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Reliability Analysis of Containment Isolation Systems

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ABSTRACT

This report summarizes the results of the Reliability Analysis of Containment Isolation System Project. Work was performed in five basic areas: design review, operating experience review, related research review, generic analysis and plant specific analysis. Licensee Event Reports (LERs) and Integrated Leak Rate Test (ILRT) reports provided the major sources of containment performance information used in this study. Data extracted from LERs were assembled into a computer data base. Qualitative and quantitative information developed for containment performance under normal operating conditions and design basis accidents indicate that there is room for improvement. A rough estimate of overall containment unavailability for relatively small leaks which violate plant technical specifications is 0.3. An estimate of containment unavailability due to large leakage evets is in the range of 0.001 to 0.01. These estimates are dependent on several assumptions (particularly on event duration times) which are documented in the report.

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1.0 SUMMARY

Containment structures and their isolation systems are designed to reduce the radiological consequences and risk to the public from various postulated design basis accident conditions. In the context of probabilistic risk assessments, questions have been raised concerning the availability and reliability of containment isolation systems when they are called upon to function under various accident conditions. To assist in providing answers to these questions, the Containment Systems Branch of the U.S. Nuclear Regulatory Commission (NRC) contracted with the Pacific Northwest Laboratory (PNL) to perform the Reliability Analysis of Containment Isolation Systems Project (RACISP). The results of this study will be used by the NRC in the resolution of Generic Issue II.E.4.3, in evaluations of the consequences of potential containment leakage and in assessments of the adequacy of containment isolation system designs and leak detection programs. The results will also be useful in the NRC staff's severe accident evaluation program where quantitative specifications are needed for containment integrity at the onset of various postulated accident scenarios.

RACISP was initiated in July 1983. The primary sources of information used in conducting the study were Licensee Event Reports (LERs) and Containment Integrated Leak Rate Test (CILRT) reports. LERs from 1965 through 1984 were reviewed, and 1858 containment related failure events were identified. Data extracted from the LERs were assembled into a computer data base. In addition, available CILRT reports were reviewed and 109 reports documenting potential containment related failure were identified.

Table 1 summarizes the preliminary estimates of containment unavailability resulting from this study. Containment unavailability is defined as the probability that the containment will not perform its function successfully at any given time during plant life. The information contained in the LERs and CILRT reports was not always presented in sufficient detail to permit an accurate characterization of potential breaches of containment integrity. Consequently, the resulting estimates of containment unavailability have a substantial measure of uncertainty.

As seen from Table 1, a preliminary estimate obtained from the LER data base of containment unavailability due to large leakage events (holes in the containment liner or open containment isolation valves) is in the range of .001 to .01. Containment unavailability for relatively small leaks which violate plant technical specifications is estimated to be 0.3. The estimated containment unavailability from simultaneously opened airlocks is 5E-05. Estimates of containment unavailability as a function of leak area were obtained using CILRT data. For pressurized water reactors (PWRs) containment unavailability ranges from 0.05 for a leak area of 0.006 square inches to 0.075 for a leak area of 0.6 square inches. The total unavailability for PWRs is estimated to be 0.25. For boiling water reactors (BWRs) containment unavailability ranges from 0.161 for a leak area of 0.006 square inches to 0.036 for a leak area of 0.6 square inches. The total unavailability for BWRs is estimated to be 0.34. These results can be combined to obtain a preliminary estimate of light water reactor (LWR) containment unavailability of 0.29.

It should be noted that these results are often based upon incomplete and imprecise information and caution must be exercised in any use of the results. The estimates of containment unavailabilities and associated leak areas are dependent upon several assumptions which are documented in the report. Recommendations for obtaining additional data and performing more detailed containment system reliability analyses are provided.

TABLE 1. Summary Results for Containment Unavailability

	Containment Unavailability	Leak Area or Rate
LER Data Base		
Tech Spec Violations	0.3	1-10 x allowable leak rate[(a)]
Airlocks	5E-05	5000 sq inches
Large Leaks	0.001-0.01	28 sq inches
CILRT Data Base		
PWR	0.05	0.006 sq inches
	0.125	0.06 " "
	0.075	0.60 " "
	0.25 Total	
BWR	0.161	0.006 sq inches
	0.143	0.06 " "
	0.036	0.60 " "
	0.34 Total	
Overall LWR	0.29	

(a) Allowable leak rate is defined as the containment leak rate that will satisfy 10 CFR Part 100.

2.0 INTRODUCTION

Since the TMI Accident, questions have been raised by the Nuclear Regulatory Commission (NRC) staff, the public, and the nuclear industry concerning the reliability of containment isolation systems (CIS) if called upon to function in the event of an accident. In order to respond to such questions, certain information and operating data on containment performance must be developed to be used in evaluating the effectiveness of containment isolation systems.

In July 1983, the Pacific Northwest Laboratory (PNL) commenced a project in which available containment performance data was collected and consolidated. The overall objective was to use this data to perform reliability analyses of containment isolation systems. More specifically, the goal was to quantify the probability of pre-existing containment boundary leak areas.

The primary sources of information identified for use in generating the data base were Licensee Event Reports (LERs) and Containment Integrated Leak Rate Test (CILRT) reports. A computer data base of reported breaches of containment integrity was created. This data base can be updated as additional containment performance data becomes available. Sections 3, 4 and 5, and Appendices A and B of this report describe the data collected, how the data are stored in the computer data base, and how data can be retrieved from the data base. It should be noted that the information in the data base is not always in sufficient detail to permit an accurate characterization of a potential breach of containment integrity. This lack of detail is primarily due to the fact that reporting requirements were not originally developed with the present study objectives in mind.

Even though any use of the data developed may result in a substantial measure of uncertainty, Sections 6 and 7 demonstrate how the data can be used in estimating the reliability of containment isolation systems. Such estimates were made for different classes of plants as well as for specific plant types. Section 8 shows that additional data from LERs and CILRT reports will have only a small effect on the reliability estimates.

The implications of the results and the necessary qualifications and assumption that must be made in using the results are discussed in Section 9. There is no information presented in this report that pertains to containment behavior under severe accident conditions. Nevertheless, the results could possibly be used in ongoing severe accident evaluation programs to more accurately depict the status of containment integrity at the onset of a severe accident.

3.0 DESIGN REVIEW

As noted by Blejwas (1982), there are at least 11 different combinations of containments using different combinations of reinforced concrete, steel and tendons in a variety of geometric configurations. The use of such design options as ice condenser, subatmospheric, and inerted containments further increases the number of different containment types. A brief review of the different types of containment designs was performed as one of the initial steps of this project. A review of guidelines and standards related to CIS design and performance was also conducted. The basic objectives of this design review were to identify major differences in containment isolation system design; to develop potential groupings of containment types; and to develop information to assist in developing a data classification scheme for use in the subsequent operating experience review.

Seven containment types were selected as representative of the main types of CIS design. These include: large dry, ice condenser, dual, subatmospheric, Mark I, Mark II, and Mark III. Of these seven, FSARs were reviewed for the following plants:

Plant	Containment Type
Palisades (PWR)	Large Dry
Sequoyah 1 (PWR)	Ice Condenser
St. Lucie 2 (PWR)	Dual
Surry 1 (PWR)	Subatmospheric
Peach Bottom 2 (BWR)	Mark I

Available information on valve and penetration size, type, and normal, shutdown and accident status (e.g., open or closed) was cataloged. Information from this review was used to develop the LER data classification scheme outlined in Appendix B.

