS indicating that the message was absent. The description of the medium by which the message problem was transmitted (or in this case not transmitted) (Field No. 053) is circled as VIS indicating that the message would normally have been presented visually (i.e., the identifying markings should have been present and visible on the LPRM string stubs).

The final section of the data collection form addresses the reporter's estimate of the criticality of the incident. The criticality of the incident is entered in Field No. 054 as "4" signifying that the reporter felt that the incident was very important with regards to plant operation. The importance of taking corrective action is entered in Field No. 055 as "5", signifying that the reporter believed that it would be very important to take corrective action (i.e., to provide grid marks on the LPRM stubs) in order to reduce the probability of the event recurring in the future.

The example NPSRS analyst's comments on the results of a simulated call-back conversation with the reporter are presented in the Call-Back File presented in Appendix J. The important information in the notes has been used as the illustrative basis for the analysis and codification of the incident. In this example, the comments of Appendix J are reflected in Appendix I and subsequently in Appendices K and L.

The Analyst's Summary File (cf, Appendix G for the basic forms and procedures) is filled out after the Call-Back File and the Data Collection Taxonomy form are completed. In the Analyst's Summary File of the example report (cf, Appendix K), the Accession Number of the incident is entered on the top of the form and the synopsis of the event, the Reporter's Recommendation, and the NPSRS Analysis of the incident are recorded as shown.

An illustrative Alert Report describing the key elements of the example incident is presented in Appendix L. The sample Alert Report identifies the proposed recipients of the report, presents a brief description of the nature of the hazard associated with the incident, and describes preventive actions that might be taken to reduce the probability of such an event recurring in the future.

REFERENCES

1. F. C. Finlayson and R. D. Newton, The Aerospace Corporation, "Nuclear Power Safety Reporting System: Final Evaluation Results", USNRC Report NUREG/CR-4132, Draft May 1985.

2. F.C. Finlayson, and J.R. Ims, The Aerospace Corporation, "Nuclear Power Safety Reporting System: Feasibility Analysis", USNRC Report NUREG/CR-3119, Vol. 1, April 1983.

3. NASA Advisory Council, Aeronautics Advisory Committee, Advisory Subcommittee on the Aviation Safety Reporting System (ASRS), "Supplementary Findings and Recommendations of the Advisory Subcommittee on Aviation Safety Reporting System (ASRS)", Letter Report to NASA and the FAA, April 5, 1982.

4. F.C. Finlayson, The Aerospace Corporation, "Nuclear Power Safety Reporting System: Concept Description", USNRC Report NUREG/CR-3119, Vol. 2, May 1983.

NUCLEAR POWER SAFETY REPORTING SYSTEM INCIDENT REPORT

Identification Strip. Please fill in all the blanks. This section will be returned to you promptly. Your name, address and phone numbers will not be retained in connection with any records kept of this incident.

We may need to call you to clarify certain elements of this event. Will you please provide us with telephone numbers away from work where we may reach you if we need to obtain further details. Also, please provide a mailing address in the event that we are unable to contact you by phone.

Area code (_____) Number_____ Best time(s)_____

Area code (_____) Number_____ Best time(s)_____

Name_____ Date of Incident ____-____-____
Mo. Day Year

Address _____

_____

_____

Time of Incident (24 hour clock)_____

Power Plant Name_____

Except for reports of criminal activities and deliberate misconduct or gross negligence, all identities contained in this report will be removed to assure complete confidentiality.

For the following questions, please indicate your response by placing an "X" in the box beside your answer or by filling in the blank(s) where appropriate. Please try not to skip any of the questions.

1. Plant Type: [ ] General Electric [ ] Westinghouse [ ] Combustion Engineering [ ] Babcock & Wilcox

2. Electrical Capacity: [ ] Less than 100 MW [ ] 100-500 MW [ ] 500-1000 MW [ ] Over 1000 MW

3. Location in plant where incident was observed: _____

4. Operational Status

Power Operation	Hot Standby	Hot Shutdown	Cold Shutdown
[ ] Startup	[ ] Grid Request	[ ] Grid Request	[ ] Grid Request
[ ] Steady State	[ ] Maintenance Outage	[ ] Maint. Outage	[ ] Maint. Outage
[ ] Load Changes	[ ] Technical Spec. Req.	[ ] Refueling	[ ] Tech. Spec. Req.
[ ] Stretch Out		[ ] Tech. Spec. Req.	[ ] Refueling

5. Reported by:

Management	Maintenance
[ ] Plant Management	[ ] Mechanical
[ ] Quality Assurance	[ ] Electrical
[ ] Engineering Staff	[ ] Instrumentation/Controls

Support Personnel	Operator
[ ] Health	[ ] Shift Supervisor
[ ] Contractor/Consultant	[ ] Licensed Control Room Operator
[ ] Chemistry	[ ] Non-Licensed Operating Personnel
[ ] Outside Inspectors	[ ] None of the above

6. Experience in Nuclear Power: _____years _____months
Experience in present position: _____years _____months

7. Hours on Shift Prior to Incident: [ ] 0-2 hours [ ] 2-6 hours [ ] 6-8 hours [ ] 8-12 hours [ ] 12-16 hours [ ] More than 16

8. Hours on Shift in Week Prior to Incident: [ ] 0-40 hours [ ] 40-60 hours [ ] 60-80 hours [ ] More than 80 hours

9. If a work related task led to the incident, estimate the number of times the task is performed (in a month, in a year, etc.) by everyone who has the responsibility for performing such tasks in the plant. _____ times per _____

10. How important do you think the incident was? (Circle one #)

Not Important 1 2 3 4 5 Critical

11. How important is it that something be done about the incident? (Circle one #)

Not Important 1 2 3 4 5 Critical

12. Narrative Description. Please describe the incident as clearly as possible. Include information on: what happened, how the problem was discovered, what actions were taken; and potential hazards that existed. What factors contributed to the incident? Why do you believe the incident happened? Please give suggestions as to how to prevent a recurrence. (Use additional space on reverse side if needed.)

(Incident Report Form
is Photoreduced by 77%
for Publication -- Original
Size is 8½" x 14")

Additional Narrative:

FOLD

NUCLEAR POWER SAFETY REPORTING SYSTEM
P.O. Box 9876
Erehwemos, U S 50505

APPENDIX B

Administrative Log Procedure

Log In Procedure

1. Stamp time and date Report form is received.

2. Assign alphanumeric accession code to report.

3. On Administrative Log sheet, enter the date that the report was received and logged in.

4. Enter assigned accession number and plant (or utility) name on Administrative Log sheet.

5. Assign analyst to NPSRS report. Enter name in responsibility column.

6. Enter date assigned in Administrative Log.

7. Staple an Analyst Action Form to the report binder and fill in the first four lines of the form.

8. Submit report to NPSRS Program Manager for screening and initial evaluation.

ADMINISTRATIVE LOG

Accession Number	Date Rec'd	Analyst Assigned	Date of Assign-ment	Call Back Made	DeID Performed	Summary Prepared	Alert Bulletin Prepared	Program Manager Review	Data Entry	Shred

APPENDIX C

Screening Procedure

1. Review NPSRS incoming report form contents.

2. Review for potential legal irregularities.

3. If incident indicates that reporter was involved in illegal activities, send the NPSRS report to the NRC for action without deidentification. Contact the reporter and notify him of actions taken. Mark legal action code in Administrative Log.

4. Review report for evidence of plant damage or personnel injury.

5. When a potentially significant safety hazard is observed in the incoming report, prepare an Alert Report initiation form and flag report with special Alert Report cover. Check Alert Report column on Administrative Log.

6. If reported incident did not exceed NUREG-0654 definition of an Emergency Action Level of "Notification of Unusual Event", indicate that No Special Action was required in connection with the report on the Administrative Log.

7. If evidence is clear that other reports related to the occurrence have been received by the NPSRS, mark the action code for Multiple Reports of Single Incidents and cross-reference with accession number of the initial (or key) report in this series.

8. If the screening process shows no evidence of illegal activities which might require it to be submitted to legal authorities or the NRC, fill in the Date Assigned line of the Analyst Action form with the current date and submit the report to the designated NPSRS analyst.

APPENDIX D

Analyst Report Evaluation Procedures and Taxonomy Description

1. Complete fixed field forms using NPSRS report information.

2. When there is insufficient information to complete the fixed fields of the form, call-back the reporter for relevant information.

3. If a call-back to the reporter is made, enter the date of the interview on the Analyst Action Form.

4. Summarize data received in telephone interview on Call-back Form.

5. Complete filling out the fixed fields of the NPSRS Taxonomy Data Collection form.

6. De-identify the report by removing the identity portion of the NPSRS form. Mail the identity strip to the reporter, and enter the date of the completed step on the Analyst Action Form.

