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SIMPLIFICATION OF NPRDS REPORTING

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FINAL REPORT

MASTER

Sandia National Laboratories
Contract No. 61-6847
SwRI Project No. 17-6667-001

Prepared for

Sandia National Laboratories
Albuquerque, New Mexico

Prepared by

Quality Assurance Systems and Engineering Division

November 1981

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO HOUSTON

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FINAL REPORT

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Prepared for

U. S. Department of Energy
Light Water Reactor Safety Technology Management Center
Sandia National Laboratories
Albuquerque, New Mexico 87185

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ABSTRACT

A significant amount of time is spent in documenting and reporting on the operation of a nuclear power plant. This study has accumulated information and provides recommendations on how to simplify reporting and eliminate redundant reporting to the Nuclear Plant Reliability Data System without degradation of the output. It also provides information on forthcoming processing and procedural changes that will minimize the lapse time encountered during data editing and correcting.

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Section 1

INTRODUCTION

The Department of Energy (DOE), through Sandia National Laboratories, contracted Southwest Research Institute (SwRI) to perform a study to recommend ways to simplify input reporting to the Nuclear Plant Reliability Data System (NPRDS). The reports included in the study were:

- Form NPRD-1 - Nuclear Unit Information Report
- Form NPRD-2 - Report of Engineering Data
- Form NPRD-3 - Quarterly Operating Report
- Form NPRD-4 - Report of Failure

The objective of the study was to evaluate each of the reporting systems (reports listed above) to determine:

1. Utility attitudes toward the four reporting systems.
2. Average time spent by the utility in the preparation of data for each of the forms and the time spent to process each of the forms.
3. Utility recommendations as to simplifications and reductions in reporting, and consolidation or elimination of forms without detracting from the value of the data base for reliability analysis or performance risk analysis.
4. Utility willingness to participate in a pilot study using new procedures and interactive data processing techniques.

A survey questionnaire was mailed to 49 utility representatives on August 26, 1981 to solicit their help in fulfilling the project objectives. By September 18, 1981, 28 of the questionnaires had been returned with the questions answered. Two of the questionnaires were returned unanswered except for an explanation of why they were not completed. One utility returned two questionnaires. Upon discussing the questionnaires with utility personnel, we were asked to disregard one of the two. One of the 28 was a consolidation of input from three plants and the parent utility. As revealed in the answers to question 19, those people answering the questionnaire had experience with NPRDS. At least 83% of the respondents had experience in four out of five data

input phases. Sixty percent of the respondents had experience with analyzing NPRDS output reports. A copy of the survey letter and a summary of the questionnaire results are included in Appendix A.

This report contains a summary of the responses to the survey questionnaire and the NPRDS contractor's evaluation of each of the responses. NPRDS program management at the Institute of Nuclear Power Operations (INPO) will be provided a complete copy of this report for their use. The contractor will implement some of the recommendations as noted in the report. Some recommendations are being included in the draft of the next revision of the Reporting Procedures Manual for NPRDS. The contractor will send the draft of the Reporting Procedures Manual by December 31, 1981 to NPRDS program management for approval.

The study also determined the extent to which automation by remote terminal can be effective, and to what degree automation reduces the time required for processing data as well as providing for more timely availability of data to NPRDS users.

Section 2

EVALUATION AND ASSESSMENT OF REPORTING SYSTEMS

2.1 UTILITY ATTITUDE

Measuring the utilities' attitude toward NPRDS reporting is compounded by not being able to distinguish between a negative attitude and low level participation due to other activities demanding a higher priority for available time. An attempt, however, was made to document the utilities' attitude by using the questionnaire and other sources of information available.

The percent of people responding to the survey indicates an acceptable interest in the subject of NPRDS reporting. The numerous comments on how to improve the system by reducing the time required to prepare the reports and by simplifying the procedures (and codes) also indicates an interest. The number of Reports of Failure (NPRD-4) submitted during 1980, however, reveals a lower participation in reporting failures than would be expected. An explanation for low level failure reporting seems to be that NPRDS is a low priority task within most utilities. Another contributing factor for low participation may be management, maintenance and engineering personnel's minimal use of the data. Also, most of the data preparation and review are done by different staff people than those who use the information. In the past, if someone wanted information from the NPRDS, they would use the output reports (quarterly report, annual report, or a special report run by the NPRDS contractor upon request) available to them. The quarterly reports and annual reports were six months to a year old before they were available to the plants; and special reports, depending on their complexity, took several days to a couple of months to produce. Today, however, using the data base report writer and a terminal, any participant may write his own retrieval request and get a quick reply. Also, with the advent of interactive data entry, the lapse time between submitting data and adding data to the data base will be nominal. These technological advances, along with many of the changes suggested by respondents to the questionnaire, will make NPRDS a more desirable management, maintenance and engineering tool.

Based on the foregoing, the authors of this report concluded that the general attitude of the utilities toward NPRDS reporting was favorable, with the reservation that the lack of available time to devote to NPRDS has hampered the utilities' participation.

2.2 DATA COLLECTING AND PROCESSING

Data collection was defined in the survey questionnaire as gathering data needed to prepare the NPRDS forms and recording the information on the forms. Data processing was defined as the functions the utility must perform to enter the collected data in the NPRDS data base; e.g., key punch, edit, review and transmission (mail) of the collected data.

Six questions in the survey, questions 5 through 10, were directed toward determining NPRD-1, NPRD-2, NPRD-3 and NPRD-4 handling times. A summary of the handling times for each report is in the survey questionnaire in Appendix A. The mean average time for making changes to NPRD-1 was about 12 minutes. The mean average time for collecting data for NPRD-2, NPRD-3 and NPRD-4 was about one hour. The mean average time for processing data for each of the three reports was also about one hour. The lapse time involved in correcting errors detected at the plant/utility by using the contractor-provided edit programs was substantially shorter than the lapse time experienced in correcting errors detected by the NPRDS contractor. The lapse time encountered in correcting plant/utility-detected errors was approximately three days. The lapse time encountered in correcting contractor detected errors was approximately 45 days. This difference in lapse time is due not to the type of errors detected, but to the way the errors were reported back to the plant/utility and to the differences in lapsed time between the Component Failure Report submittal date and the date the report is corrected. The longer the time between these two dates, the more time it takes to find the related paperwork needed to correct the report error(s).