This design review indicated that similarities exist for the penetrations and valve designs for the containment types identified above. For example, they all contain large penetrations and valves such as equipment hatches, personnel air locks, and purge/vent valves. However, many differences are noted, particularly, between PWR and BWR designs.

The simplest grouping of containment design is a PWR category and a BWR category. This grouping may be useful for general reliability comparisons. More specific reliability comparisons and consideration of potential

improvements (e.g., continuous containment pressure monitoring system) would require more containment-type-specific and even plant-specific analyses. The Detailed Review and Analysis Task further investigates differences in performance of the different containment designs.

In support of this design review, applicable standards and guidelines related to CIS design and performance were identified and reviewed to provide background information for the operating experience review.

4.0 OPERATING EXPERIENCE REVIEW

This section summarizes the results of a review of operating experience with containment isolation systems. The prime sources of operating experience information were Licensee Event Reports (LERs). Additional information was gathered from NRC inspectors, containment leakage testing reports, and the technical literature. The Nuclear Safety Information Center (NSIC) data base was screened for failures of containment isolation valves and penetrations as recorded in the Licensee Event Reports. For a time period ongoing from April 1965 to May 1983, approximately 3000 entries that could be of potential interest were identified. LER abstracts were reviewed for these incidents and a classification scheme was developed using the results of the design review discussed in Section 3.0. Appendix B provides details on the classification system used and information contained in the data base. A summary and a detailed listing of the data base have been prepared and are available upon request from the NRC project manager. Section 4.1 discusses general findings from the LER reviews. Results from a survey of selected NRC inspectors and other experts are given in Section 4.2. Section 4.3 discusses the availability and potential uses of integrated leak rate test (ILRT) data.

4.1 TRENDS OBSERVED IN REVIEWING LER ABSTRACTS

Of the LER (and Abnormal Occurrence Report) abstracts reviewed for failures related to CISSs, approximately 2000 were found to be applicable, that is relating to failures to isolate and/or excessive leakage. Since some LERs describe multiple failure incidents, the total number of applicable CIS failure incidents extracted from these abstracts was approximately 3000. Thus, for every three LERs classified as CIS-related in the Nuclear Safety Information Center data base, one can expect two to address CIS failures-to-isolate and/or excessive leakage. However, although one of every three so classified LERs does not address these types of CIS failure, roughly a one-to-one correspondence exists between the number of LERs and the number of CIS failure incidents addressing isolation failure and/or excessive leakage.

4.1.1 Failure Trends for Isolation Valves

Valve failures accounted for approximately 70 percent of all applicable CIS failures. Leakage was observed to be the most frequent type of isolation valve failure in the LER Review. Most often, seat damage due to foreign material was the cause of the leakage. Seat corrosion, general seat wear, and packing leakage were other frequently observed failure causes. Failures of isolation valves to close were usually found to be caused by the following:

- o valve operator failure/problems
- o packings (generally too tight, thereby causing torque switches to kick out before full closure)
- o interruption of valve operator power/air supply

The valve operator problems accounted for approximately 40 percent of the failures to close, with air solenoids and Limitorque operators comprising the majority of these. In the case of air-operated solenoid valves, the solenoid failure was often caused by contaminated air. In several incidents, less clean service air was bled into the cleaner instrument air supply. Some solenoids have shown a tendency to stick due to baking of oil contained in the air supply. The Zion plants have been especially susceptible to these air-operated solenoid valve problems.

4.1.2 Failure Trends for Penetrations

Penetration failures accounted for approximately 30 percent of all CIS failures. Approximately 90 percent of the penetration failures in the LER Review were attributable to personnel air lock (PAL) problems. Primary failure causes were as follows:

- o leakage past door seal gaskets
- o leakage due to foreign material on seals
- o failures to close due to interlock mechanism failures or maladjustment

PAL failures accounted for the majority of failures to isolate (as opposed to excessive leakage).

4.1.3 Failure Trends in BWRs

Primary containment failure/problems for BWRs are most often related to valve failures-to-close or excessive leakage. Leakage past MSIVs was especially frequent (much more than in PWRs), often involving as many as 15 valves leaking in excess of technical specifications. MSIV failures to isolate were rarely reported.

Failures-to-close were most often attributable to valve operator problems, closing on foreign materials, and separation of the valve disk from the valve stem (a mechanical control parts failure). Other BWR valves experiencing problems include vacuum breaker valves, containment vent valves, and traversing in-core probe valves.

4.1.4 Failure Trends in PWRs

PAL leakage dominated the CIS failures in PWRs and accounted for approximately half of the LERs for PWRs. PAL seal problems were caused primarily by dirt, aging, and foreign material damage. Failures of one or both of the PAL doors to close and latch were also reported frequently. Often, one of the doors would not latch. When the operator opened the other door, the pressure differential would cause the unlatched door to swing open. This type of failure was almost always caused by problems with the interlock mechanism. However, many of the incidents involving simultaneous opening of PAL doors were attributed to "operator error." Also noteworthy is that PAL failures often occurred while the plant was at or near full power.

Remaining problems in PWRs involved valve leakage and/or failures to close. Excessive leakage through large purge isolation valves was another prevalent type of valve failure at the PWRs. Degradation of the valve seat because of the operating environment was often responsible for leakage.

4.1.5 Trends in Operator/Personnel-Induced Failures

Both BWRs and PWRs experienced CIS failures attributed to plant personnel. Personnel-induced failures occurred relatively uniformly at both plant types. Common incidents involved the following:

- o operators forgetting to close valves after testing or power transitions
- o maintenance personnel incorrectly wiring or installing valves
- o construction personnel damaging valves and penetrations during plant modifications or repairs

Incidents such as the above were often traceable to procedural deficiencies. Incidents were also reported where holes were drilled through containment and left unsealed until discovered during an ILRT. These failure were attributed to personnel error.

4.1.6 General Reporting\Trends in LERs

With reference to the information extracted from the LER abstracts for the LER Coding Form, the following data were found to usually be reported (>2/3 of the time):

- o component identifier
- o system (in which located)
- o failure mode and causes
- o discovery mode
- o corrective actions

The following data were sometimes reported (1/3-2/3 of the time):

- o component type, location (relative to containment), and manufacturer
- o related LERs

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- failure mode and causes
- discovery mode
- corrective actions

The following data were sometimes reported (1/3-2/3 of the time):

- component type, location (relative to containment), and manufacturer
- related LERs

The following data were usually not reported (1/3 of the time):

- failure duration
- whether or not containment was isolated
- leak rates

LER abstracts on valve leakage tended to provide the least information, primarily due to a tendency to address several leak rate test failures in a single LER.

As noted earlier, LER (and Abnormal Occurrence Report) abstracts from April 1965 through May 1983 were reviewed. From 1965 through mid-1977, the abstracts contained only general information about incidents. Little of the specific information sought for the LER Coding Forms was provided and no definite numbering system for the incident reports was evident. Event dates and reactor power levels were reported inconsistently. The event descriptions provided in the abstracts were general, providing little specific information such as leak rates and valve types, locations, sizes, and manufacturers.