7. Prepare the Analyst's Summary File entries

8. Enter a synopsis of the occurrence on the Analyst's Summary File.

9. Enter the reporter's recommendations for reducing the probability of the event's reoccurrence in the Recommendation Section of the Analyst's Summary File.

10. Enter the NPSRS analysis of the significant causal factors associated with the occurrence in the Analyst's Summary File.

11. Have the supervisor sign off the NPSRS forms for quality control review of analysis and data entry.

12. Enter the date when the analyst coding forms are entered into data base on the Analyst Action Form.

13. Enter the date when the analyst fixed field coding forms and callback forms are shredded on the Analyst Action Form.

14. File the Analyst's Summary File into the NPSRS documentation files and send the Analyst Action Form to the Administrative clerk for the completion of the Administrative Log.

APPENDIX D
(Continued)

NPSRS Analysis Taxonomy

Field No.	Field Prefix	Field Label	Description	Searchable
001	ACN		Accession Number. The unique identifying number assigned to a report (numeric entry).	X
002	RPTD		Report date: month, day and year of occurrence.	X
003	DAY	SUN	Sunday	X
		MON	Monday	
		TUE	Tuesday	
		WED	Wednesday	
		THU	Thursday	
		FRI	Friday	
		SAT	Saturday	
		UNK	Unknown	
004	TIMO		Time of Occurrence (Numeric entry 24 hour clock)	X
005	RPTR		Reporter Classification	X
		PRI	Primary (participant)	
		SEC	Secondary (observer)	
		UNK	Unknown	
		KNO	Has knowledge, but not observer or participant	
006	ORPT		Other (key) NPSRS Report of same occurrence (Accession No.)	
		NAP	Not applicable	
007	RESP		Response to Reporter	X
		NON	None	
		CBC	Callback Attempted and Completed	
		CBT	Callback Attempted	
		OTH	Other	
008	ALRT		Alert Report Option	
		ROU	Routine	
		ALR	Alert Report Prepared	

Field No.	Field Prefix	Field Label	Description	Searchable
009	PTYPE		Plant Type/Manufacturer	
		GE	General Electric	
		WH	Westinghouse	
		CE	Combustion Engineering	
		BW	Babcock and Wilcox	
		NPR	Non-Power Reactor	
		OTH	Other Power Reactor	
010	WATCAP		Electrical Generating Capacity	X
		MIN	Less than 100 MW	
		LOW	100-500 MW	
		MED	500-1000 MW	
		LRG	Over 1000 MW	
011	SRP		Operational Status of Nuclear Plant	X
			Power operation	
		POSS	Steady state	
		POLC	Load changes	
		POSO	Stretch out	
			Hot standby	
		HBGR	Grid Request	
		HBMO	Maintenance outage	
		HBTR	Technical Specification Requirements	
			Hot shutdown	
		HDGR	Grid Request	
		HDMO	Maintenance Outage	
		HDTR	Technical Specification Requirements	
			Cold shutdown	
		CSTS	Technical specification Requirement	
		CSRO	Refueling outage	
		CSMO	Maintenance outage	
			Reactor starting/shutdown	
		RSU	Reactor start up	
		RSD	Reactor shutdown	

Field No.	Field Prefix	Field Label	Description	Searchable
012	RPTN		Dominant problem code. The single most appropriate designator is assigned from the following list.	X
		CRC	Human performance problems of control room crew.	
		EOC	Human performance problems of plant operators outside control room.	
		MTC	Human performance problems of maintenance technician.	
		OTG	Human performance problems of other groups.	
		NPF	Failure of Nuclear Steam Supply System or equipment.	
		NRP	Problems related to nuclear refueling.	
		ICS	Problems related to instrumentation & control system	
		EPP	Problems related to electrical power distribution.	
		NEF	Malfunctions or failure related to non NSSS or equipment.	
		NMP	Problems related to nuclear power plant procedures, manuals, and regulations.	
		OTH	Problems that cannot be reasonably assigned to any of the above categories.	
013	FREQ		Estimated number of times that the critical task of the incident is performed in a period (week, month, year)	
			_____ per _____	
			Number Period: wk; mo; yr	
014	PNUM		Total Number of Active Participants in Occurrence	X

Field No.	Field Prefix	Field Label	Description	Searchable
015-024	PRP 01-10		Description of participants involved in occurrence describe by using prefixes and labels of fields 025-039 (Reporter is always PRP01)	
025	JC		Job Classification	X
			Management/Supervision	
		MPM	Plant Management	
		MQA	Quality Assurance	
		MES	Engineering Staff	
		MOT	Other	
			Maintenance and Repair	
		MMM	Mechanical Maintenance	
		MEM	Electrical Maintenance	
		MIC	Instrumentation and Control	
		MROT	Other	
			Support Personnel	
		SHP	Health Physics	
		SCC	Contractor and Consultant	
		SAI	Outside Auditors and Inspectors	
		SCH	Chemistry	
		SOT	Other	
		SES	Engineering Staff	
			Operations Personnel	
		OSS	Shift Supervision/Foreman	
		OLO	Licensed Operators	
		ONL	Non-Licensed Operators	
		STA	Shift Technical Advisor	
		OTT	Other	
026	EXP	0-999	Experience (in position) Expressed in months	X
		UNK	Enter UNK if unknown	
027	INTIM		Time Incident Took Place	X
		MORN	0800 - 1200	
		AFTE	1200 - 1600	
		EVEN	1600 - 2000	
		NIGH	2000 - 2400	
		GRAV	2400 - 0400	
		RISE	0400 - 0800	
		UNK	Unknown	

Field No.	Field Prefix	Field Label	Description	Searchable
028	HRSC		Hours on Current Shift Prior to Occurrence	X
		BEGIN	0-2 hrs	
		MIDD	2-6 hrs	
		END	6-8 hrs	
		OVER	8-12 hrs	
		DOUB	12-16 hrs	
		STRET	Over 16 hrs	
		UNK	Unknown	
029	HRWK		Hours on Shift in Week Prior to Incident	X
		NOM	0-40	
		OVER	40-60	
		WAOV	60-80	
		DOUB	Over 80	
		UNK	Unknown	
030	LOC		Location of Participant in Plant at Time of Occurrence	X
			Nuclear System Area	
		NCN	Containment	
		NAB	Nuclear Auxiliary Building	
		NFB	Fuel Building/Spent Fuel Room/Fuel handling area	
		NOT	Other in Nuclear System Area	
			Control Area	
		CMC	Main Control Room	
		CSP	Hot Shut Down Panel	
		CLP	Local Control Panel	
		COT	Other in Control Area	
		CSR	Remote Shutdown Panel	
			Balance of the Plant Area	
		BSW	Switch House/Switching Area	
		BTB	Turbine Building auxiliary system/outside structures	
		BOT	Other in Balance of Plant	
		UNK	Unknown	

Field No.	Field Prefix	Field Label	Description	Searchable
031	ACT		Activity Engaged in at Time of Occurrence	X
			Management	
		MPD	Material Procurement and Distribution	
		RES	Reporting	
		MPS	Manpower Planning and Staffing	
		SVC	Supervision Control	
		MOT	Other	
			Operational	
		MON	Monitoring	
		MAN	Manual acts or Operations	
		OIC	Inventory Control (waste water, etc.)	
		OFH	Fuel Handling	
		DRC	Restoration/Functional Acceptance	
		OTP	Tagging Equipment	
		STO	Shift Turnover	
		OTH	Other	
			Maintenance Repair	
		MOA	Obtaining Access to Location for Work (including work release permission).	
		MTG	Tagging Equipment	
		MRS	Removal from Service	
		MEM	Execution of Maintenance	
		MRE	Restoration (including housekeeping)	
		MIF	Inspection/Functional Acceptance	
		MRO	Other	
			Surveillance (including testing and calibration).	
		STP	Testing Preparation	
		SOA	Obtaining Access to Location (including work release permission)	
		STA	Tagging Equipment	
		SRS	Removal from service	
		SEM	Execution of Maintenance	
		SRE	Restoration (including housekeeping)	
		SIF	Inspection/Functional Acceptance	
		SOT	Other	
		UNK	Unknown	