The contractor plans several changes which will reduce the turnaround time on data submitted to NPRDS. Those changes, which were referred to in the survey questionnaire, are to:

1. Process data within one week after it is received.
2. Simplify error reports.
3. Correct obvious errors in the data and notify the sender of the changes.

4. Call to resolve errors needing plant/utility input.
5. Develop interactive data entry.

These changes will have the greatest impact on turnaround time and lapse time experience with Reports of Failure (NPRD-4).

Items 1-5 above are being implemented. Full implementation of items 1-4 is scheduled by December 31, 1981. Interactive data entry is in the design and development phase. The respondents' answers to questions 2, 3 and 4 indicated a high interest in implementing interactive data entry.

2.3 UTILITY RECOMMENDATIONS

Other changes being planned for the reporting process were also discussed in the survey questionnaire. These changes included making minor changes to the required input forms. The changes are:

1. Deleting the NSSS contractor from the NPRD-2, NPRD-3 and NPRD-4 forms since it is redundant information from NPRD-1.
2. Deleting the fractional percentages from NPRD-2, card E since the fractions are not needed.
3. Changing the way quarter start dates are identified on NPRD-3 reports. The quarters will be identified as YY-Q where YY is the year and Q is quarter (Q = 1, 2, 3 or 4). The start and end dates will not be needed since the computer can calculate them.

These changes will be made in the next draft revision to the Reporting Procedures Manual. The draft revision is subject to approval of NPRDS program management.

With the information on the planned changes, the survey recipients were asked in questions 12 through 17 for their recommendations on ways to simplify and reduce NPRDS reporting requirements. Questions 13, 14 and 15 were close-ended; questions 12, 16 and 17 were open-ended. The questions, the responses, and the NPRDS contractor's recommendations related to the responses are given below.

1. Question 12 asked for recommended changes to the four reporting forms, NPRD-1, NPRD-2, NPRD-3 and NPRD-4.
  - a) NPRD-1.
Response:
Include the type of BWR on the form; e.g., BWR-6.

Recommended Action:

Recommend adding an optional field on the Form NPRD-1 to report generic types of light water reactor plants.

b) NPRD-2.

i) Response:

"Eliminate Data Start Date, NSSS. Consider eliminating: utility system code, safety class, MFGR code, MFGR serial #, Vendor #, Vendor code, test frequency."

Recommended Action:

The Data Start Date is the date that data collection starts on a particular position containing a component. The Data Start Date changes when the component is replaced. The Data Start Date, prior to the introduction of the data base file, was an essential part of a unique key to the record. Other information in the record may now be used to make the key unique. The date is also valuable in those cases where the time between the Data Start Date and the In-Service Date is a large percent of the total time between the In-Service Date and the present. This occurred primarily for those components that were in service prior to 1974 when NPRDS was started. Recommend that an in-depth study of deleting Data Start Date from future input be made prior to deciding its fate. The NPRDS contractor plans to delete the NSSS entry requirement from Forms NPRD-2, NPRD-3 and NPRD-4 as noted in the survey questionnaire. The data load software skips these fields now.

Recommend deletion of Vendor Number and Vendor Code from the NPRDS since this information is not needed to determine component reliability. Also, this information is not needed for locating spare parts since the Manufacturer Code and Manufacturer Model are available also.

Recommend that the Testing field be kept. It is used in system/component reliability analysis and by plants in adjusting their component test intervals based on reliability or availability analysis of the system. The testing data are used to determine the number of demands on a component in the standby mode. The count of the number of

failures that occur on testing compared to the number of tests (demands) on the component is used in finding the number of failures per demand on the component.

- ii) Response:
"DATA START DATE - This doesn't seem to serve any purpose for the utility."

Recommended Action:
See comments above.

- iii) Response:
The component identification number in columns 19-29 is duplicated in columns 43-60 on card 'C'.

Recommended Action:
The Utility Component Identification Number is recorded in columns 19-29. The Supplier/Vendor System or Component Identification Number is recorded in columns 43-60. These fields are different unless the utility elects to use the supplier's or vendor's identification on their drawings identifying the components. The Supplier/Vendor System or Component Identification Number is primarily used by utilities that have generic system designs. The Supplier/Vendor System or Component Identification is not needed for reliability studies and was recommended for deletion in 1.b(i) above.

- iv) Response:
Delete testing data on card E (operational and testing data card). The reason for deleting the testing information was that different utilities have different testing frequencies.

Recommended Action:
Recommend that the Testing information field be kept. Also see 1.b(i) above.

c) NPRD-3.

- i) Response:
"Eliminate (1) duplication of dates, (2) Failure reports submitted, (3) on-line time."

Recommended Action:

Quarter dates will be requested only once on NPRD-3 as noted in the survey questionnaire. The reporting quarter will be identified one time on Form NPRD-3 as YY-Q where YY represents the year and Q the first through the fourth quarter of the calendar year. This will simplify data entry. Quarter start and end dates are fixed and included in the computer programs.

The requirement for entering the number of Failure Reports submitted was deleted when Revision 7 to the Reporting Procedures Manual was published.

Recommend that NPRDS program management consider deleting On-line Time. On-line Time is not used to determine component reliability. This information is redundant to Generation Availability Data System (GADS) reporting.

- ii) Response:
Exact times for 'standby conditions' are not available because of technical specification differences.

Recommended Action:
Recommend keeping the hours for standby condition. The hours are needed for calculating reliability of safety-related systems/components that operate during reactor standby.

- iii) Response:
"Allow for daylight savings time changes to number of hours in reporting period."

Recommended Action:
Daylight saving time is not observed by the entire nation. To maintain uniformity and simplicity in reporting for all plants, the NPRDS contractor recommends that the plants continue to use the specified quarterly hours given in the NPRDS Reporting Procedures Manual.

d) NPRD-4.

- i) Response:
"A) eliminate (1) Fail # (key on time), (2) report date.

- B) Add space for affected system/associated system.
- C) Eliminate duplicate spaces to relieve left/right justification questions."

Recommended Action:

A) Recommend deleting Failure Number. Component and system failures can be ordered by failure time as suggested. Recommend that NPRDS program management delete Failure Number.