From mid-1977 through 1981, the quality of the abstracts improved. More detailed incident descriptions were provided, and more of the specific information sought for the LER Coding Forms was found. However, some relapse in the reporting quality seems to have occurred with the most recent LER abstracts (1982-1983). Sufficient information was still provided to permit completion of most of the items on the LER Coding Forms; however, this information was less complete than that found in the mid-1977 through 1981 LER abstracts

4.1.7 Failures Resulting In High Leak Rates

In reviewing the LER data base several incidents were noted which had the potential for very high leakage rates. Since limited information was provided on leak rates or leak areas, a brief review was performed of failures involving valves and penetrations with a large leak potential. Three types of events are of interest: large penetration failures (e.g., airlocks); large valve failures (e.g., purge/vent valves); and direct breach of containment (e.g., drilled holes).

Many instances of failure of one airlock door or seal appear in the data base. A smaller number of failures of both doors or instances of leaving both doors open were noted. The following incident is a typical example:

Date	Reactor	Containment Type	Event	Leak Rate
12/18/78	Arkansas Nuclear 1	Large Dry	Emergency hatch outer and inner doors left open	Leak rate function of hatch area but corrective action taken in seconds

Although the potential leak area is large for these type of events, airlock or similar penetration failures may not be of major concern due to the short failure duration and a frequent testing interval. The large number of failures do indicate some design problems which should be investigated.

Failures of large valves have resulted in large leak rates. The data base contains a large number of single valve failures but failure of two valves is required for a large leak rate. Purge valves and vent valves are of interest because of their size and failure rates. Selected incidents are described below:

Date	Reactor	Containment Type	Event	Leak Rate
1973	Oconee 1	Large Dry	3 isolation valves open	No information
9/14/79	Palisades	Large Dry	2 containment exhaust 3 inch valves by-pass valves left open	

Based upon this cursory review, the occurrence of several valve failures with potentially large leak rates were identified. The LER data base describes the failure mechanism but gives little or no information on the leak rates. Section 4.3 discusses Integrated Leak Rate Test (ILRT) reports, another source of leak rate information.

A quick search of the data base revealed few events in which containment was directly penetrated by events such as inadvertent drilling. Two such instances have been documented (San Onofre 1 in 1977 and Surry 2 in 1980).

4.2 RESULTS OF SURVEY OF NRC INSPECTORS AND OTHER EXPERTS

Selected NRC Senior Inspectors for containment systems were contacted and asked to relate their experience with containment isolation system performance. In addition, American Nuclear Insurers was contacted regarding their reports of containment isolation system performance related work (Weinstein 1980).

4.2.1 NRC Inspectors

All the inspectors pointed out problems with leakage in BWR MSIVs and PWR large purge isolation valves. One inspector mentioned a problem with the testing conditions for MSIVs--whether to test them during "hot" or "cold" conditions. He favored hot testing since this more readily simulates potential accident conditions. Seat deformation was specified as the main cause of leakage during testing of PWR large purge isolation valves (butterfly type). One inspector indicated that, if the valve were left open for a few hours prior to its test, the seat would deform sufficiently so that, upon closure and immediate testing, excessive leakage would take place. Often, about an hour in the closed position would be required before the valve seat would return to its normal configuration and subsequently pass the leakage test.

All the inspectors mentioned that reported leakage rates often do not represent true leakage rates. Utilities are generally allowed to perform some minor repair on a valve prior to recording its "as-found" condition for a leakage test. Similarly, major repair (such as completely rebuilding a valve) is permitted prior to recording a valve's "as-left" condition at the end of its leakage test. One inspector indicated that Types B and C tests are performed before Type A, enabling repairs to be made so that the Type A test can be passed easily.

Each inspector had additional comments, the highlights of which are summarized below.

Inspector 1

Inspector 1 noted that PWR outboard isolation check valves, especially ones in the reactor coolant pump seal and letdown lines, have failed to pass leakage tests because of a weak spring that normally assists valve closure. Instrument penetrations which form an extension of the containment boundary sometimes become disrupted during maintenance activities. When returned to service, the leakage test may be ignored. Thus, the penetrations are calibrated only for normal operating rather than design basis pressures. When tested at design basis pressures, they fail. He pointed out that PWR fuel transfer tube drain valves are often not identified as isolation valves and are therefore left open during leakage testing, causing excessive leakage until closed. He also brought attention to a concern over the proper fluid medium for use during isolation valve leakage testing, i.e., whether the normal working fluid should be employed rather than exclusively testing with air.

Inspector 2

Inspector 2 listed some of the more common causes of isolation valve leakage: seating problems, dirt/debris, and packing problems. He also mentioned that valve designs and configurations sometimes make proper performance of Types B and C tests impossible. Valves may be tested in the "wrong" direction, i.e., opposite to the normal flow direction. However, this difficulty does not arise during the Type A test.

Inspector 3

Inspector 3 noted failures to pass Type C tests by BWR isolation check valves in the feedwater, reactor core isolation cooling, and high pressure coolant injection systems. He made a special point of stating that leakage tests are often performed too quickly after pressurization of the line. Readings are often taken before equilibrium conditions have been established. Test results can vary significantly depending upon the time of testing. He recommended spreading the readings out over at least one-half hour after pressurization.

Inspector 4

Inspector 4 stated that most problems encountered during Type A tests were due to human errors, primarily in failing to follow test procedures. He felt that these outweighed hardware-related problems that might be encountered.

Inspector 5

Inspector 5 mentioned that maintenance procedures on isolation valves are not always followed and that isolation valve and penetration inspections are sometimes performed at irregular intervals. San Onofre experienced a Type A test failure when its containment was breached by drilling during the test.

4.2.2 American Nuclear Insurers

In addition to the NRC inspector contacts, M. B. Weinstein of the American Nuclear Insurers was contacted regarding his containment related work reported in the technical literature (Weinstein 1980).

Weinstein indicated that, in screening events (from LERs and ILRT reports) for inclusion in a data base on containment integrity failures, he retained only those incidents where a definite leakage path was established through the containment. This approach was taken to minimize questions concerning whether or not certain failures constituted losses of containment integrity. Since his goal was to estimate an upper bound on the availability of containment integrity (a lower bound on the unavailability), this approach was reasonable. As a consequence of this limiting assumption, the following types of containment integrity "failures" were excluded from his data base:

- o failures of components where containment integrity was maintained by a functioning, redundant component
- o failures where a potential leak path could, but was highly unlikely to, exist. Included in this category were the following:
  - Isolation valve failures in liquid-filled systems
  - Isolation valve failures in systems pressurized above the containment design basis pressure
- o as a result of this assumption, isolation valve failures in engineered safety feature (ESF) systems, air supply systems, and BWR feedwater systems were disregarded.
- o Failures which occurred during outages and were corrected prior to restart. Such failures were deemed not to compromise containment integrity since the plant was not in a state where containment integrity was essential, so long as the breach was corrected prior to restart.

Weinstein noted numerous failures of check valves in BWR feedwater and ESF systems. However, he questioned whether such failures constituted a breach of containment integrity. The presence of pressurized water within the system should effectively prevent escape of radionuclides during a potential accident. Certain classes of large valves were of particular interest: purge valves, vent valves, and MSIVs. These often fail in pairs, enabling leakage to exceed the maximum value allowed by technical specifications.

Personnel air lock (PAL) failures (both doors simultaneously), though common, usually constitute only a small percentage of the total unavailability of containment integrity when compared to that attributable to failures of large valves. Although the potential leak area through a PAL is large, the duration of such failures is sufficiently short to amount to a small portion of the total unavailability.

Weinstein explained that approximately one-half of his estimates for failure durations were obtained from utility sources. He felt that utilities were a useful source of such information for major containment failures. However, they would be of little value for small failures, such as for certain individual valves. ILRT reports sometimes contain information on durations of larger failures and were a better source than LERs for such information.