Field No.	Field Prefix	Field Label	Description	Searchable
032	ERR		Error Responsible for Occurrence	X
		ALDR	Substance Abuse (Alcohol and/or drugs)	
		INFO	Received or Obtained Inadequate Information	
		MISI	Misunderstood Information	
		COMF	Failure in Communicating or Reporting of Information	
		PROC	Procedural Deficiency	
		DIRC	Directive Deficiency	
		DECI	Incorrect Decision Concerning Appropriate Action	
		DECA	Incorrectly carried out Decision	
		WRKL	Workload to High	
		REFW	Normal Reflex (inappropriate to work situation)	
		DISO	Disorientation	
		MEML	Memory Lapse	
		ERCL	Maintaining Erroneous Conclusion	
		COOR	Poor Coordination	
		IMTO	Improper Tools used	
		WINF	Received Incorrection Wrong Information	
		FDCT	Failure to Detect or Recognize System Alarm	
		PEDN	Poor Equipment Design	
		ININ	Insufficient Information	
		PBLT	Poor Background Lighting	
		INTR	Insufficient Training	
		PACC	Poor Accessibility	
		FPRC	Failed to follow procedure	
		OTH	Other Reason not in library	
033	SYSP		Principal system involved in occurrence. Use codes shown under SYSS (34)	X

Field No.	Field Prefix	Field Label	Description	Searchable
034	SYSS		Other System(s) involved in occurrence	X
		HPC	Heat Production Control	
		ESF	(1) Engineering Safety Features	
		ECC	Emergency Core Cooling System	
		CAI	Containment Atmosphere Inserting	
		CGC	Containment Combustible Gas Control	
		CIS	Containment Isolation	
		CSC	Containment Pressure Suppression-Containment Spray	
		HPI	Core Spray-High Pressure Coolant Injection	
		LPI	Core Spray-Low Pressure Coolant Injection	
		ADE	Automatic Depressurization	
		ESW	Emergency (Residual Heat removal) Service Water	
		CFL	Core Flood	
		HRE	Hydrogen Recombiner	
		SIN	Safety Injection	
		ESA	Engineered Safety Feature Activation System	
		IVW	Isolation Valve Seal Water	
		PPR	Penetration Pressurization	
		RWS	Refueling Water Storage Tank	
		BWS	Borated Water Storage Tank	
		ICL	(2) Inventory Control	
		FWT	Feedwater	
		RWC	Reactor Water Cleanup	
		CVC	Chemical and Volume Control	
		MKU	Make-up	
		RCL	(3) Reactivity Control	
		CRD	Control Rod Drive	
		SLC	Standby Liquid Control	
		RCT	(4) Reactor Coolant	
		RRC	Reactor Recirculation	
		RHR	Residual Heat Removal	
		RCS	Reactor Coolant System	
		DCH	Decay heat	
		RPV	(5) Reactor Pressure Vessel	
		PRV	Pressure Vessel	
		REA	Reactor Assembly	
		RET	Reactor Internals	
		RFA	Reactor Fuel Assemblies	
		STU	Steam Production and Utilization	

Field No.	Field Prefix	Field Label	Description	Searchable
		CWS	(1) Circulating water system	
		COT	Cooling Towers	
		CSY	(2) Condensate System	
		CST	Condensate storage and transfer	
		CPO	Condensate Polishing	
		ARF	Air Removal	
		FDW	(3) Feedwater	
		CIC	Reactor Core Isolation Cooling	
		MFW	Main Feedwater	
		AFW	Auxiliary Feedwater	
		EFW	Emergency Feedwater	
		MSS	(4) Main Steam System	
		SBP	Steam bypass	
		SDP	Steam Dump	
		MFD	Main Feedwater	
		AFD	Auxiliary Feedwater	
		EFV	Emergency Feedwater	
		TRB	(5) Turbine	
		EXS	Extractor Steam	
		HPT	High pressure Turbine	
		LPT	Low pressure Turbine	
		TLO	Turbine Lube Oil	
		EHC	Electro-Hydraulic Control	
		TUC	Turbine Control	
		MSR	Moisture Separator Reheater	
		EPD	Electrical Production and Distribution	
		PDS	(1) Ex-plant production and distribution switchyard	
		MGN	(2) Main Generator	
		HYS	Hydrogen System	
		SEO	Seal Oil	
		STC	Stator Cooling	
		EXC	Exciter	
		BDC	Bus Duct Cooling	
		ACD	(3) In Plant AC distribution	
		SAC	(4) Standby AC Power System	
		DGE	Diesel Generators	
		SAS	Starting Air System	
		FOS	Fuel Oil Storage and transfer system	
		JWS	Jacket Water System	

Field No.	Field Prefix	Field Label	Description	Searchable
		DCP	(5) DC Power System	
		ACP	(6) Vital AC Power System	
		SSE	Support Services	
		COS	(1) Communications System	
		LIS	(2) Lighting System	
		SEC	(3) Security System	
			(4) Component Cooling	
		SEW	Service Water	
		RCW	Reactor Building Closed Cooling Water	
		TCW	Turbine Building Closed Cooling Water	
		SCW	Secondary Services Component Cooling Water	
		NEW	Nuclear Services Component Cooling Water	
		CCW	Component Cooling Water	
		FRP	(5) Fire Protection	
		FWS	Fire Water System	
		CO2	Carbon Dioxide	
		HAL	Halon	
		HVA	(6) Heating, Ventilation and Air Conditioning	
		SGT	Standby Gas Treatment	
		ESV	Emergency Core Cooling System Ventilation	
		BUV	Building Ventilation	
		CRV	Control Room Ventilation	
		IAC	(7) Instrumentation and Control	
		AIP	AC Instrument Power	
		DIP	DC Instrument Power	
		FWC	Feedwater Control	
		ICS	Integrated Control System	
		NNI	Non Nuclear Instrumentation	
		NIN	Nuclear Instrumentation	
		RAM	Radiation Monitoring	
		RPS	Reactor Protection System	
		REC	Recirculation Control	

Field No.	Field Prefix	Field Label	Description	Searchable
		TIP	Traversing Incore Probe	
		SWC	Steam Generator Water Level Control	
		INI	Incore Instrumentation	
		RDW	(8) Radwaste	
		LRA	Liquid Radwaste	
		SRA	Solid Radwaste	
		OGS	Off Gas System	
		RFL	(9) Refueling	
		FHE	Fuel Handling Equipment	
		FPC	Fuel Pool Cooling	
		FUS	Fuel Storage	
		ASY	(10) Air Systems	
		SEA	Service Air	
		INA	Instrument Air	
		PSS	(11) Process Sampling System	
		PRS	Primary Sampling	
		SES	Secondary Sampling	
		NUW	(12) Make-up Water	
		TRS	Treatment System	
		CGS	(13) Compressed Gas System	
		OTH	(14) Other	
		NAP	(15) Not Applicable	

Field No.	Field Prefix	Field Label	Description	Searchable
035	PCOM		Principal System Component(s)	X
		BATT	(1) Batteries	
		LEA	Lead-Acid	
		NIC	Nickel Cadmium	
		BLW	(2) Blowers	
		COM	Compression	
		FAN	Fan	
		TUB	Turbine	
		CCI	(3) Circuit Closures/Interrupter	
		CBR	Circuit Breaker	
		CON	Contractor	
		CNR	Controller	
		RLY	Relay	
		STR	Starter	
		SWT	Switch	
		SWG	Switch Gear, Motor Operated Disconnects	
		FUS	Fuse	
		DMF	(4) Demineralizer/Filter	
		AIF	Air Filter	
		GAF	Gasoline Filter	
		DFF	Diesel Fuel Filter	
		WAF	Water Filter	
		WAS	Water Separater	
		OIF	Oil Filter	
		TRA	Trap (lint, minerals, etc.)	
		MTR	(5) Motors	
		CAP	Capacitator	
		DCC	DC Commutator Hydraulic	
		IND	Induction	
		PNU	Pneumatic	
		SLP	Split Phase	
		SYI	Synchronous Induction	
		PMP	(6) Pumps	
		AXL	Axial	
		CNF	Centrifugal	
		DIA	Diaphragm	
		EMG	Electromagnetic	
		GEA	Gear	
		JET	Jet	
		RAD	Radial	

Field No.	Field Prefix	Field Label	Description	Searchable
		REC	Reciprocating	
		ROT	Rotary	
		VAC	Vacuum	
		VAN	Vane Type	
		POTH	Other	
		ELC	(7) Electrical Conductors	
		BUS	Bus	
		CTC	Control Cable	
		PWC	Power Cable	
		SIC	Signal Cable	
		TRB	Terminal Blocks	
		TEW	Thermocouple Extension Wire	
		EQP	(8) Electrical Equipment	
		ALT	Alternator	
		APY	Amplidyne	
		BAC	Battery Charger	
		CNR	Converter	
		DYR	Dynamotor	
		GEN	Generator	
		INT	Inverter	
		RCT	Rectifier	
		STT	Stator	
		TRF	Transformer	
		VOR	Voltage Regulator	
		PWS	Power Supply	
		FLR	Fluorescent Lamps	
		INL	Indicators (Lights)	
		IND	Indicators (Mech)	
		MET	Meters	
		HXR	(9) Heat Exchangers	
		BOI	Boiler	
		CON	Condenser	
		CLR	Cooler	
		EAP	Evaporator	
		HEC	Heater/Cooler	
		HES	Heater/Superheater	
		STG	Steam Generator	
		SAC	(10) Sensors and Control Instruments	
		FLO	Flow	
		LEV	Level	
		NUC	Nuclear	
		POS	Position	
		PRE	Pressure	