The Report Date is not needed for statistical studies on component or system reliability. The computer assigns a transaction number to each transaction submitted. This number can be used to identify the last time a report was added, changed or deleted. Since the Report Date may be used by some plants/utilities for recordkeeping purposes, recommend that the Report Date be deleted and a block added at the top or bottom of the page for plant and utility use for their own recordkeeping purposes.

B) Recommend that NPRDS program management permit adding a field to identify affected system/associated system.

C) Fields have been left and right justified based on data types in the flat file used in the past. Numeric fields were right justified; character fields were left justified. Left and right justification is automatically provided by the new NPRDS data base processing system. This system will be fully implemented prior to December 31, 1981.

- ii) Response:
Change the 'Licensee Event Report Submitted (Date)' to 'Licensee Event Report Number' (LER Number). The reason given was that LER dates change with each revision, whereas the LER number remains constant.

Recommended Action:

This change has been approved by the ANS 58.20 Subcommittee and is planned for inclusion in the next revision to the Reporting Procedures Manual.

- iii) Response:
Category 'A', Cause of Failure codes on the 'V' card are difficult to assign.

Recommended Action:

Recommend that the Data Reporting Working Group, which is presently studying this problem, report their recommendations to the NPRDS program management.

- iv) Response:
Failure event start and end times on the 'G' card "...should be reduced to year, month and day only. Hours and minutes of failures are not normally recorded. (They are) difficult, if not impossible, to obtain ...."

Recommended Action:
The times are needed for calculating out of service hours. Out of service hours are used in determining component position availability. Recommend that the times not be deleted.

- v) Response:
"Modify fields of Failure Description, Cause of Failure, and Corrective Action to allow greater descriptive information on a given failure event."

Recommended Action:
Allowing only four lines of narrative forces the writer to be concise and to the point. The narrative is valuable in explaining component/system failures, especially when the selected Data Failure Analysis code does not adequately describe the problem and the corrective action. Additional remarks can be easily added to the data base. Recommend that consideration be given to adding more narrative lines.

- vi) Response:
Include the remarks at the bottom of the form in the NPRDS data base when the Failure Analysis Data codes on the V card are 'XX'. The remarks are not presently stored in the NPRDS data base.

Recommended Action:
The remarks at the bottom of Forms NPRD-2, NPRD-3 and NPRD-4 were helpful in identifying the need for additional codes in the NPRD manual when it was not as complete as it is today. The remarks were not intended for inclusion in the data base. Recommend deleting the space on the bottom of the NPRD-2, NPRD-3 and NPRD-4 forms which is

used for listing remarks. The present narrative fields can be used to explain 'Other'. Also see Recommended Action for 1.d(v) above.

- vii) Response:
Clearly define 'standby' and 'shutdown' for each reactor type.

Recommended Action:
Recommend that the Reportable Scope Working Group clearly define standby and shutdown for each NSSS reactor type and provide the definitions to the NPRDS program management at INPO.

- viii) Response:
Delete the Failure Analysis Data codes from card 'V'.

Recommended Action:
No reason was given for deleting the codes. These codes are used to determine reasons for component failures. Better definitions of the codes may resolve the difficulty encountered when using them. The Data Reporting Working Group is working on better definitions. Recommend that the codes not be deleted.

- ix) Response:
"DATE OF FAILURE - Appears to duplicate FAILURE EVENT START."

Recommended Action:
The Date of Failure will be renamed as the Date of Discovery in the new draft revision to the NPRDS Procedures Reporting Manual. The Date of Discovery is the date the component or system failure was discovered and is used to determine the restoration time for a component position. The Event Start Date is defined as the date that the failure event started and is used to determine out of service hours for a position. The Event Start Date may be before the Date of Discovery; i.e., the Event Start Date is defined as halfway between the last two test dates if the failure occurred after the previous test and prior to the last test. Recommend that neither of these dates be deleted.

- x) Response:

"Failure analysis - documentation follow-up-One NPRDS Report contains all the information that NRC, NSSS suppliers, vendors, and consultants should need. SwRI should forward the data instead of requiring separate reports."

Recommended Action:

NPRDS contractor can and does supply NRC, NSSS suppliers, vendors and consultants with information from the data base subject to the guidelines established by NPRDS program management. This information is available upon request. The data, however, does not meet NRC requirements for their LER reports. The reporting criteria are different for the two systems and some of the codes do not have a one-to-one relationship between the two systems. Recommend that NPRDS program management review the potential for NPRDS data to be made available in specific formats designed to support reporting to NRC and NSSS suppliers, and other vendors.

- xi) Response:
Licensee Event Reports (LER) and NPRDS reports should not be required for the same event.

Recommended Action:

LERs and NPRDS Failure Reports (NPRD-4) are submitted for different reasons. In some cases, the reporting criteria overlap, requiring the same failure to be reported in both systems. It may be possible for INPO and NRC to reach an agreement where one report could satisfy both requirements. Recommend that INPO consider this possibility.

- xii) Response:
"Use tables and check marks for all fields on the form rather than look-ups and code entries."

Recommended Action:

The current forms evolved from a report format which contained tables and check blocks. The tables and check blocks were deleted because they became cumbersome to use due to the number of the combinations and selections available. This principle can be employed, however, using interactive data

entry where the table of coded options is displayed along with the data field to be filled in. Recommend that the forms not be changed, but that this principle be tested with the implementation of interactive data entry.

2. In question 13 the respondents had the opportunity to express their desires on two ways of handling Report of Failure (NPRD-4) transactions that are rejected because the required engineering data is not in the NPRDS data base. Twenty-one out of 25 of the respondents preferred that the NPRD-4 transaction be saved by the contractor until:
  - a) The plant/utility adds the required engineering data, or
  - b) The plant/utility deletes the Report of Failure, or
  - c) If (a) or (b) is not done by the plant/utility within a specified time, the report is automatically deleted from the hold file and the plant/utility is notified of the deletion.

Four respondents chose to continue with the present method of deleting the Report of Failure immediately and notifying the plant/utility. One respondent selected 'other' as well as one of the first two choices. The third method suggested was to enter data in the data base with a modified engineering record on file. This would permit use of the failure information while the submitting utility gathered the remainder of the engineering data.