The results of the RACISP can be compared with Weinstein's results (1980). Containment unavailabilities obtained in RACISP are typically higher due to several reasons: a lack of detail in the data base, the conservative assumptions made on the leak duration times and whether the reported failure events actually represented a direct leak path from containment. In addition RACISP performed a more detailed review of ILRT reports and defined ILRT failures more stringently. As discussed earlier in this section, Weinstein (1980) screened out several categories of events since his goal was to estimate an upper bound on the availability of containment integrity (lower bound on the unavailability). The RACISP did not perform this detailed screening and its results may be more representative of an upper bound on the unavailability.

4.3 POTENTIAL USES OF INTEGRATED LEAK RATE TEST (ILRT) DATA

A review of reports resulting from ILRTs conducted at eighteen nuclear power plants during the period 1973 through 1983 was undertaken to determine the potential of these type reports as sources of data for use in the detailed review and analysis task. ILRT reports for the following nuclear power plants were reviewed. The reactor and containment types and the year during which the ILRT was conducted are presented in parenthesis.

- Millstone 1 (BWR, Steel Mark-1, 1973)
- Prairie Island 1 (PWR, Steel Double, 1973)
- Arkansas Nuclear 1 (PWR, Prestressed Concrete, 1974)
- Brunswick 2 (BWR, Reinforced Concrete Mark-1, 1974)
- Calvert Cliffs 1 (PWR, Prestressed Concrete, 1974)
- Brunswick 1 (BWR, Reinforced Concrete Mark-1, 1976)
- Kewaunee (PWR, Steel Double, 1976)
- Donald C. Cook 1 (PWR, Reinforced Concrete Ice Condenser, 1978)
- McGuire 1 (PWR, Steel Ice Condenser, 1979)
- Donald C. Cook 2 (PWR, Reinforced Concrete Ice Condenser, 1981)
- Sequoyah 2 (PWR, Steel Ice Condenser, 1981)
- Surry 1 (PWR, Reinforced Concrete Subatmospheric, 1981)
- Surry 2 (PWR, Reinforced Concrete Subatmospheric, 1981)

- Calvert Cliffs 2 (PWR, Prestressed Concrete, 1982)
- Maine Yankee (PWR, Reinforced Concrete, 1982)
- St. Lucie 1 (PWR, Steel Double, 1983)
- Crystal River 3 (PWR, Reinforced Concrete, 1983)
- Fort Calhoun 1 (PWR, Reinforced Concrete, 1983)

The focus of these reviews was to develop an understanding of the type of information contained in the ILRT reports and ideas about how the information could be used in the process of evaluating containment performance under various accident conditions.

4.3.1 General Description of ILRT Data Relevant to RACISP

The purpose of ILRTs is to demonstrate that leakage through primary reactor containment and systems and components penetrating the primary containment is less than the allowable leakage rates specified in the plant's technical specifications. Demonstration of containment integrity is accomplished by performance of local leak rate tests and the integrated leak rate test of the primary containment.

Local leak rate tests are performed individually on components which seal or penetrate the primary containment (Type B tests) plus all primary containment isolation valves (Type C tests). The integrated primary containment leak rate test (Type A test) is performed by pressurizing the entire containment structure and measuring the overall integrated leakage rate.

Generally, the ILRT reports reviewed contained some information about results of the Type A, B and C tests; however, the degree of detail available varied considerably. Narrative summaries describing the conduct of the Type A tests (including descriptions of test equipment, instrumentation used and analytical techniques used to compute leakage rates), initial plant conditions, a chronology of events occurring during the test (including the discovery of leaks), analysis of the Type A test data and a statement about successful completion of the tests were generally included in all the reports reviewed. Detailed numerical data about the Type A test were generally included in the reports in various forms (i.e., tabular and/or graphically).

Data from the Type B and C tests varied considerably in the degree and form in which it was reported. The report resulting from an ILRT conducted at Maine Yankee in 1982 contained data from Type B and C tests conducted in 1980 and 1981. This data was presented in two tables making it easy to compare leakage rates found for given system or component during that two-year time period. A similar reporting format was used in the St. Lucie 1 ILRT Report. Other reports provided some data from previously conducted Type B and C tests but in less convenient formats, while others provided only limited data from tests conducted in conjunction with the ILRT being reported. In some reports the system or component tested was identified by title; while in other reports, system or component identification was by a code or number which would require referring to the plant FSAR for further specification.

Various other types of information such as system drawings, procedure change descriptions, test checklists, computer code descriptions, and measuring equipment calibration certifications were also included in the ILRT reports reviewed.

4.3.2 Information Available in ILRT Reports

Basically the information contained in ILRT reports that may be useful to RACISP appears to be the narrative descriptions of the Type A tests and the numerical data resulting from the Type A, B and C tests.

The narrative descriptions provide information concerning leaks that are discovered during pressurization of primary containment. Discovery of a leak during pressurization for the ILRT was reported in many of the reports reviewed. In every case pressurization was halted while the source of leakage was identified and either repaired or isolated. After repair or isolation, pressurization continued and the ILRT proceeded until it successfully concluded. In some cases the leakage rate and the leaking system or component are specifically identified in the narrative.

The numerical data resulting from the Type A, B and C tests described in the ILRT Reports can provide useful information on the overall condition of containment integrity. As indicated in Section 4.1 the LER data base contains little information on leak rates and duration times. Information from the over 300 ILRT reports which have been generated can supplement the LER data base and provide essential information on leakage areas. Several organizations have performed report reviews of ILRT reports. ORNL (Dougan 1984) reviewed selected ILRTs in support of the Appendix J revision. Quadrex (Rowley et al. 1983) reviewed a large amount of Type A tests to study testing time reduction. Stone and Webster (Frank et al. 1982) reviewed selected ILRTs and assisted in developing improved test procedures. However, none of these reviews have examined the ILRTs to extract leakage rate data. The results of a more detailed review of ILRTs are described in Section 8.0.

5.0 RELATED RESEARCH REVIEW

A search was conducted for information on current projects and documents from completed projects which were directly related to the RACISP. Brief descriptions of each of the projects were prepared. The projects were summarized under two headings: Current Projects and Completed Projects . Each project description includes, where available: project title, performing organization, project manager, objectives, major activities, and comments. Major pertinent documents already published in the project are included. In some cases an item represents only a published article or report as indicated.

The search identified eight current and 13 completed projects or studies, and 25 published documents. Of the current work being performed, the large scale effort involving three programs at Sandia National Laboratories (SNL) is the most significant. These include the Electrical Penetration Assemblies Program, the Integrity of Containment Penetrations under Severe Accident Loads, and the Containment Integrity Program. Prior to this effort, the Containment Systems Experiment performed by PNL was perhaps the most significant study of containment isolation to date. Overall, these projects, along with the other summarized in this report, indicate a shift in emphasis in containment-related research from studies of the potential for gross structural failures to studies of leakage rates, pathways, and human factors which influence the reliability of containment systems.

Some additional studies with particular relevance to RACISP include: the ORNL review of ILRT reports in support of the Appendix J revision (Dougan 1984); the Quadrex review of type A test results in support of ILRT testing time reduction (Rowley et al. 1983); the Stone and Webster review of selected ILRTs to assist in developing improved test procedures (Frank et al. 1982); and the Hanford Engineering Development Laboratory review of ILRT reports in support of Fast Flux Test Facility ILRT requirements (Irwin and Conrads 1984).