Field No.	Field Prefix	Field Label	Description	Searchable
		TEM	Temperature	
		VIB	Vibration	
		CDY	Conductivity	
		CUR	Current	
		VOT	Voltage	
		RPM	RPM	
		FRQ	Frequency	
		VAV	(11) Valves	
		ANG	Angle	
		BAL	Ball	
		BUT	Butterfly	
		CHK	Check	
		DPM	Diaphragm	
		GAT	Gate	
		GLB	Globe	
		NDL	Needle	
		PUG	Plug	
		QKO	Quick-Opening	
		3WY	Three Way	
		4WY	Four Way	
		RLF	Relief	
		SUO	Shutoff	
			(12) Valve Operation	
		MAC	Electric Motor-AC	
		MDC	Electric Motor-DC	
		SQB	Explosive, Squib	
		FLT	Float	
		HYD	Hydraulic	
		MEC	Mechanical	
		PND	Pneumetic/Diaphragm Cylinder	
		SAC	Solenoid-AC	
		SDC	Solenoid-DC	
			(13) Vessels/Tank	
		ACC	Accumulators	
		PRV	Pressure Vessels	
		TNK	Tanks	
		OTH	(14) Not in Library	
		TPW	(15) Tools/Power	
		EPT	Electric Tools	
		PPT	Pneumatic Powered Tools	
		MAT	Manual Tools	
		TEQ	(16) Test Equipment	
		NAP	Not Applicable	

Field No.	Field Prefix	Field Label	Description	Searchable
036	SCOM		Other System Component(s) (use codes for principal system components in 035)	
		NAP	Not Applicable	
037	PFM		Performance Shaping Factors Contributing to Incident	X
			(1) Displays Visual	
		ADI	Poor Adequacy of Displayed Information	
		UDI	Poor Useability of Displayed Information	
		VDI	Poor Visibility of Displayed Information	
		GDS	Poor Graduation of Scale	
		ILI	Poor Illumination of Indicators	
		PXE	Parallax Error	
		RFT	Reflectance	
		IDO	Inadequate Display Organization	
		INU	Inordinate Number of Display Update	
		ICI	Inadequate Cueing of Information	
			(2) Auditory	
		UNS	Not able to discriminate source (location) of audible tone or sound	
		UDT	Cannot detect sound or tone over background noise	
		IWK	Interferes with work-related communications	
			(3) Controls	
		INP	Movement of Control Inappropriate with respect to expected action	
		LOC	Control not located with controls of similar function	
		FOR	Control requires inordinate amount of force to operate	
		RCH	Controls not within ready reach of operator	
		CND	Controls not sufficiently distinguishable	
			(4) Consoles	
		SAC	Inadequate Space Provided (sitting room, leg room, writing surfaces)	
		IAC	Controls and displays on console inaccessible to operator	
		ORG	Control layout not organized by function	
		IUM	Console poorly illuminated	
		ITF	Adjacent personnel interfere with operator on a control console	

Field No.	Field Prefix	Field Label	Description	Searchable
			(5) Work Places	
		WKI	Workplace poorly illuminated	
		DFI	Differential illumination required within system	
		ISW	Insufficient space for required work	
		HAL	Passageways inadequate to handle traffic flow	
		ESC	Escape Corridors are inadequate or missing	
		PRT	Insufficient space for operators wearing protective clothing or tools.	
		EQB	Equipment blockage of visual and/or auditory information links	
			(6) Maintenance Entry Points	
		IRI	Inaccessible Replacement Item	
		FPA	Limited Front Panel Access	
		STM	Special Tools Required for Maintenance Task	
		UNP	Insufficient Coding for Identification of Parts	
		ICH	Maintenance Instructions are Incoherent	
		INC	Maintenance Instructions are Incorrect	
			(7) Environmental Impact Conditions	
		HEX	Heat Excessive	
		VIB	Vibration Excessive	
		NIO	Noise Excessive	
		LIT	Lighting (poor)	
		RDA	Radiation in Air	
		ADC	Radiation on Ground/in Water	
			(8) Procedures	
		IPG	Insufficient Procedural Guidelines	
		IFD	Insufficient Fault Diagnosis Information	
			(9) Anomaly	
		AIN	Specific Alarm Information	
		STA	Missing Critical Status Alerting	
038	RERR		Result of Error	X
		EQD	Equipment Damage	
		DIE	Personnel Fatality (non-Radiation)	
		RDI	Radiation Fatality	
		RIN	Radiation Injury	
		PIN	Physical Injury	
		SDK	System Degradation Minor (less than 3 hrs)	
		MDK	System Degradation Major (more than 3 hrs)	
		MBK	System Major Breakdown	
		ENR	Environmental Damage (Radiation)	
		END	Environmental Damage (Non-Radiation)	
		TSV	Tech Spec Violation	
		ESF	Essential Safety Feature Actuation System Signal	

Field No.	Field Prefix	Field Label	Description	Searchable
039	BEH		Behavioral Factors	X
		DISC	Physical Discomfort	
		PINP	Personal Injury	
		SCPR	Social Pressure	
		VCOM	Noisy Voice Communications	
		FATG	Fatigue	
		WKLD	Workload Excessive	
		RSUT	Resource Utilization	
		UNFM	Unfamiliar with Operation	
		INCP	Incapacitation	
		DIST	Distraction	
		IRSC	Inadequate Human Resources	
		SCHD	Schedule Pressure	
		SICK	Illness	
		IPER	Interpersonnel Relationships	
		RCOM	Noisy Communications	
		EMST	Emotional Stress or Trauma	
		UPAT	Unprofessional Attitude	
		COAL	Confusing System Alarms	
		CMPL	Complacency	
		NDAP	Not Applicable	
		UNKN	Unknown	
		NON	None	
040-049	COMM01-COMM10		Command/Control, Information Transfer, or Communications problems, described by using prefixes and labels of fields 050-053 (up to 10 unique messages and Associated Problems can be identified).	X
040		NAP	Not Applicable	
050	MORG		Message Origin	X
		CNTR	Control Room	
		MSUP	Outside Control Room Personnel	
		SGEM	System Generated Message	
		RSDP	RSDP Remote Shutdown Panel	
		OTHE	Other	

Field No.	Field Prefix	Field Label	Description	Searchable
051	MTYPE		Message Type	X
		CLNC	Clearance Instruction to Proceed with Task	
		CORD	Coordination Information for Controlling Nuclear Power Plan Activity	
		RQST	Request for Clearance to Proceed	
		WRNG	Warning of Impending Dangerous Condition or System Malfunction	
		INTN	Intentions, present status or Planned Actions	
		DATA	Data, Text, Graphic or Instrument Readings	
		AVSY	Advisory, i.e., Containment or Maintenance Recommendation	
		CONF	Confirmation Including Readback	
		MALF	Erroneous Signals/Message Delivered by Command/Control or Communications Systems	
		OTHR	Other	
052	MPROB		Message Problem	X
		PHN	Phonetic Similarity (Similar Sounds)	
		TPN	Transposition (Order Inversion)	
		OAC	Inaccuracy for other Reasons	
		CPL	Incomplete	
		FLS	False	
		AMB	Ambiguous or Misleading	
		TIM	Untimely	
		GBL	Garbled in Transmission or Presentation	
		ABS	Absent	
		FLR	Equipment Failure Prevented Transmission	
		NMN	Message not Received	
		OTH	Other	

Field No.	Field Prefix	Field Label	Description	Searchable
053	MEDIA		Message Medium	X
		PUB	Publication	
		RDO	Radio	
		VID	Video (CRT)	
		TLE	Telephone	
		VOX	Voice	
		VIS	Visual, e.g., Instrument Reading	
		CPO	Computer Printout	
		ITC	Intercom	
		INF	Computer Interface	
		OTH	Other	
054	INCID		Incident Importance Rating	X
			1 Not important	
			2 Somewhat important	
			3 Important	
			4 Very important	
			5 Critical	
055	CAPR		Corrective Action Priority Rating	X
			1 Not important	
			2 Somewhat important	
			3 Important	
			4 Very important	
			5 Critical	

APPENDIX E

Procedure for Completing NPSRS Analysis Taxonomy Data Collection Form

From NPSRS report information complete the NPSRS Taxonomy data collection form:

1. Enter 5 digit accession number in Field No. 1.
2. Enter reported date (Mon/Day/Yr) of occurrence in Field No. 2.
3. Circle day of occurrence in Field No. 03.
4. Enter time of occurrence in Field No. 04.
5. Circle classification of reporter code in Field No. 5.
6. If pertinent, enter other NPSRS report covering same occurrence in Field No. 6.
7. Circle response code in Field No. 7.
8. Circle Alert Report requirement code in Field No. 8.
9. Circle type of nuclear plant involved in NPSRS report in Field No. 9.
10. Circle nameplate plant generating power capacity in Field No. 10.
11. Circle operational status of reactor at time of incident in Field No. 11.
12. Circle dominant problem designation field code in Field No. 12.
13. Fill in reporter's estimate of frequency of repetition for task that caused incident (from Item No.9 on Report form).
14. Enter number of active participants involved in occurrence in Field No.14
15. For the principle participants, plant systems, components, and equipment involved in the occurrence, circle appropriate information in Fields 15-24 using descriptive prefixes and labels listed in Fields 25-39.
16. For command/control or communications related problems, circle the appropriate information in Fields 40-49 using descriptive prefixes and labels listed in Fields 50-53.
17. Circle rating of incident importance in Field No. 54.
18. Circle rating of priority for corrective action in Field No. 55.
19. If field no.'s 1-5, 12-15, 25-32, and 37-39 are blank and cannot be filled out, perform call-back procedure.