Recommended Action:

The contractor will create a file of Failure Reports rejected due to no engineering data in the data base. The file will be run against the data base monthly for six months. When a Failure Report matches engineering data in the data base, the Failure Report will be added to the data base and dropped from the file. If the engineering data is not added within four months after being submitted, the utility will again be notified that the Failure Report has not been added to the data base and will be deleted in 60 days unless the engineering data is added. If the engineering data is still not in the data base at the end of six months, the Failure Report will be deleted from the file and the utility will be notified of the

deletion. This program will be implemented during the first quarter of 1982.

Recommend that NPRDS program management consider modifying NPRD-2 reporting data to permit modified NPRD-4 reports.

3. Question 14 provided two options on how the plant and utility could correct data which was rejected during the contractor's editing phase of processing the data. One option consisted of the plant/utility personnel reviewing a computer listing of the data submitted with the error(s) identified and marking the correction(s) on the listing. The listing would then be returned to the contractor for the contractor to make the changes in the submitted data and to continue processing the rejected data. The second option consisted of the present method; i.e., the plant/utility resubmitting the data after being notified of it being rejected. Fourteen of the 25 respondents preferred the first method. One respondent added a comment expressing a preference to "make data corrections via telephone - person to person."

Recommended Action:

When batch data is submitted, the rejected transactions will be monitored and the contractor will make the minor data corrections where the correct data can be determined. If engineering data does not exist for a Failure Report (NPRD-4), the report will be handled as noted above. Three reports will be returned to the sender for each batch of data submitted. One report will list the rejected data with the reason for the rejection. A second report will list the data accepted with warning messages, and identification of data changed by the contractor (from-to). The third report will identify the accepted data. The letter accompanying the returned reports will identify a person at the contractor's office to contact concerning the reports. The contractor's contact will also be able to make corrections to the data which are reported via telephone.

4. Question 15, the third close-ended question that related to simplification of inputting data, dealt with the difficulty of selecting Failure Analysis Data codes. Even though the degree of difficulty in selecting Failure Analysis Data codes varied among the three choices (frequently, sometimes and seldom difficult), the Cause of Failure 'A' Category and 'B' Category were repeatedly given as the most difficult to select. In 19 out of 24 responses, Cause of Failure Category 'A' codes were marked as being as difficult or more difficult to choose as any of the other

Failure Analysis Data codes. In 11 out of 24 responses, Cause of Failure Category 'B' codes were marked as being as difficult or more difficult to choose as any of the other Failure Analysis Data codes. There was no response to this question on one survey sheet. In only one case was a different code more difficult to select than either Cause of Failure code. In this one case, the Mode of Failure was more difficult to select than the 'A' or 'B' Category Cause of Failure.

The survey revealed that the Mode of Failure was the second most difficult code for people to select.

Recommended Action:

The Data Reporting Working Group is studying this. Recommend that they submit their recommended changes to the NPRDS program management.

5. Open-ended question 16 gave the participants an opportunity to suggest changes that would make it easier to select Failure Analysis Data codes.

The suggestions were as follows:

a) Response:

Definitions needed.

- i) "Provide guidelines for code selection - to ensure consistency (definitions & examples)."
- ii) Clear descriptive definitions of the codes are needed. "...the Data Reporting Working Group is in the process of developing these descriptions."
- iii) "The Failure Analysis Data codes listed in the NPRDS book are too limited & vague for our type of operation. Many times we are forced to select a code that is only remotely related to the actual failure. Some of the data codes are 'masked' by a double interpretation - Southwest Research & ours."

b) Response:

Make the following additions to the Failure Analysis Data codes:

- i) Type of Failure: add 'Human Error'

- ii) Cause of Failure, Category 'A': add 'Piece-part Failure'

Add 'Other' or change present code of 'Unknown' to 'Other'.

One reason for the addition/change was that "...occasionally a cause does not fit the available codes but is known or suspected and can be explained in the narrative. Partially responsible for this is different interpretations of the various codes. A standard interpretation or an example included in the Reporting Procedures Manual might be helpful."

A second suggestion was, "For type of failure add 'other' code. Maybe it would be easier if we were able to enter the remarks onto the report to show just what the 'other' code is saying."

- iii) Effect of Failure (on plant): add 'Place Plant in a Technical Specification Action Statement Condition'.

- c) Response:

"Category A 'Cause of Failures' often require subjective judgements in lieu of in-depth analyses which are often not feasible. Since category 'B' is available to specifically describe failure cause, perhaps it alone should be used."

- d) Response:

Reiteration of desire for including the remarks written on the bottom of Form NPRD-4 in the NPRDS data base when card V is coded with 'XX' or 'Other'.

Recommended Action:

The Data Reporting Working Group is studying changes to the Failure Analysis Data codes. Changes to the codes require NPRDS program management consideration.

6. Question 17 gave the respondents the opportunity to address any areas not already addressed in the survey that would make data processing easier for them. The suggestions were:

a) Response:

"Improve turnaround time between utility data submittal & edit/merge/balance results. Process data as it is received."

Recommended Action:

The turnaround time will be shortened when the data is processed weekly by the contractor as mentioned in the survey questionnaire.

b) Response:

"Conduct the audit at the same time as the merge/balance - either accept or reject data when it is submitted - not 6 months later."

Recommended Action:

As mentioned in the survey questionnaire, there will be three reports returned to the plant or utility after each data submittal. One report will contain only those transactions accepted. The second report will contain only those transactions with warning messages. This will include those transactions where the data was changed by the contractor. The third report will contain only rejected transactions. Two levels of edits will be conducted on all transactions before the reports are written. The first edit check may find errors that make final editing impossible. For example; an invalid transaction type code. Valid transactions are add, change and delete. If the computer cannot determine the action to be taken, the transaction will be rejected. The manual audits of the Failure Reports will be made weekly instead of the present quarterly schedule. The rejected reports will be coordinated with the edit system reports. Corrections can be made by telephone where feasible.

c) Response:

"Revise the output report."

i) "Accepted data - only print out the 1st 38 columns - 1st line- as accepted data."

ii) "Provide a response required section - which lists all rejected data - & the name & phone # of the person to contact about corrections."

Recommended Action:

See 6.b above and Recommended Action for question 14 on page 14.

- d) "Have the ability to correct via the phones - person to person."

Recommended Action:

This is in the plans and is currently being implemented. See Recommended Action for question 14 on page 14.