6.0 GENERIC ANALYSIS

The LER data base contains a large number of single valve and penetration failures but typically an additional failure of a redundant component is required for a large leakage rate to result. The data base also identifies incidents where containment integrity was directly breached. These are the types of incidents of primary interest to this project. These incidents can range from relatively minor violations of technical specification limits to large breaches in containment.

Two major areas are of interest in any reliability analysis: reliability and availability. Reliability is defined as the probability that a component will perform successfully for a given mission time. Availability is defined as the probability that a component will perform successfully at a given instant of time. Unreliability and unavailability are the complements of these terms (i.e., component will fail). Typically for on-line components reliability is the measure of interest while availability is used to describe the status of standby components. Unavailability is useful in describing containment isolation system failures and can be defined as the total duration of containment failure divided by the total time containment is required.

A possible approach for quantifying the unavailability of containment isolation systems is to estimate the failure duration of the complete set of incidents which result in a direct breach of containment along with their leakage rates or leak areas. The failure duration can be divided by the total reactor years represented by the data base (approximately 740 reactor years for the period of the data base covering the time period from April 1965 to May 1983). Several problems were encountered in implementing this approach. As noted in earlier sections of this report, the LER data base is based upon LER abstracts which often provide only partial information on the failure events. In particular, the leak rate and the leak duration were seldom given. The complete LER with accompanying letter or contact with the specific utility involved in preparing the report may be required to obtain the necessary detailed information. An additional problem is the incompleteness of the LER data base in including the results of ILRT tests. Several ILRT failure incidents have been documented. Information on these failures is often not included in the LER data base and when they are, minimal details are provided.

Recognizing the above problems, a simple analysis of containment unavailability was performed using the LER data base. Two classes of events were examined: those that were known to violate plant technical specification on leak rates and those that were known to result in large leaks.

6.1 TECHNICAL SPECIFICATION VIOLATIONS

The LER data base contains 1838 reported events. Valve failure (valve fails to close or is improperly opened) or leakage accounts for 1414 reported events while penetration failure or leakage accounts for 424 events. A majority of the events reported involve the failure of one component while a redundant

component is still functional. These events represent a violation of the plant technical specifications but do not necessarily result in a direct leak path from containment.

Valve and penetration leakage data were examined to obtain an estimate of the unavailability of containment. A majority of events involving leaking valves or penetrations were identified in type B and C local leak rate tests. A total of 534 events were identified which violated the technical specifications on leakage for valves and penetrations other than airlocks. A total of 302 events were identified which violated technical specifications on airlocks. Again, these violations of technical specifications do not necessarily result in a direct leak path from containment. They include such events as one valve leaking above a specified upper limit with an intacct redundant valve in series so that an actual leak path from containment did not exist, and one airlock door leaking but backed up by a leaktight second door.

The events described above were reviewed to develop a subset of events more realistically representing actual leak paths from containment. Many events were identified which violated the Type B and C technical specifications for "as found" leakage (greater than 60 percent of allowable leakage, L_a). Some judgment in reviewing the LER abstracts was necessary but approximately 40 percent, or 215 of the reported valve leakage events appeared to fit this category. Type B and C tests for valves and penetrations other than airlocks are typically performed at least every two years. Conservatively assuming a one-year failure duration for these types of events and 740 reactor years, an estimated unavailability of containment is 0.3 for leakage from valves and penetrations. These technical specification violations are assumed to result in a leak rate from one to ten times the allowable limit.

6.2 LARGE LEAKAGE EVENTS

The LER data base was reviewed to identify events which result in large direct breaches of containment. As discussed in Section 4.1.7, these failures involve valves and penetrations with a large leak potential. Three types of events were identified: large penetration failures (e.g., airlocks); large valve failures (e.g., purge/vent valves); and direct breach of containment (e.g., drilling holes).

Of the 302 events identified for airlocks, 75 events involved both doors of an airlock being simultaneously opened. These events result in a large leak area but have a very short duration time. The duration times reported range from seconds to a few hours. Conservatively assuming a 4-hour event duration for these types of events and 740 reactor years, the estimated unavailability for containment is 5.0E-05 for leakage from simultaneously opened airlock doors. The doors of typical airlock are assumed to represent an area of approximately 5000 square inches.

In reviewing the data base, four events were identified to be of interest in estimating large leakage potential:

Reactor	Year	Event
Oconee 1	1973	Isolation Valves Open
San Onofre 1	1977	Holes in Containment
Palisades	1979	By-pass Valves Open
Surry 1	1980	Holes in Containment

These events all involved a direct breach of containment resulting from a procedural breakdown/operator error. Their frequency is believed to be typical of large leakage events. Using 740 reactor years, a frequency of 5E-03 per year is obtained. The LER data base contains no information on event duration. Based on engineering judgment, an average event duration of one year is assumed. This results in an unavailability of 5E-03. This estimate is very preliminary and a range of .01 to .001 for the unavailability of containment from large leakage events is suggested as a preliminary estimate. The actual leak area/rate for these events ranged from small drilled holes to an open six inch valve. A leak area equivalent to a six inch open penetration is assumed to obtain a conservative estimate.

7.0 PLANT SPECIFIC ANALYSIS

The information presented in Section 6.0 ignored potential differences due to reactor type and containment type. In this section a reference BWR and a reference PWR are examined and a simple reliability analyses of selected containment isolation system components are performed. Applicable methods are discussed and data needs are identified.

7.1 ANALYSIS APPROACH

If sufficient containment isolation systems failure experience exists for the plant of interest, reliability estimates can be made directly. An approach similar to that described in Section 6.0 could be applied to a specific plant. However, such detailed data is seldom available and predictive modeling must be used to develop estimates.

A plant specific containment reliability analysis consists of the following steps:

1. Obtain system description information.
2. Bound the problem.
3. Prepare logic models (e.g., fault trees) or directly identify containment leak paths.
4. Obtain failure rate data, failure detection data, and leak area data.
5. Calculate unavailability and associated leak area for containment leak paths.
6. Develop distributions of unavailability versus leak area.

A key factor in this analysis is the type and quality of available data. A containment system design consists of various mechanical and electrical components for which general failure data is available (e.g., WASH-1400 data base). The LER data base provides information on the number failures of various containment components over a set time period. To be useful in a reliability assessment, this information must be converted to operating and demand failure rates. To perform this conversion the number of valves and penetrations for each reactor in the data base is required along with information on the testing frequency. This involves a substantial effort and work in this area was not performed in this project. The utility of a more detailed LER data base versus the cost to develop such a data base needs o be examined.

In addition to failure rate data, associated leak area estimates are required for a containment reliability analysis. As discussed in earlier sections, the LER data base provides minimal leak area information. A spectrum of leak areas exist

for containment components. For example, a valve will leak a small amount at a relatively high probability and will fail completely at a much smaller probability. This spectrum of failures problem is one of the more difficult encountered in safety/reliability analysis and no simple solution has been developed. The analyst typically has to resort to engineering judgment.

The following sections provide simple examples of a reliability analysis for two reference plants: Peach Bottom 2 and St. Lucie 2.

7.2 PEACH BOTTOM-2 EXAMPLE

Peach Bottom 2 is a BWR with a Mark I containment. Primary containment consists of a drywell and a pressure-suppression chamber connected by vent tubes. The primary containment is inerted with nitrogen to maintain the oxygen level to less than 4 percent and is surrounded by a secondary containment building. As this example will show, the inerting system offers some plant-specific capability for detecting pre-existing leaks.