APPENDIX E (Continued)

NPSRS Taxonomy Data Collection Form

	Field No.	
Accession No. (ACN): (Numeric entry)	#001	_ _ _ _ _
Report Date (RPTD): (Month, day, year - e.g. 11/29/85)	#002	_ _/_ _/_ _
Day (DAY): (Circle only one)	#003	SUN MON TUE WED THU FRI SAT UNK
Time (TIMO): (Hour, minutes on 24 hr clock - numeric)	#004	_ _ _ _
Reporter Classification (RPTR) (Circle only one)	#005	PRI SEC UNK
Other Key Report (ORPT): (Numeric entry)	#006	_ _ _ _ _
Response (RESP): (Circle only one)	#007	NON CBC CBT OTH
Alert Report (ALRT): (Circle only one)	#008	ROU ALR
Plant Type (PTYPE): (Circle only one)	#009	GE WH CE BW NPR OTH
Electrical Gen. Cap. (WATCAP): (Circle only one)	#010	MIN LOW MED LRG
Plant Operational Status (SRP): (Circle only one)	#011	POSS POLC POSO HBGR HBMO HBTR HDGR HDMO HDTR CSTS CSRO CSMO RSU RSD
Primary Problem (RPTN): (Circle only one)	#012	CRC EOC MTC NPF NRP EPP NEF NMP OTH ICS OTG
Task Repetition Frequency (FREQ): (Number per period)	#013	_____time(s) per_____ (number) (e.g., Wk, Mo, Yr.
Participants (PNUM): (Numerical Entry 0-10)	#014	_ _

First Participant (PRP01): (Alpha numeric entry)	#015	P R P 0 1			
Job Classification (JC): (Circle only one)	#025	MPM	MQA	MES	STA
		MOT	MAN	MEN	
		MIC	MROT	SHP	
		SCC	SAI	SCH	
		SOT	OSS	OLO	
		OTT	ONL	SES	
Position Experience (EXP): (Months - numerical entry)	#026	- - -			
Time Incident Occurred (INTIM): (Circle only one)	#027	MORN	AFTE	EVEN	
		NIGH	GRAV	RISE	
		UNK			
Current Shift Hours Worked (HRSC): (Circle only one)	#028	BEGIN	MIDD	END	
		OVER	DOUB	STRET	
		UNK			
Weekly Hours on Shift (HRWK): (Circle only one)	#029	NOM	OVLR	WAOV	
		DOUB	UNK		
Plant Location of Incident (LOC): (Circle only one)	#030	NCN	NAB	NFB	NOT
		CMC	CSP	CLP	COT
		BSW	BTB	BOT	UNK
		CSR			
Activity (ACT): (Circle only one)	#031	MPD	REM	MPS	STO
		SVC	MOT	MON	OTH
		MAN	OIC	OPR	
		DRC	OTP	MOA	
		MTC	MRS	MEN	
		MRE	MIF	MRO	
		STP	SOA	STA	
		SRS	SEM	SRE	
		SIP	SOT	UNK	
Error (ERR): (Circle only one)	#032	INFO	MISI	COMP	PROC
		DIRC	DECI	DECA	WRTL
		REFW	DISO	MEML	UNCL
		COOR	INTO	WINF	FLOT
		PEDN	ININ	FBLT	INJR
		PACC	OTH	ALDR	FPRC

(Use additional sheets for Other Participants (Fixed Fields #016 - #024), including data entries for Fixed Fields #025 - #039 for each participant).

Other Participant (PRP02 to PRP10): (Alpha numeric entry)	#016-#024	_ _ _ _ _			
Job Classification (JC): (Circle only one)	#025	MPM MOT MIC SCC SOT OTT	MOA MMM MROT SAI OSS ONL	MES MEM SHP SCH OLO SES	STA
Position Experience (EXP): (Months - numerical entry)	#026	_ _ _			
Time Incident Occurred (INTIM): (Circle only one)	#027	MORN NIGH UNK	AFTE GRAV	EVEN RISE	
Current Shift Hours Worked (HRSC): (Circle only one)	#028	BEGIN OVER UNK	MIDD DOUB	END STRET	
Weekly Hours on Shift (HRWK): (Cirle only one)	#029	NOM DOUB	OVER UNK	WAOV	
Plant Location of Incident (LOC): (Circle only one)	#030	NCN CMC BSW CSR	NAB CSP	NFB CLP BTB BOT	NOT COT UNK
Activity (ACT): (Circle only one)	#031	MPD SVC MAN DRC MTG MRE STP SRS SIF	RES MOT OIC OTP MRS MIF SOA SEM SOT	MPS MON OFH MOA MEM MRO STA SRE UNK	STO OTH
Error (ERR): (Circle only one)	#032	INFO DIRC REFW COOR PEDN PACC	MISI DECI DISO IMTO ININ OTH	COMF DECA MEML WINF PELT ALDR	PROC WRKL ERCL FDCT INTR FPRC

(Use additional sheets for Other Participants (Fixed Fields #016 - #024), including data entries for Fixed Fields #025 - #039 for each participant).

Principal System (SYSP):
(Circle only one)

	#033	HPC	ESF	ECC	CAI
		CGC	CIS	CSC	HPI
		LPI	ADP	ESW	CFL
		HRE	SIN	ESA	IVW
		PPR	RWS	BWS	ICL
		FWT	RWC	CVC	MKU
		RCL	CRD	SLC	RCT
		RRC	RHR	RSC	DCH
		RPV	PRV	REA	RET
		STU	COT	CSY	CST
		CPO	ARF	FDW	CIC
		MFW	AFN	EFW	MSS
		SBP	SOP	MFD	AFD
		EFV	TRB	EXS	HPT
		LPT	TLO	EHC	TUC
		POS	MGN	HYS	SEO
		STC	EXC	BDC	ACD
		DGE	SAS	FOS	JWS
		DCP	ACP	SSE	COS
		LIS	SEC	SEW	RCW
		TCW	SCW	NEW	CCW
		FRP	FWS	CO2	HAL
		HVA	SGT	ESV	BUV
		CRV	IAC	AIP	DIP
		FWC	ICS	NNI	NIN
		RAM	RPS	REC	TIP
		SWC	INI	RDW	LRA
		SRA	OGS	REL	FHE
		FPC	FUS	ASY	SEA
		INA	PSS	PRS	SES
		MUW	TRS	CGS	OTH
		NAP	RFA	MSR	

Principal System (SYSS):
(Circle only one)

	#034				
		HPC	ESF	ECC	CAI
		CGC	CIS	CSC	HPI
		LPI	ADP	ESW	CFL
		HRE	SIN	ESA	IVW
		PPR	RWS	BWS	ICL
		FWT	RWC	CVC	MKU
		RCL	CRD	SLC	RCT
		RRC	RHR	RSC	DCH
		RPV	PRV	REA	RET
		STU	COT	CSY	CST
		CPO	ARF	FDW	CIC
		MFW	AFN	EFW	MSS
		SBP	SOP	MFD	AFD
		EFV	TRB	EXS	HPT
		LPT	TLO	EHC	TUC
		POS	MGN	HYS	SEO
		STC	EXC	BDC	ACD
		DGE	SAS	FOS	JWS
		DCP	ACP	SSE	COS
		LIS	SEC	SEW	RCW
		TCW	SCW	NEW	CCW
		FRP	FWS	CO2	HAL
		HVA	SGT	ESV	BUV
		CRV	IAC	AIP	DIP
		FWC	ICS	NNI	NIN
		RAM	RPS	REC	TIP
		SWC	INI	RDW	LRA
		SRA	OGS	REL	FHE
		FPC	FUS	ASY	SEA
		INA	PSS	PRS	SES
		MUW	TRS	CGS	NAP
		NAP	RFA	MSP	OTH