- e) Response:

"... the computer should hold rejected data if the errors are in the D or V cards and allow you to correct the error on the printout wo/resubmitting the cards (or resubmit only the corrected card)."

Recommended Action:

Error correction can currently be accomplished by the NPRDS contractor on data in the data base. When interactive data entry is available, the user may perform these corrections. In the interim, minor error corrections can be made by calling the NPRDS contractor. See Recommended Action for question 14 on page 14.

- f) Response:

"There is no definite scope for the reportable components. At this time we are using our Q-list and Technical Specifications to make judgements on reportability. This makes data collection difficult due to our maintenance request form process. We have noted for instance that power supply failures, within a neutron monitoring system, have been reported under the detector component. This may be being done by the utility to minimize the number of engineering data forms required, however we question whether subsequent edits on power supply failures in neutron monitoring systems would reveal a failure reported in this manner."

Recommended Action:

Recommend that the Reportable Scope Working Group study this problem and report their recommendations to NPRDS program management.

- g) Response:

Reiteration of desire that 'standby' and 'shut-down' be clearly explained for each reactor type.

Recommended Action:

Recommend that the Reportable Scope Working Group study this problem and report their recommendations to NPRDS program management.

- h) Response:

"Implementation of the Report Writer on-line data entry, editing and data corrections will greatly reduce the time involved for data submittal."

Recommended Action:

Report Writer retrieval capabilities exist now and classes are being conducted at various utilities. On-line (interactive) data entry is planned for the near future. Recommend that interactive data entry be implemented.

i) Response:

"When a component failure causes a system failure, the system failure report is usually a repeat of the component narrative. It might be easier in these cases if we are not required to fill out another report. This can be done by the central computer."

Recommended Action:

A system failure time can be identified by this method when caused by a component failure. The system restoration time may be different if the component is restored to operation and the system remains down for another reason. Recommend that NPRDS program management not depend on component failure reports to determine system down times.

The last page of the survey gave the respondents a chance to voice other recommendations not addressed in the survey. The recommendations were:

1. Response:

"Provide an updated QO-1 when an edit - merge - balance is returned to the utility -; many times this is our only means of determining what Eng(ineering) data is actually in the SWRI data base."

Recommended Action:

Printing the complete listing of engineering data every time an engineering transaction is submitted would require a budget increase for printing, shipping personnel and postage. See Recommended Action for question 14 on page 14 for Recommended Action.

2. Response:

"Investigate eliminating System Failure Reports."

Recommended Action:

There are approximately 8,825 Component Failure Reports and 154 System Failure Reports in the data base as of the third quarter of 1981. All but two of these Failure Reports can be contributed to a compo-

nent failure. The cost effectiveness of submitting System Failure Reports and maintaining them in the data base becomes questionable in view of having only two System Failure Reports in 9,000 Failure Reports over the past seven years that are not also reportable as component failure. Recommend further study of the need for System Failure Reports.

3. Response:

"To further clarify question 14. If interactive data entry were available, marking up of the computer printout would not be needed. Data would be verified correct at the time of entry. However, this means of correction would be a valuable time saver. It would eliminate original form paperwork, keypunch, verification, sorting, and mailing of computer cards."

Recommended Action:

Recommend that interactive data entry be implemented.

4. Response:

"I would like to see the NPRDS Reporting Procedures Manual simplified in its instructions. Also, the 3.0 Definitions section could be a little more descriptive. The component Engineering Data (Table 3) section does not always give enough selections or the selections are too vague. We are again forced to pick out erroneous information."

Recommended Action:

Recommend that the Reportable Scope Working Group and the Data Reporting Group review the manual and submit their recommendations to the NPRDS program management. Also, recommend that the NPRDS contractor review the manual and make changes where instructions can be improved.

5. Response:

"Failure event start & end dates may not be an accurate indication of how long equipment was inoperable - Mech. Seal may alarm "Hi-Temp" (Failure Start) yet may not be repaired for several months (Failure End) - yet the seal was not out of service for the entire time."

Recommended Action:

See Recommended Action for 1.d(ix) on page 11.

6. Response:

There are too many similar:

- a) Mode of Failure codes: i.e., Fracture/Breach/Physical Distortion; Won't open/won't start/won't respond, and

b) Corrective Action Taken codes: i.e., Reseal/Repack.

Recommended Action:

The Data Reporting Working Group is reviewing the Failure Analysis Data codes. Recommend that they report their findings to the NPRDS program management for consideration.

Section 3

SUMMARY

Numerous recommended changes are listed in this report which will help minimize complexity and reduce time involved to input NPRDS data. Three areas that will have the greatest impact are:

1. Better definitions of Failure Analysis Data codes. The Data Reporting Group of the ANS 58.20 Subcommittee is working on improvements in this area.
2. Shorter turnaround time for data submitted to the NPRDS contractor. The contractor's present plans of processing the data weekly will cut the contractor's turnaround time from its maximum of four months to a maximum of two weeks. Submitting corrections via telephone will also reduce the time it takes to get correct data added to the data base.
3. The advent of interactive data entry will cut processing time to a minimum. Errors will be identified immediately. Data entry personnel will be able to make the corrections while the source documents are readily available. Interactive data entry will eliminate the need for each utility to run a computer edit on their data before submitting it. Also, interactive data entry supports maintaining the data base on a more current basis.

Section 4

RECOMMENDATIONS

To simplify data reporting and to reduce reporting times, emphasis is needed in four areas. These are:

1. Implementation of the revised edit reports and error correction process.
2. Completion of the study on revising the Failure Analysis Data codes.
3. Revision of the Reporting Procedures Manual with the new changes.
4. Implementation of the interactive data entry program.

Appendix A
SURVEY QUESTIONNAIRE WITH RESULTS

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QUALITY ASSURANCE SYSTEMS
AND ENGINEERING DIVISION

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TELEPHONE (512) 684-5111
TELECOPIER 684-4822

August 26, 1981
Doc. No. 17-6667-001(03)

TO: NPRDS Utility Contacts

SUBJECT: Survey/Questionnaire Regarding Simplification of
Reporting for NPRDS

This letter and survey is the one referenced in the announcement sent to you on NOTEPAD on August 25, 1981.