Two areas are of interest when examining the response of containment isolation systems to design basis accidents: 1) the potential for pre-existing leaks; 2) failure at the time of the accident or shortly thereafter (including failure to isolate). This project is focused on containment leakage and not gross structural failure. Also, degradation due to severe accident conditions was not considered.

Appendix C presents a partial listing of the penetrations and valves for Peach Bottom 2. Key valves include: steam line, drywell purge, suppression chamber purge, and suppression chamber vacuum breaker. Major penetrations include: drywell head, drywell head access, equipment access latch, and personnel access hatch. A rigorous reliability analysis would examine these and other valves and penetrations to estimate the potential for pre-existing leak and its corresponding size.

For purposes of this example, a failure of the drywell head and a failure of the suppression chamber vacuum breaker valves were examined. The drywell head is a 32-foot diameter cover with a double gasket seal. The suppression chamber vacuum breaker system consists of two 20-inch lines with two valves in series. Both valves are located outside of primary containment. One valve is air operated and is opened when a differential pressure switch de-energizes a dc solenoid valve to release air from the air operator. This valve fails open upon loss of air supply and may be opened from the control room. The other valve in each line is a self-operating vacuum breaker similar to a simple check valve.

The Reactor Safety Study (NRC 1975) gives a failure rate for double gaskets of 3E-09 per hour. Assuming gasket failure results in a leak area 1/16 inch times the circumference of the gasket, a leak area of 75 square inches is estimated. The reference BWR has an inerted containment which allows for detection of unacceptable leaks. A three-day detection and correction time is assumed resulting in an unavailability of 2E-07 for a 75 square inch leak area for this event.

The Reactor Safety Study (NRC 1975) gives a failure rate of large piping of 1E-10 per hour. Assuming this represents a complete break, a leak area of 300 square inches is estimated. Similarly to above a three-day detection and correction time is assumed. An unavailability of 7.2E-09 is estimated for a 300 square inch leak area. Using valve failure rate data in the Reactor Safety Study, an unavailability estimate of two valves failing open or remaining open is 1.3E-07. This estimate assumes a six-month detection and correction time for each component. Using this six-month value, a failure rate for two valves remaining open of 3E-11 per hour is obtained. Again assuming a three-day detection time for two valve failures, an unavailability of 2.2E-09 is estimated for a leak area of 300 square inches.

A detailed reliability analysis would examine each major penetration and valve and obtain estimates of the unavailability and leak area similar to the above analysis. In addition to pre-existing leaks, the failure of containment isolation components at the time of the accident or shortly thereafter are of interest. The Reactor Safety Study (NRC 1975) used Peach Bottom 2 as a reference plant and obtained a value of 3.1E-04 for a leak area of 1 to 13 square inches (a common mode contribution of 5E-03 was identified in the study but was conservatively calculated and significant for large LOCA only) and a value of 1.7E-04 for a leak area greater than 28 square inches. These values are substantially larger than those presented above. As an upper bound comparison, the large leak frequency developed in Section 6.0 (5E-03 per year) is applied to the reference BWR. Again a three-day detection and correction time is used. This results in an estimated unavailability 4.1E-05 for large leaks. Based upon the leak detection capabilities of BWRs with inerted containments, the impact from large pre-existing leaks on BWRs should not be of major concern assuming proper action is taken to identify and correct them.

7.3 ST. LUCIE-2 EXAMPLE

St. Lucie 2 is a PWR with dual containment. Primary containment is a steel containment vessel. This vessel is surrounded by a reinforced concrete shield building and the two structures are separated by an annular space.

Appendix C presents a partial listing of the penetrations and valves for St. Lucie 2. Key valves include: containment purge, hydrogen purge, and containment vacuum relief. Major penetrations include personnel access airlocks, the equipment access hatch, piping and duct penetration sleeves and electrical penetration sleeves. A rigorous reliability analysis would examine these and other valves and penetrations to estimate the potential for pre-existing leak and its corresponding size.

For purposes of this example, a failure of the equipment access hatch and a failure of the containment vacuum relief system were selected. These systems roughly correspond with those selected for Peach Bottom 2. The equipment access hatch is a 28-foot diameter plate with a double gasket seal. The containment vacuum consists of a 24-inch line with two valves in series. A check valve is inside containment and a butterfly valve outside the containment.

The Reactor Safety Study (NRC 1975) gives a failure rate for double gaskets of 3E-09 per hour. Assuming gasket failure results in a leak area of 1/16 inch times the circumference of the gasket, a leak area of 66 square inches is estimated. Unlike Peach Bottom 2, St. Lucie 2 does not have any continuous leakage detection capability. A one-year detection and correction time is assumed based upon Type B leak testing at 2-year intervals and limited use of the hatch. An unavailability of 2.6E-05 for a 66 square inch leak area is estimated.

Since the inner valve is located inside containment, failure of the piping in the vacuum relief systems is not of major interest. Using valve failure rate data in the Reactor Safety Study and a six-month detection and correction time, an unavailability estimate of 1.3E-07 was calculated for two valves failing or remaining open. No common mode effects were considered. Thus an unavailability of 1.3E-07 for a 450 square inch leak area is estimated.

A detailed reliability analysis would examine each major penetration and valve and obtain estimates of the unavailability and leak area similar to the above analysis. In addition to pre-existing leaks, the failures of containment isolation systems components at the time of the accident or shortly thereafter are of interest. The Reactor Safety Study (NRC 1975) analysis of the Surry plant (PWR, subatmospheric) resulted in a value of 8.6E-04 for a leak area greater than 13 square inches. A more recent study (Carlson 1981) of Sequoyah (PWR, ice condenser) obtained a value of 1.2E-04. These values are assumed to bound those of St. Lucie 1. These values are somewhat larger than those presented above. As an upper bound comparison, these values should be compared with the unavailability of containment due to large leaks of 5E-03 (see Section 6.0). This comparison indicates that pre-existing leaks should be more carefully examined for PWRs similar to St. Lucie which have no continuous or short-term leak detection capabilities.

8.0 COLLECTION AND REVIEW OF ADDITIONAL DATA

The Collection and Review of Additional Data Task updated the LER data base to May 1984 and repeated the generic analysis presented in Section 6.0. The generic analysis was expanded to include a more detailed review of ILRT reports. The results of Type A, Type B and Type C tests were used to obtain a preliminary estimate of containment unavailability.

8.1 ADDITIONAL LER DATA

Following the approach outlined in Section 6.1, valve and penetration leakage data were examined to obtain an estimate of the unavailability of containment. The total reactor years for the period of the LER data base (April 1965 to May 1984) is approximately 815 (473 PWR and 342 BWR). A total of 232 leakage events were identified to be of interest. An estimated containment unavailability of 0.3 is obtained and is the same as the previous estimate.

The updated LER data base identified 86 simultaneously opened airlock events. Conservatively assuming a 4-hour event duration time for these types of events and 815 reactor years, the estimated unavailability of containment is 5.0E-05. This is the same as the previous estimate.

A review of the updated LER data base identified no additional events involving large valve failures or direct breaches of containment. Using the four events described in Section 6.2 and 815 reactor years, an unavailability of 5E-03 is obtained. This is the same as the previous estimate.

The above results indicate that the unavailability estimates for technical specification violations and large leakages are not sensitive to one more year of additional data. It does not appear necessary to update the data base annually and a two or three year interval may be appropriate.