Principal System Components (PCOM):
(Circle one or more)

#035

BATT	LEA	NIC	BLW
COM	FAN	CCI	CBR
CON	CNR	RLY	STR
SWT	SWG	FUS	DMF
AIF	GAF	DFF	WAF
WAS	OIF	TRA	MTR
CAP	DCC	IND	PNU
SLP	SYI	PMP	AXL
CNF	DIA	EMG	GEA
JET	RAD	REC	ROT
VAC	VAN	POT	ELC
BUS	CTC	PWC	SIC
TRB	TEW	EQP	ALT
APY	BAC	CNR	DYR
GEN	INT	RCT	STR
TRF	VOR	FIR	INL
IND	MET	HXR	PWS
BOI	CON	CLR	EAP
HEC	HES	STG	FLO
LEV	NUC	POS	PRE
TEM	VIB	CDY	CUR
VOT	RPM	FRQ	VAV
ANG	BAL	BUT	CHK
DPM	GAT	GLB	NDL
PUG	QKO	3WY	4WY
RLF	SUO	MAC	MDC
SQB	FLT	HYD	MEC
PND	SAC	SDC	ACC
PRV	TNK	TEQ	TPW
EPT	PPT	MAT	OTH
TUB	NAP		

Principal System Components (SCOM):
(Circle one or more)

#036

BATT	LEA	NIC	BLW
COM	FAN	CCI	CBR
CON	CNR	RLY	STR
SWT	SWG	FUS	DMF
AIF	GAF	DFF	WAF
WAS	OIF	TRA	MTR
CAP	DCC	IND	PNU
SLP	SYI	PMP	AXL
CNF	DIA	EMG	GEA
JET	RAD	REC	ROT
VAC	VAN	POT	ELC
BUS	CTC	PWC	SIC
TRB	TEW	EQP	ALT
APY	BAC	CNR	DYR
GEN	INT	RCT	STR
TRF	VOR	FIR	INL
IND	MET	HXR	PWS
BOI	CON	CLR	EAP
HEC	HES	STG	FLO
LEV	NUC	POS	PRE
TEM	VIB	CDY	CUR
VOT	RPM	FRQ	VAV
ANG	BAL	BUT	CHK
DPM	GAT	GLB	NDL
PUG	QKO	3WY	4WY
RLF	SUO	MAC	MDC
SQB	FLT	HYD	MEC
PND	SAC	SDC	ACC
PRV	TNK	TEQ	TPW
EPT	PPT	MAT	OTH
NAP			

Performance Shaping Factors (PF): (circle only one)	#037	ADI	UDI	VDI	GDS
		ILI	PXE	RFT	IDO
		INU	ICI	UNS	UDT
		IWK	INP	LOC	FOR
		RCH	SAC	IAC	ORG
		IUM	ITF	WKI	DFI
		ESP	HAL	ESC	PRT
		EQB	IRI	FPA	STR
		UNP	ICH	INC	HEX
		VIB	NIO	LIT	RDA
		ADC	IPG	IFD	AIN
		STA	CND	ISW	
Result of Error (RERR): (Circle only one)	#038	DIE	RDI	RIN	PIN
		SDK	MDK	MBK	ENR
		END	NON	TSV	EQD
		TSY	EST	NON	
Behavioral Factors (BEH): (Circle only one)	#039	DISC	PINP	SCPR	
		VCOM	FATG	WKLD	
		RSUT	UNFM	INCP	
		DIST	IRSC	SCHD	
		SICK	IPER	RCOM	
		EMST	UPAT	COAL	
		CMPL	NDAP	UNKN	

(Use additional sheets for Other Participants, including data entries for Fixed Fields #016 to # 039.)

Command/Control (COMM01 to COMM10) (Alpha numeric entry)	#040-#049	_ _ _ _ _ _			
Message Origin (MORG): (Circle only one)	#050	CNTR SGEM	MSUP OTHE	RSDP	
Message Type (MTYPE): (Circle only one)	#051	CLNC WRNG AVSY	CORD INTN CONF	RQST DATA MALF	OTHR
Message Problem (MPROG): (Circle only one)	#052	PHN FLS ABS	TPN AMB FLR	OAC TIM NMN	CPL GBL OTH
Message Medium (Media): (Circle only one)	#053	PUB VOX INF	RDO VIS OTH	VID CPO	TLE ITC

(Use additional sheets as necessary for other COMM entries)

Incident Importance (INCID): (Circle only one)	#054	1 2 3 4 5
Action Priority (CAPR): (Circle only one)	#055	1 2 3 4 5

APPENDIX F

Procedure for Performing Call-back

1. Call-back is initiated when there is insufficient information to complete the fixed fields of the Taxonomy Data Collection forms from the data on the NPSRS Incident Report form.

2. Call-back Guidelines
   a. Call reporter at place other than work
   b. If someone else answers, do not identify yourself or leave your number.
   c. Find out when the reporter is expected to be available at that number.
   d. When the reporter answers a call, identify yourself and state the purpose of the call.
   e. Ask the reporter if it is convenient for him to discuss the occurrence at this time. If it is not, schedule another call back time.
   f. Assure the reporter that his responses are held in complete anonymity and that you are only resolving a few points before the NPSRS form is deidentified.
   g. Go over the unresolved portions of the NPSRS form with the reporter until all conflicts or missing pieces of information are resolved.
   h. If, after five call-back attempts, the analyst is unable to contact the reporter, a letter should be mailed to the reporter requesting him or her to phone the NPSRS for an interview.

3. Enter the report accession number on the Call-back File.

4. Enter the time and date of contact with the reporter on the Call-back Form.

5. Enter a summary of the data and descriptive information related to the incident that may have been obtained in the interview on the Call-back Form.

CALL-BACK SUMMARY FORM

Accession No._____ Time:_____

_____ Date:_____

Call back File

_____

Call back comments (COMMT)

_____

APPENDIX G

Procedure for Completing Analyst's Summary File

The Analyst's Summary file consists of three sections: (1) Synopsis, (2) Reporter's Recommendations, and (3) NPSRS Analysis.

The Synopsis Section is a brief statement about the human performance depicted in the NPSRS form.

The Reporters Recommendation section is a summarization of the reporter's recommendations made on the NPSRS form or during the call-back interview. It addresses how the occurrence could be avoided.

The NPSRS Analysis Section is a concise descriptive analysis of the causal human-factors that led to the occurrence and the results of the occurrence on personnel and plant operation.

APPENDIX G (Continued)

Analyst's Summary File

Accession Number_____.

Synopsis (SYNOP)

Reporter's Recommendation (RECMDN)

NPSRS Analysis (ANALYS)

APPENDIX H

Procedure for Preparing an Alert Report

1. In the normal course of events, analysts will receive special Alert Report assignments directly from the Program Manager. However, when reports are received without Alert Report designation, the analyst will perform an additional review of the incident to determine whether Alert Report status is warranted.

2. Reports deemed by the analyst to justify Alert Report status will be reviewed with the Program Manager before the Alert Report is prepared.

3. The analyst will identify the element of nuclear community at which the alert is directed, i.e., particular type of nuclear power plants, NRC, etc.

4. The hazardous condition responsible for alert will be described.

5. The reporter's recommendations for preventative measures which will reduce the probability of reccurrence of the hazardous conditions will be identified.

6. The Program Manager will review the completed Alert Report. Upon final approval, the Alert Report will be sent to the NRC and to the selected utilities and/or nuclear plants for information purposes.

7. Each Alert Report must include the following disclaimer:

   NPSRS Alert Report are sent to the NRC, utilities, and individual nuclear power plants for information purposes only. No action is inherently required on the part of the recipients of the Alert Report. Action may be taken voluntarily on the part of utility recipients. It is the responsibility of the NRC to make any decisions that are based upon Alert Reports that require action which may be imposed upon individual recipients of the reports.

ALERT REPORT _____ _____
(date)

ATTENTION: (Utilities/Nuclear Power Plants)

HAZARD
DESCRIPTION: (Description of Dangerous Condition)

PREVENTION
METHODS: (How Conditions Can Be Made Less Hazardous)

DISCLAIMER: NPSRS Alert Reports are sent to the NRC, utilities, and individual nuclear power plants for information purposes only. No action is inherently required on the part of the recipients of the Alert Report. Action may be taken voluntarily on the part of utility recipients. It is the responsibility of the NRC to make any decisions that are based upon Alert Reports that require action which may be imposed upon individual recipients of the reports.