The Department of Energy (DOE) through Sandia National Laboratories, has contracted Southwest Research Institute (SwRI) to perform a study to recommend ways to simplify and reduce the input required to prepare the NPRDS reports. Reports required to be submitted by the utilities are:

- Form NPRD-1 - Nuclear Unit Information Report
- Form NPRD-2 - Report of Engineering Data
- Form NPRD-3 - Quarterly Operating Report
- Form NPRD-4 - Report of Failure

The object of the study is to evaluate each of the reporting systems (reports listed above) to determine:

- a. Utility attitudes towards the four reporting systems
- b. Average time spent by the utility in the preparation of data for each of the forms and the time to process each of the forms
- c. Utility recommendations as to simplifications and reductions in reporting, consolidation or elimination of forms
- d. Utility willingness to participate in a pilot research study.

Based on the results of the study recommendations will be made on changes that will reduce the utility paperwork load. The study will help determine:

- a. Areas where improvements can be made to minimize complexity and reduce time involved to input or update NPRDS data

SAN ANTONIO, HOUSTON, TEXAS, AND WASHINGTON, D.C.

- b. The extent to which automation by remote terminal entry can be effective and to what degree automation reduces time required for processing data as well as provide for more timely availability of data to NPRDS users.

In order for the outcome of this study to be meaningful and of benefit to all NPRDS participants, the importance of your participation can not be over emphasized. It is most important that all questions be answered as completely as possible on the attached questionnaire.

An information copy is being sent to the NPRDS coordinator. If the coordinator is not also the primary NPRDS contact, we are interested in also having him/her respond to the survey.

Because of the short time limit on this study, we request that you complete the questionnaire prior to Labor Day and return it in order that we can received it between September 8 and September 11, 1981. You will be mailed a copy of the results of the survey for your information.

Along with the questionnaire we have also enclosed a listing of the number of reports which was submitted by your utility for 1980. This listing may be of assistance to you when answering the questions regarding the time spent preparing and processing the forms.

We plan to follow-up with utilities by telephone to expedite the survey response. For further details, please contact L. LeJune or C. Mosley, SwRI, at 512/684-5111, extensions 2959 and 3334 respectively.

Sincerely,

Benjamin M. Tashjian, P.E.
NPRDS Program Manager

/cam

Attachments

cc: NPRDS Coordinator

Survey/Questionnaire Regarding
Simplification of Reporting for NPRDS

The questionnaire that follows contains the statistical results of the survey. Some respondents did not answer all of the questions; some provided more answers than solicited. Therefore, on some of the questions the number of responses will not total the number of reports evaluated (25). The written responses submitted with the returned questionnaire are given in the preceding text of this report.

*****

INFORMATION:

The NPRDS contractor will soon begin processing your data within the first week after receiving it. This will provide rapid feedback of:

- 1) Accepted data.
- 2) Minor data corrections made by the contractor. For example, an O in a numeric field may be changed to a zero, CKTBRA changed to CKTBRK.
- 3) Rejected data requiring utility correction.

Interactive data entry can be provided by the NPRDS contractor. With this capability, the user has displayed on a computer terminal screen a form, or section of a form, with spaces for the user to type in data. Any of the NPRD data entry forms can be selected and displayed. Interactive data entry provides these features:

- 1) Data is edited at the time of entry. Errors are identified to the user and the form is displayed for the user to correct the invalid data immediately.
- 2) Tables listing the valid codes for a given data field can be displayed for reference. Valid codes displayed can be based upon previously entered data. With appropriate equipment, the desired code selection can be made with a light pen rather than typing in the data.
- 3) Data sent to the NPRDS contractor on cards, tape or by telecommunications for batch processing may have some errors. Those errors which cannot be corrected by the contractor can be displayed to the utility user for correction.

Interactive data entry provides these advantages:

- 1) Rapid feedback that data did, or did not, pass the edit criteria.
- 2) Easy identification and correction of errors.
- 3) It is not necessary to fill out a paper form or key punch cards for data entry.
- 4) In-house computer systems or key punching would not be needed for processing data, including editing. The only in-house equipment needed would be a terminal station and telecommunication equipment.

Questions 1 thru 4 are intended to provide information needed in designing the interactive data entry system.

*****

1. After the NPRDS contractor starts processing data within the first week after receiving it, how often do you anticipate submitting your data? (Check anticipated submittal period for each form.)

SUBMITTAL PERIOD	NPRD-2	NPRD-4
a. Daily	—	—
b. Weekly	1	2
c. Monthly	11	12
d. Quarterly	7	9
e. Other (Specify) _____	6	1
f. Unknown	2	1

It is expected NPRD-1 will be submitted in paper form to the NPRDS contractor as needed and NPRD-3 Quarterly Operating Report would continue to be reported quarterly.

2. If interactive data entry were available to you, how much would you use it? (Check frequency of use for each type of submission.)

TYPE OF SUBMISSION	-----FREQUENCY-----				
	NONE	SOME	MOST	ALL	UNKNOWN
a. Engineering data (NPRD-2)	1	7	5	10	2
b. Quarterly Operating data (NPRD-3)	1	6	5	12	1
c. Report of failure (NPRD-4)	3	1	7	13	1
d. Correction of rejected transactions	—	3	8	13	1
e. Updating data currently on file	1	3	6	12	3

3. Are you interested in participating in a test program using interactive data entry? (Check one)

a. Yes	10
b. No	2
c. Undecided	2
d. Need more information	13

4. If all of the following means of data submission were available to you, how much would you use each one? (Mark percentage of usage for each method or check f).

METHOD	PERCENT OF USAGE		
	MEAN	STD DEV	RANGE
a. Computer cards sent by mail	11.8	24.4	0-95
b. Computer tape sent by mail	3.6	12.5	0-60
c. Remote batch by means of computer to computer	14.4	28.3	0-100
d. Interactive data entry	51.2	42.8	0-100
e. Other (Specify) _____	3.0	15.0	0-75
f. Undecided	16.0	37.4	0-100

*****

INFORMATION:

Questions 5 thru 10 will help estimate the time presently needed for data collection and data processing. The estimate will be used to identify the areas with the greatest needs for simplifying and improving data collecting and processing.

Data collection, for the purpose of this survey, is defined as gathering the data needed to prepare the NPRDS forms and recording the information on the forms.

Data processing is defined as the functions the utility must do to get the collected data in the NPRDS data base; e.g., key punch, edit, review and transmission (mail) of the collected data.