8.2 REVIEW OF ILRT REPORTS

Integrated Leak Rate Test (ILRT) reports provide a data base of potential use in the RACISP. A recent study by the Hanford Engineering Development Laboratory (Irwin and Conrads 1984) was used to obtain information on integrated leak rate test (ILRT) failures. This report provides data on the majority of ILRT tests conducted to date for the U.S. LWR industry. Actual and potential ILRT failures are documented and where available estimates of the leakage rate is given. A total of 231 ILRTs were reviewed to identify specific instances in which a containment failed to meet the required integrity as found during the ILRT. An ILRT was considered a failed test under the following conditions: evidence of structural deterioration; an identified leak path is isolated to meet the test acceptance criteria; the containment boundary is altered so that the ILRT is affected; the test sequence is aborted to repair identified leak paths; and test conditions change which result in underpredicting the leak rate. Of the 231 ILRTs, 69 were preoperational ILRTs which serve to identify design and construction failures and are not of direct interest to RACISP.

The Reliability Analysis of Containment Systems Project is primarily interested in identified leak paths which were isolated and/or repaired. Sixty ILRT failures were identified to be of direct value in estimating containment unavailability (see Table 2). Of these sixty ILRT failures, 35 were for BWRs and 25 were for PWRs. Failures of pre-operational ILRTs, ILRTs which failed due to ILRT instrumentation problems, and ILRTs which failed due to leaks into PWR secondary systems were not considered. The 231 ILRT reports reviewed represent a total operating period of 571 years from the pre-operational ILRT to the most recent ILRT for the reactors considered. PWRs represent 329 years and BWRs represent 242 years. Assuming a typical three year test interval for an ILRT and an average failure duration of one-half of this period, the estimated unvailability of containment is 0.16 for LWRs. PWR unavailability is 0.11 and BWR unavailability is 0.22.

The ILRT data base contains limited information of the leakage rates associated with the above containment unavailabilities. Leakage rate data is provided for 29 of the 60 ILRT failures. This data is typically given in terms of percent per day or a factor of allowable leakage. The isentropic flow model was used to obtain estimated leak areas for the ILRT data. Table 3 provides the details of the model used. Table 4 gives the available leakage rate data and the calculated leak areas. The calculated leak areas ranged from approximately 0.007 square inches to 0.65 square inches. The fraction of ILRT failures falling into subsets of this range was calculated for PWRs and BWRs. It was assumed that the range of leak rates reported also applied to ILRT tests where no leak rate information was provided. The results of this analysis are summarized below:

PWR Containment Unavailability vs. Leak Area

Unavailability	Leak Area, sq. inches
0.022	0.006
0.055	0.06
0.033	0.60
0.11 total	

BWR Containment Unavailability vs. Leak Area

Unavailability	Leak Area, sq. inches
0.104	0.006
0.093	0.06
0.023	0.60
0.22 total	

The above results indicate that although BWRs have a higher containment unvailability, the failures are associated with a smaller leak area than PWRs. On an expected leak area basis (unavailability times leak area) failures with the larger leak areas dominate the results. The expected leak area of a PWR is higher than that of a BWR.

TABLE 2. ILRT Failures of Interest

Reactor Name	Type	Test No.	Reactor Name	Type	Test No.
Beaver Valley-1	PWR	1	Oconee-1	PWR	1
Beaver Valley-1	PWR	2	Oconee-2	PWR	2
Big Rock Point	BWR	7	Oconee-3	PWR	1
Browns Ferry-1	BWR	1	Oyster Creek	BWR	1
Browns Ferry-2	BWR	2	Oyster Creek	BWR	3
Brunswick-2	BWR	1	Oyster Creek	BWR	4
Brunswick-2	BWR	2	Oyster Creek	BWR	5
Cal.Cliffs-1	PWR	1	Oyster Creek	BWR	6
Cook-1	PWR	2	Palisades	PWR	1
Dresden-1	BWR	1	Palisades	PWR	2
Dresden-1	BWR	6	Peach Bottom-2	BWR	1
Dresden-1	BWR	7	Peach Bottom-3	BWR	1
Dresden-3	BWR	2	Peach Bottom-3	BWR	2
Duane Arnold	BWR	1	Pilgrim-1	BWR	3
Fitzpatrick	BWR	1	Pilgrim-1	BWR	4
Fort Calhoun	PWR	2	Quad Cities-1	BWR	2
Ginna	PWR	2	Rancho Seco	PWR	1
Hatch-1	BWR	1	Robinson-2	PWR	2
Indian Point-1*	PWR	1	San Onofre-1	PWR	1
Indian Point-3	PWR	1	San Onofre-1	PWR	4
LaCrosse	BWR	1	Surry-2	PWR	1
LaCrosse	BWR	2	Surry-2	PWR	2
LaCrosse	BWR	6	Surry-2	PWR	3
LaCrosse	BWR	7	Three Mile Island-1	PWR	1
Millstone-1	BWR	2	Three Mile Island-1	PWR	2
Millstone-1	BWR	3	Turkey Point-4	PWR	1
Monticello	BWR	2	Turkey Point-4	PWR	2
Monticello	BWR	3	Vermont Yankee	BWR	1
Nine Mile Point-1	BWR	3	Vermont Yankee	BWR	2
Nine Mile Point-1	BWR	4			

* Note two failed ILRTs reported so count twice

TABLE 3. Leak Rate/Leak Area Calculation Method

Use isentropic flow model. Assume choked flow and properties of air:

$$A = 1.88 \frac{\dot{m}\sqrt{T}}{P} \qquad (1)$$

where:

A = area, sq. ft.
$\dot{m}$ = flow rate, lb_m per second
T = temperature, °R
P = pressure, lb_f

The flow rate can be written in terms of the weight percent leakage per day and the weight of air in containment:

$$\dot{m} = (1.16E\text{-}07)Lm$$

where:

$\dot{m}$ = flow rate, lb_m per sec.
L = leakage, wt. percent per day
m = weight of air, lb_m

Assuming an air temperature of 530°R and the ideal gas law:

$$PV = mRT \qquad (3)$$

where:

P = pressure, lb_f
m = weight of air, lb_m
R = gas constant for air = 53.3 ft-lb_f per lb_m °R
T = temperature = 530°R

Combining equations (1), (2), and (3) and converting area to square inches, results in Equation (4).

$$A = (2.55E\text{-}8)LV \qquad (4)$$

where:

A = leak area, sq. in.
L = leakage, wt. percent per day
V = containment volume, cubic ft.