APPENDIX I

Completed Example of an
NPSRS Taxonomy Data Collection Form

	Field No.	
Accession No. (ACN): (Numeric entry)	#001	ØØØ1Ø
Report Date (RPTD): (Month, day, year - e.g. 11/29/85)	#002	Ø1/Ø9/85
Day (DAY): (Circle only one)	#003	SUN MON TUE (WED) THU FRI SAT UNK
Time (TIMO): (Hour, minutes on 24 hr clock - numeric)	#004	193Ø
Reporter Classification (RPTR) (Circle only one)	#005	(PRI) SEC UNK
Other Key Report (ORPT): (Numeric entry)	#006	NAP
Response (RESP): (Circle only one)	#007	NON (CBC) CBT OTH
Alert Report (ALRT): (Circle only one)	#008	ROU (ALR)
Plant Type (PTYPE): (Circle only one)	#009	(GE) WH CE BW NPR OTH
Electrical Gen. Cap. (WATCAP): (Circle only one)	#010	MIN LOW (MED) LRG
Plant Operational Status (SRP): (Circle only one)	#011	POSS POLC POSO HBGR HEMO HETR HIGR HIMO HDTR CSTS (CSRO) CSMO RSU RSD
Primary Problem (RPTN): (Circle only one)	#012	CRC (EOC) MTC NPF NRP EPP NEF NMP OTH ICS OTG
Task Repetition Frequency (FREQ): (Number per period)	#013	Ø1 (number) time(s) per YR (e.g., Wk, Mo, Yr.)
Participants (PNUM): (Numerical Entry 0-10)	#014	Ø2

First Participant (PRP01): (Alpha numeric entry)	#015	P R P 0 1			
Job Classification (JC): (Circle only one)	#025	MPM	MQA	MES	STA
		MOT	MMM	MEM	
		MIC	MROT	SHP	
		SCC	SAI	SCH	
		SOT	OSS	OLO	
		OTT	(ONL)	SES	
Position Experience (EXP): (Months - numerical entry)	#026	014			
Time Incident Occurred (INTIM): (Circle only one)	#027	MORN	AFTE	(EVEN)	
		NIGH	GRAV	RISE	
		UNK			
Current Shift Hours Worked (HRSC): (Circle only one)	#028	BEGIN	MIDD	END	
		(OVER)	DOUB	STRET	
		UNK			
Weekly Hours on Shift (HRWK): (Circle only one)	#029	NOM	(OVER)	WAOV	
		DOUB	UNK		
Plant Location of Incident (LOC): (Circle only one)	#030	(NCN)	NAB	NFB	NOT
		CMC	CSP	CLP	COT
		BSW	BTB	BOT	UNK
		CSR			
Activity (ACT): (Circle only one)	#031	MPD	RES	MPS	STO
		SVC	MOT	MON	OTH
		MAN	OIC	OFH	
		DRC	OTP	MOA	
		MTG	MRS	(MEM)	
		MRE	MIP	MRO	
		STP	SOA	STA	
		SRS	SEM	SRE	
		SIP	SOT	UNK	
Error (ERR): (Circle only one)	#032	INFO	MISI	COMF	PROC
		DIRC	DECI	DECA	WRKL
		REFW	DISO	MEML	ERCL
		COOR	IMTO	WINF	FDCT
		PEDN	(ININ)	PBLT	INTR
		PACC	OTH	ALDR	FPRC

(Use additional sheets for Other Participants (Fixed Fields #016 - #024), including data entries for Fixed Fields #025 - #039 for each participant).

Other Participant (PRP02 to PRP10): (Alpha numeric entry)	#016-#024	PRPØ2
Job Classification (JC): (Circle only one)	#025	MPM MOA MES STA MOT MMM MEM MIC MROT SHP SCC SAI SCH SOT OSS OLO OTT (ONL) SES
Position Experience (EXP): (Months - numerical entry)	#026	Ø8Ø
Time Incident Occurred (INTIM): (Circle only one)	#027	MORN AFTE (EVEN) NIGH GRAV RISE UNK
Current Shift Hours Worked (HRSC): (Circle only one)	#028	(BEGIN) MIDD END OVER DOUB STRET UNK
Weekly Hours on Shift (HRWK): (Cirle only one)	#029	NOM OVER WAOV DOUB (UNK)
Plant Location of Incident (LOC): (Circle only one)	#030	(NCN) NAB NFB NOT CMC CSP CLP COT BSW BTB BOT UNK CSR
Activity (ACT): (Circle only one)	#031	MPD RES MPS STO SVC MOT MON OTH MAN OIC OFH DRC OTP MOA MTG MRS (MEM) MRE MIF MRO STP SOA STA SRS SEM SRE SIF SOT UNK
Error (ERR): (Circle only one)	#032	INFO MISI COMF PROC DIRC DECI DECA WRKL REFW DISO MEML ERCL COOR IMTO WINF FDCT PEDN ININ PBLT INTR PACC (OTH) ALDR FPRC

(Use additional sheets for Other Participants (Fixed Fields #016 - #024), including data entries for Fixed Fields #025 - #039 for each participant).

Principal System (SYSP):
(Circle only one)

#033

HPC	ESF	ECC	CAI
CGC	CIS	CSC	HPI
LPI	ADP	ESW	CFL
HRE	SIN	ESA	IVW
PPR	RWS	BWS	ICL
FWT	RWC	CVC	MKU
RCL	CRD	SLC	RCT
RRC	RHR	RSC	DCH
RPV	PRV	REA	RET
STU	COT	CSY	CST
CPO	ARF	FDW	CIC
MFW	AFN	EFW	MSS
SBP	SOP	MFD	AFD
EFV	TRB	EXS	HPT
LPT	TLO	EHC	TUC
POS	MGN	HYS	SEO
STC	EXC	BDC	ACD
DGE	SAS	FOS	JWS
DCP	ACP	SSE	COS
LIS	SEC	SEW	RCW
TCW	SCW	NEW	CCW
FRP	FWS	CO2	HAL
HVA	SGT	ESV	BUV
CRV	IAC	AIP	DIP
FWC	ICS	NNI	NIN
RAM	RPS	REC	TIP
SWC	INI	RDW	LRA
SRA	OGS	REL	FHE
FPC	FUS	ASY	SEA
INA	PSS	PRS	SES
MUW	TRS	CGS	OTH
NAP	RFA	MSR	

Principal System (SYSS):
(Circle only one)

#034

HPC	ESF	ECC	CAI
CGC	CIS	CSC	HPI
LPI	ADP	ESW	CFL
HRE	SIN	ESA	IVW
PPR	RWS	BWS	ICL
FWT	RWC	CVC	MKU
RCL	CRD	SLC	[illegible]
RRC	RHR	RSC	
RPV	PRV	REA	RET
STU	COT	CSY	CST
CPO	[illegible]RF	FDW	CIC
MFW	[illegible]	EFW	MSS
S[illegible]	[illegible]	MFD	AFD
EFV	TRB	EXS	HPT
LPT	TLO	EHC	TUC
POS	MGN	HYS	SEO
STC	EXC	BDC	ACD
DGE	SAS	FOS	JWS
DCP	ACP	SSE	COS
LIS	SEC	SEW	RCW
TCW	SCW	NEW	CCW
FRP	FWS	CO2	HAL
HVA	SGT	ESV	BUV
CRV	IAC	AIP	DIP
FWC	ICS	NNI	NIN
RAM	RPS	REC	TIP
SWC	INI	RDW	LRA
SRA	OGS	REL	FHE
FPC	FUS	ASY	SEA
INA	PSS	PRS	SES
MUW	TRS	CGS	NAP
(NAP)	RFA	MSR	OTH

Principal System Components (PCOM):
(Circle one or more)

#035

BATT	LEA	NIC	BLW
COM	FAN	CCI	CBR
CON	CNR	RLY	STR
SWT	SWG	FUS	DMF
AIF	GAF	DFF	WAF
WAS	OIF	TRA	MTR
CAP	DCC	IND	PNU
SLP	SYI	PMP	AXL
CNF	DIA	EMG	GEA
JET	RAD	REC	ROT
VAC	VAN	POT	ELC
BUS	CTC	PWC	SIC
TRB	TEW	EQP	ALT
APY	BAC	CNR	DYR
GEN	INT	RCT	STR
TRF	VOR	FIR	INL
IND	MET	HXR	PWS
BOI	CON	CLR	EAP
HEC	HES	STG	FLO
LEV	NUC	POS	PRE
TEM	VIB	CDY	CUR
VOT	RPM	FRQ	VAV
ANG	BAL	BUT	CHK
DPM	GAT	GLB	NDL
PUG	QKO	3WY	4WY
RLF	SUO	MAC	MDC
SQB	FLT	HYD	MEC
PND	SAC	SDC	ACC
PRV	TNK	TEQ	TPW
EPT	PPT	MAT	OTH
TUB	NAP		