The number of NPRDS reports that each plant submitted is included as attachment 2 and may be of help in calculating handling times.

*****

5. What is the average number of manhours spent by your utility during 1980 in collecting the required information needed to complete one of each of the NPRDS reports? (Enter time needed to complete each form or check none if none were submitted.)

REPORT	(MINUTES)			
	MEAN	STD DEV	RANGE	NONE SUBMITTED
a. NPRD-1	13.0	20.1	0-75	15
b. NPRD-2	65.6	78.6	0-300	10
c. NPRD-3	58.4	59.7	0-240	2
d. NPRD-4	53.3	51.7	0-180	9

6. If any of your NPRDS data collection is accomplished by retrieving data already stored in your computer, how much time do you save in completing one of each of the NPRDS reports by using the stored data? (Enter time saved or check unknown or data not stored in computer for each form.)

REPORT	MANHOURS SAVED COLLECTING DATA	UNKNOWN	DATA NOT STORED IN COMPUTER
a. NPRD-1	(SAMPLE TOO SMALL TO	2	23
b. NPRD-2	DO A STATISTICAL	3	20
c. NPRD-3	ANALYSIS)	2	22
d. NPRD-4		3	18

7. What is the average number of manhours spent by your utility to process one of each of the NPRDS reports after information is collected? Calculate average manhours on reports submitted during 1980. (Enter time needed to complete each form or check none if none were submitted.)

(MINUTES)

REPORT	MEAN	STD DEV	RANGE	NONE SUBMITTED
a. NPRD-1	11.8	27.8	0-120	16
b. NPRD-2	*42.7	*69.4	*0-240	11
c. NPRD-3	*60.0	*60.4	*0-240	2
d. NPRD-4	*56.5	*79.9	*0-240	10

*ONE REPLY WAS CONSIDERED "INVALID DATA" AND NOT USED

8. What is the average lapse time to process a failure report? Consider the time from component failure until you know the failure report has been sent to the NPRDS contractor for the first time.
(Enter lapse time in days, weeks, and/or months or check 'b' if none were resubmitted.)

(DAYS)

	MEAN	STD DEV	RANGE	
a. Time	60.5	79.8	0-365	
b. None resubmitted				8

9. What is the average lapse time to process a failure report that was previously rejected by your computer while running the NPRDS edit check? Consider the time from when you know it has been rejected until it is resubmitted.
(Enter lapse time in days, weeks, and/or months or check b or c.)

(DAYS)

	MEAN	STD DEV	RANGE	
a. Time	3.2	4.2	0-14	
b. None resubmitted				5
c. Edit not available				
at plant or utility				3

10. What is the average lapse time to process a failure report that was previously rejected by the contractor's NPRDS edit check? Consider the time from when you know it has been rejected until it is resubmitted.

(Enter lapse time in days, weeks, and/or months or check 'b' if none were corrected and resubmitted.)

(DAYS)

	MEAN	STD DEV	RANGE

a. Time	43.0	76.1	0-150

b. None resubmitted			6

*****

INFORMATION:

Question 11, along with question 6 above, will be used to determine the extent that computer equipment is now used to process NPRD-1, NPRD-2, NPRD-3 and NPRD-4 reports.

*****

11. What percentage of each type of NPRDS report is generated or produced by the following methods? (Enter percentage of each form type completed by method a, b, and c. The total percentages of methods 'a', 'b' and 'c' for any one form should total 100%.)

		NPRD-1	NPRD-2	NPRD-3	NPRD-4
a. Form completed	%				
by individual	MEAN	81.3	93.8	85.4	89.6
and sent to	STD DEV	38.5	22.4	34.5	29.4
data entry/	RANGE	0-100	0-100	0-100	0-100
key punch					
b. Automatical-	%				
ly produced	MEAN	2.1	6.2	2.1	6.2
by computer	STD DEV	10.2	22.4	10.2	22.4
from your	RANGE	0-100	0-100	0-100	0-100
own inhouse					
data file					
c. Other					
(Explain)					
_____	%				
_____	MEAN	8.3	0.0	8.3	0.0
_____	STD DEV	28.2	0.0	28.2	0.0
_____	RANGE	0-100	0-0	0-100	0-0

*****

INFORMATION:

The following minor changes are planned for the NPRDS forms:

1) Include the NSSS contractor only on the NPRD-1 form. It is redundant information on the NPRD-2, 2A and 4 forms.

2) Percentage fields on NPRD-2, card E forms will be changed from 5 card positions to 3 card positions. Fractional percentages are not needed.

3) Quarter start and end dates are fixed for a given year. Quarters will be identified as YY-Q, for example 81-2 for second quarter of 1981. The quarter will be requested once on NPRD-3.

Question 12 is intended to provide suggestions for simplifying the four reporting forms.

*****

12. Do you feel any other fields should be changed on the following forms:

(If yes, identify field name and reason. If no, please indicate and move to next question. If additional space is needed, use 'Remarks' section at end of questionnaire.)

NPRD-1   Yes   1   No   24

(If your answer is yes, please indicate which fields and why.)

_____ (SEE TEXT OF REPORT FOR REMARKS) _____

_____
_____

NPRD-2   Yes   4   No   21

(If your answer is yes, please indicate which fields and why.)

_____ (SEE TEXT OF REPORT FOR REMARKS) _____

_____
_____

NPRD-3   Yes   4   No   21

(If your answer is yes, please indicate which fields and why.)

_____ (SEE TEXT OF REPORT FOR REMARKS) _____

_____
_____

NPRD-4   Yes   9   No   16

(If your answer is yes, please indicate which fields and why.)

_____ (SEE TEXT OF REPORT FOR REMARKS) _____

_____
_____

*****

INFORMATION:

Batch processing, data entry via cards, tape or telecommunications is the present means of adding, changing and deleting data in the data base. In the future when batch data is submitted, the rejected transactions will be identified on a computer listing and returned to the sender. An error message will state the reason for the reject(s). This listing may be used to annotate the correction(s) for later entry into the data base. A separate listing will be provided of those transactions that were accepted.

Questions 13 thru 17 are intended to provide recommended changes to the Reporting Procedures Manual that may reduce the paper workload of the reporting personnel.