Principal System Components (SCOM):
(Circle one or more)

#036

BATT	LEA	NIC	BLW
COM	FAN	CCI	CBR
CON	CNR	RLY	STR
SWT	SWG	FUS	DMF
AIF	GAF	DFF	WAF
WAS	OIF	TRA	MTR
CAP	DCC	IND	PNU
SLP	SYI	PMP	AXL
CNF	DIA	EMG	GEA
JET	RAD	REC	ROT
VAC	VAN	POT	ELC
BUS	CTC	PWC	SIC
TRB	TEW	EQP	ALT
APY	BAC	CNR	DYR
GEN	INT	RCT	STR
TRF	VOR	FIR	INL
IND	MET	HXR	PWS
BOI	CON	CLR	EAP
HEC	HES	STG	FLO
LEV	NUC	POS	PRE
TEM	VIB	CDY	CUR
VOT	RPM	FRQ	VAV
ANG	BAL	BUT	CHK
DPM	GAT	GLB	NDL
PUG	QKO	3WY	4WY
RLF	SUO	MAC	MDC
SQB	FLT	HYD	MEC
PND	SAC	SDC	ACC
PRV	TNK	TEQ	TPW
EPT	PPT	(MAT)	OTH
NAP			

Performance Shaping Factors (PF): (circle only one)	#037	ADI	UDI	VDI	GDS
		ILI	PXE	RFT	IDO
		INU	ICI	UNS	UDT
		IWK	INP	LOC	FOR
		RCH	SAC	IAC	ORG
		IUM	ITF	WKI	DFI
		ESP	HAL	ESC	PRT
		EQB	IRI	FPA	STR
		UNP	ICH	INC	HEX
		VIB	NIO	LIT	RDA
		ADC	(IPG)	IFD	AIN
		STA	CND	ISW	
Result of Error (RERR): (Circle only one)	#038	DIE	RDI	RIN	PIN
		SDK	MDK	MBK	ENR
		END	(NON)	TSV	EQD
		TSY	ESF	NON	
Behavioral Factors (BEH): (Circle only one)	#039	DISC	PINP	SCPR	
		VCOM	(FATG)	WKLD	
		RSUT	UNFM	INCP	
		DIST	IRSC	SCHD	
		SICK	IPER	RCOM	
		EMST	UPAT	COAL	
		CMPL	NDAP	UNKN	

(Use additional sheets for Other Participants, including data entries for Fixed Fields #016 to # 039.)

Command/Control (COMM01 to COMM10) (Alpha numeric entry)	#040-#049	COMM01			
Message Origin (MORG): (Circle only one)	#050	CNTR SGEM	MSUP (OTHE)	RSDP	
Message Type (MTYPE): (Circle only one)	#051	CLNC WRNG AVSY	CORD INTN CONF	RQST (DATA) MALF	OTHR
Message Problem (MPROG): (Circle only one)	#052	PHN FLS (ABS)	TPN AMB FLR	OAC TIM NMN	CPL GBL OTH
Message Medium (Media): (Circle only one)	#053	PUB VOX INF	RDO (VIS) OTH	VID CPO	TLE ITC

(Use additional sheets as necessary for other COMM entries)

Incident Importance (INCID): (Circle only one)	#054	1 2 3 (4) 5	
Action Priority (CAPR): (Circle only one)	#055	1 2 3 4 (5)	

APPENDIX J

Completed Example of a Call-back Summary File

Accession No. 010 Time:

Date:

Call back File

Call back comments (COMMT)

Reporter recommends etching LPRM matrix code numbers on RP vessel next to device stub. He estimates that about 2 hours would be needed to code all the stubs for every LPRM in the vessel.

Reporter indicated that the space and accessibility for performing his activities under the RPV for LPRM replacement is poor. For a person of his size, there was not enough room to either stand up or kneel while selecting the correct stub, removing its retainer nut and seal, and hooking up the drain rig. The poor accessibility makes the process very tiring, especially over the course of a twelve-hour shift.

Reporter indicated that he was performing his tasks with only a subset of the procedure list for the complete task. In particular, he was working with procedures which did not include a coordinate map for the LPRM stubs on the vessel. Personnel working on the refueling floor (who perform the actual LPRM string removal) have a coordinate map with their procedures, but under-vessel operational personnel do not.

No QA/QC backup was procedurally provided to double check the reporter's work.

Reporter's estimate of the significance of the event is based upon the observation that performing the set up on the wrong LPRM string could lead other crew members on the refueling floor above to pull apart the correct but undetached LPRM in trying to withdraw it. A potential radiation hazard exists to crew if the LPRM were to be broken in the process.

APPENDIX K

Completed Example of an Analyst's Summary File

Accession Number 10 .

Synopsis (SYNOP) In the process of under-vessel LPRM replacement tasks, the set up was performed on an adjacent LPRM string not scheduled for replacement. The reporter was working in a cramped space where accessibility was poor and the task was physically tiring. The shift hours were long, the LPRM stubs were not clearly marked, and the written procedures for the task were incomplete. As a result of physical and mental fatigue, and in the absence of unambiguous markings for the LPRM stubs, the reporter became complacent and made an incorrect decision regarding the LPRM string to be repaired. No damage or injury resulted because the problem was detected by the reporter's shift replacement.

Reporter's Recommendation (RECMDN) Positive means of identifying LPRM's under vessel should be provided. The reporter recommends etching appropriate matrix numbers next to the corresponding LPRM stubs. In addition, the procedural guidelines for the task should be modified. A back-up QC/QA checker should be provided to assure that the correct set up has been performed. A core map with appropriate x,y coordinates of the LPRM locations should also be provided.
Consideration should be given to reducing shift length and work loads for the individual performing this task.

NPSRS Analysis (ANALYS) Although the erroneous setting up on the wrong LPRM string was acknowledged by the reporter to have been partly due to complacency on his part, physical and mental fatigue were almost certainly the dominant problems. Under such conditions, procedures for performing these tasks should be modified to incorporate reporter's recommendations. This incident deserves consideration for an alert report because of the potential radiation hazards to the crew from the breaking of an LPRM for which for which set up was incorrectly performed. Moreover, the failure to identify under-vessel LPRM stubs could cause the maintenance crew (in subsequent operations) to reposition the instrumentation electrical leads on improper stubs leading to potential operational misinformation during plant operoperation.

APPENDIX L

Completed Example of an Alert Report Form

Alert Report No. 00010 Date: 17 Jan 1985

Attention: Utilities Owning BWR's, General Electric Company's Nuclear Energy Division, and NRC

Hazard: During a routine LPRM replacement operation being performed in the room under the RPV, the wrong LPRM string was prepared for removal. The LPRM removal preparation process involves the removal of the LPRM retainer nut and seal, and the installation of a drain plug. The mistake was discovered and corrected prior to any attempt to remove the LPRM string that had actually been selected for replace insert. Significant contributors to the operator erros include: poor identification of individual LPRM strings in the space under the RPV, poor working conditions in the cramped space, long working hours for the maintenance crew performing LPRM removal preparations, and no backup QC/QA provided in the procedural guidelines. If the error had not been corrected prior to removal of the correct LPRM string, the maintenance crew performing the LPRM removal operation could have been subjected to a potentially serious radiation hazard created by breaking an LPRM not prepared for removal

Prevention:

Actions which will reduce the probability of recurrence of the potentially hazardous conditions presented by this event are:

a) Positive means of identifying the LPRM's (i.e., etched identifying marking underneath the RPV should be provided.)
b) Adequate procedural guidelines with the inclusion of backup QC/QA checks should be provided.
c) Maintenance crew members should not work in a poor environment such as the space beneath the RPV for an extended period of time.
d) Maintenance crew members should not be assigned to perform vital tasks that are associated with substantial hazards after extensive periods of overtime.

NRC FORM 335 (2 84) NRCM 1102, 3201, 3202

U.S. NUCLEAR REGULATORY COMMISSION

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SEE INSTRUCTIONS ON THE REVERSE

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13. ABSTRACT (200 words or less)

This report is the last in a series investigating the feasibility of adapting a voluntary, anonymous, non-punitive, third-party managed reporting concept in a U.S. commercial nuclear industry/regulatory environment. Such a system is intended for use in identifying and quantifying, in an uninhibited manner, the factors that contribute to the occurrence of significant safety incidents which elicit either positive or negative responses from humans in U.S. nuclear power plants.

This report specifies the elements of a Nuclear Power Safety Reporting System (NPSRS), along with operating procedures and forms to be used for accepting, integrating and processing reports submitted to the system. Also included is a taxonomy for collating and storing reports received from a variety of sources addressing myriad safety-related topics.

A companion NUREG/CR-4132 presents the results of a limited evaluation of the technical specifications contained in this report.

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