*****

13. When you submit a Report of Failure, NPRD-4, and the required engineering data is not in the data base, would you prefer that: (Check one)

a. The report is rejected and you are notified of the reject (present method) 4

b. You are notified of the missing engineering data and the report is saved until one of following occurs:

- (1) You add the engineering data, or
- (2) You delete the Report of Failure, or
- (3) If you do not add the engineering data or delete the Report of Failure, the report is automatically deleted after a given number of days and you are notified. 21

c. Other (Specify) (See text of report) 1

14. Which of the following procedures for data handling do you prefer for resubmitting rejected data?

a. Mark computer listing and return the listing to the contractor to make the changes and re-enter the data. 14

b. Resubmit the data via card, tape or telecommunication. 11

*****

INFORMATION:

Failure Analysis Data codes are recorded on card V of form NPRD-4, Report of Failure. The codes are listed in Section 11.0 of the Reporting Procedures Manual for the Nuclear Plant Reliability Data System.

Questions 15 and 16 will help determine if selecting and assigning Failure Analysis Data codes is a problem and what can be done to solve the problem if it exists.

*****

15. Using the failure description provided, how often is it difficult to relate the description to the Failure Analysis Data codes listed in the NPRDS Reporting Procedures Manual? (Check one degree of difficulty for each type of code.)

CODE TYPE	FREQUENTLY Difficult	SOMETIMES Difficult	SELDOM Difficult
a. Type of Failure	2	9	13
b. Mode of Failure	4	8	12
c. Cause of Failure			
(1) 'A' Category	13	8	3
(2) 'B' Category	7	11	6
d. Failure Effect	1	7	16
e. Failure Detection	1	4	19
f. Corrective Action	—	10	14
g. Follow-up Documentation	1	2	21

16. What changes do you think would make selecting Failure Analysis Data codes easier?

Remarks:_____ (SEE TEXT OF REPORT FOR REMARKS)_____

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

a. 'Yes 4

If yes, please explain:_(SEE TEXT OF REPORT FOR REMARKS)_____

*****

INFORMATION:

Questions 18 and 19 will be used to establish the need for future training.

*****

18. How many people (including yourself) at your plant would be interested in acquiring NPRDS training? (Enter number of people for each type of training. Enter zero if none are interested.)

a. NPRDS Direct Assistance (training at your plant for personnel responsible for data input)

Number of people 43 *(11)

b. NPRDS Direct Assistance (training at NPRDS workshops for personnel responsible for data input)

Number of people 29 *(14)

c. NPRDS Report Writer Training (on line data access and retrieval)

Number of people 32 *(15)

*Number of respondents requesting training for total number of personnel indicated.

19. What has been the extent of your involvement with NPRDS? (Check all pertinent answers.)

a. Knowledge of Procedures Manual	24
b. Attended NPRDS Workshop	18
c. Collected data	21
d. Processed data	21
e. Reviewed input data	22
f. Analyzed output reports	15

20. Are you available for any follow-up questions we may have?

a. Yes	22
b. No	3

If you are available, please print your name, plant name and phone number where you may be contacted.

Name : _____	(Check NPRDS	
Plant: _____	Responsibility)	
Phone: _____	NPRD Contact	11
	NPRD Coordinator	15
	Other (Specify)	3
	_____	

Additional Comments: (SEE TEXT OF REPORT FOR COMMENTS)

[illegible]

LISTING BY PLANT OF THE NUMBER
OF REPORTS ADDED DURING 1980

<u>UTILITY</u>	<u>NPRD-2</u>	<u>NPRD-3</u>	<u>NPRD-4</u>
APCJMF1	0000	0000	0000
APLANO1	0187	0006	0035
APLANO2	1642	0004	0004
BECPPS1	0057	0004	0019
BGECCN1	0000	0004	0000
BGECCN2	0000	0003	0000
CECIPS2	0000	0005	0000
CPCPAL1	0065	0005	0027
CPLBEP1	0015	0004	0038
CPLBEP2	0012	0005	0065
CPLHBR2	0059	0004	0044
CWEDRS2	0008	0004	0027
CWEDRS3	0010	0004	0033
CWEQAD1	0007	0004	0011
CWEQAD2	0011	0004	0029
CWEZIS1	0000	0006	0000
CWEZIS2	0000	0005	0000
CYAHNP1	0022	0006	0058
DLPBVS1	0000	0006	0007
DPCNEE1	0001	0004	0022
DPCNEE2	0000	0004	0011
DPCNEE3	0001	0005	0011
FPCCRP3	0000	0004	0026
FPLSL1	0001	0004	0000
FPLTPS3	0000	0004	0000
FPLTPS4	0004	0004	0000
GPCEIH1	0000	0000	0000
IMPDCC1	0367	0005	0003
IMPDCC2	0507	0004	0000
JCPOCP1	0000	0000	0000
MECTMI1	0254	0003	0008
MECTMI2	0327	0004	0002
MYAMYP1	0000	0004	0021
NMPNMP1	0000	0001	0016
NNEMNS1	0213	0004	0038
NNEMNS2	0500	0004	0146
NPPCPR1	0000	0000	0000
NSPMNP1	0006	0004	0058
NSPPIN1	0000	0004	0000
NSPPIN2	0000	0004	0000
OPPFCS1	0000	0000	0000

LISTING BY PLANT OF THE NUMBER
OF REPORTS ADDED DURING 1980

UTILITY	NPRD-2	NPRD-3	NPRD-4
-----	-----	-----	-----
PECPBS2	0000	0004	0006
PECPBS3	0000	0004	0005
PEGSGS1	0008	0007	0004
PGCTNP1	0000	0005	0000
PNYIPS3	0000	0004	0000
PNYJAF	0000	0000	0000
PNYJAF1	0000	0004	0000
RGEREG1	0000	0004	0000
SCESOS1	0000	0000	0000
SMURSS1	0002	0007	0000
TECDBS1	0004	0007	0098
TVABRF1	0000	0005	0000
TVABRF2	0000	0005	0000
TVABRF3	0000	0005	0000
VEPNAS1	0000	0001	0000
VEPSPS1	0000	0000	0000
VEPSPS2	0000	0000	0000
VYCVYS1	0012	0004	0030
WMPPBH1	0122	0004	0006
WMPPBH2	0022	0004	0003
WPSKNP1	0000	0004	0000

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