TABLE 4. ILRT Leak Area Data

Reactor Name	Type	Containment Volume ft.3	Leakage wt. % per day	Area sq. in.
Brunswick-2	BWR	2.9E+05	1.25	0.0092
Brunswick-2	BWR	2.9E+05	6.4	0.047
Dresden-1	BWR	2.9E+06	8.8	0.65
Dresden-1	BWR	2.9E+06	2.3	0.17
Dresden-3	BWR	2.9E+05	7.5	0.056
Fitzpatrick	BWR	2.9E+05	0.545	0.0040
Hatch-1	BWR	2.6E+05	1.44	0.0095
Indian Point-1	PWR	1.8E+06	0.323	0.015
Indian Point-3	PWR	2.6E+06	2.2	0.15
LaCrosse	BWR	2.6E+05	0.6	0.0040
LaCrosse	BWR	2.6E+05	0.11	0.0007
LaCrosse	BWR	2.6E+05	0.62	0.0041
LaCrosse	BWR	2.6E+05	0.26	0.0017
Monticello	BWR	2.6E+05	3.0	0.020
Monticello	BWR	2.6E+05	1.9	0.013
Nine Mile Point-1	BWR	3.04E+05	2.4	0.019
Oyster Creek	BWR	3.0E+05	9.0	0.069
Oyster Creek	BWR	3.0E+05	1.5	0.012
Oyster Creek	BWR	3.0E+05	2.3	0.018
Palisades	PWR	1.6E+06	15.1	0.62
Peach Bottom-3	BWR	2.8E+05	0.7	0.0050
Quad Cities-1	BWR	2.8E+05	1.2	0.0086
Rancho Seco	PWR	2E+06	8.0	0.41
San Onofre-1	PWR	4.6E+05	0.8	0.0094
San Onofre-1	PWR	4.6E+05	1.6	0.019
Surry-2	PWR	1.8E+06	0.3	0.014
Surry-2	PWR	1.8E+06	1.0	0.046
Surry-2	PWR	1.8E+06	0.15	0.0069
Three Mile Island-1	PWR	2E+06	0.2	0.010

Range .0007 --> .065 sq. Inhes

29 Data Points	Area Range[a]	Total	BWR	PWR
19 BWR	0.001 --> 0.01	11 points	9	2
10 PWR	0.01 --> 0.1	13 points	8	5
	0.1 --> 1.0	5 points	2	3
		29	19	10

(a) Use mid-range values for area estimmates

The above analysis is very preliminary and based upon rather sketchy data. Several major assumptions were necessary. The assumption of the failure duration is probably conservative but may be offset by using limited leak rate data. Also it should be remembered that Type B and C tests are typically performed before an ILRT. This implies that the leak rates noted in an ILRT are smaller than the actual case. An additional review of "as found" leakages from Type B and Type C tests was performed as discussed below.

To improve upon the above results, 136 ILRT reports were obtained and reviewed to examine Type B and Type C test results. A total of 49 ILRT reports were identified for which the Type A test did not fail but with the consideration of type B and C "as found" leakage would be classified as a failure. Of these 49 reports, 29 were for PWRs and 20 were for BWRs.

To simplify the analysis these 49 failures are added directly to the results presented above. Thus a total of 109 ILRT failures are identified. Of these failures, 55 were for BWRs and 54 were for PWRs. Using the same assumptions as before, the estimated unavailability of containment is 0.29 for LWRs. PWR unavailability of containment is 0.25 and BWR unavailability is 0.34. Containment unavailability versus leak area estimates are obtained using the same assumptions as before. The results of this analysis are summarized below:

PWR Containment Unavailability vs. Leak Area

Unavailability	Leak Area, sq. inches
0.05	0.006
0.125	0.06
0.075	0.60
0.25 total	

BWR Containment Unavailability vs. Leak Area

Unavailability	Leak Area, sq. inches
0.161	0.006
0.143	0.06
0.036	0.60
0.34	

9.0 CONCLUSIONS AND RECOMMENDATIONS

This report has summarized the results of the Reliability Analysis of Containment Isolation System Project. Qualitative and quantitative information developed for containment isolation system performance under normal operating conditions and design basis accidents indicate that there is room for improvement in containment performance. Table 1 presents some summary results. A rough estimate for overall containment unavailability for relatively small leaks which violate plant technical specifications is 0.3. An estimate of containment unavailability due to large leakage events ranges from .001 to 0.01. These estimates are dependent on several assumptions (particularly on event duration times) which are documented in this report.

Example plant specific reliability analyses indicate that containment design details are important and a wide range of containment unavailability versus leak area estimates can result. Only selected containment penetrations and valves were examined. The BWR plant had an estimated unavailability of approximately two orders of magnitude lower than that of the PWR for similar penetrations and valves. The principal difference is due to the leak detection capabilities of the inerted BWR containment. In comparing pre-existing leak unavailabilities with estimates of containment component failures at the time of an accident (e.g. failure to isolate), one notes that the values calculated for the BWR for pre-existing leaks are much lower. Large pre-existing leak areas in inerted BWRs may not be of much concern assuming proper action is taken to identify and correct them. A more complete analysis of pre-existing containment breaches in PWRs is recommended. Based on the simple comparisons in this report, the potential for pre-existing leaks should be more carefully examined for PWRs which have no continuous or short term leak detection capabilities.

This study identified several areas where improved or additional data is required to perform containment reliability analyses. The LER data base contains little information on leak areas/rates and duration times. As discussed in the report, another potential source of information are the ILRT reports. ILRTs were reviewed to obtain additional information on containment failures and the data to quantify them. The estimated unavailability of containment is 0.29 for LWRs. BWRs have a larger unavailability than PWRs but the failures are associated with a smaller leak area.

The LER data base was used in this report to support the generic analysis. As discussed in the main text, this data base can be used to generate operating and demand failure rates for containment isolation components. A rigorous analysis of this data requires substantial cost and time. Component failure data are available from other data bases and were used in the preliminary analyses given in Section 7.0. Based upon time and cost constraints, we recommend that the LER data base be examined for information on key containment components and that a rigorous analysis of all the information reported not be performed. Such key components include large purge and vent valves, airlocks and equipment hatches for which existing data bases provide little specific information. Section 6.2 presents a preliminary analysis of airlock failures.

The results of this study can be compared with those of Weinstein (1980). Containment unavailabilities obtained in RACISP are typically larger for several reasons. Due to a lack of detail in the data base, conservative assumptions were made on the leak duration times and whether the reported failure events actually represent a direct leak path from containment. In addition, RACISP performed a more detailed review of ILRT reports and defined ILRT failures more stringently. Weinstein (1980) screened out several categories of events since his goal was to estimate an upper bound on the availability of containment (lower bound on the unavailability). The RACISP did not perform this detailed screening. Recognizing the preliminary nature of the results, the estimates reported in this study may be more representative of an upper bound on containment unavailability.

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APPENDIX A

USER MANUAL AND LISTING FOR LER COMPUTER DATA BASE PROGRAM

APPENDIX A

USER MANUAL AND LISTING FOR LER COMPUTER DATA BASE PROGRAM

This appendix contains the user manual and a listing for an interactive computer program to search, edit and generate reports from the containment isolation system LER data base. This computer program utilizes the dBase III data base management software package. Appendix B provides additional details on the structure of the LER data base.

TABLE OF CONTENTS

SYSTEM REQUIREMENTS

IBM Personal Computer, XT, or compatible with at least 256K Bytes of Memory.

DOS version 2.0 or higher.

One floppy disk drive and a hard disk drive. (Software will run with two floppy disk drives, but since only about 100 records can be accessed this way, we do not recommend trying to use the software with two floppy drives and no hard disk.)

A printer with at least 80 column capacity.

dBASE III database management software package.

A color monitor is not required, but the program is designed to use color to make operation easier.

INTRODUCTION

This reporting system is designed so that you can find out what is in the Containment Isolation System LER (Licensee Event Report) database, whether you know anything about dBASE III or not. There are, however, a few basic ideas you need to understand first. One database we're all familiar with is the telephone directory. Let's look at a sample line from an imaginary phone book:

Jones Sally K 43 Uptown Pike Notown.....234-5678

This line is one RECORD in the database. Since you know how phone books are organized, you know that Jones is the last name of a person, Sally is her first name, K her middle initial, 43 Uptown Pike is her street address, Notown is the city where she lives, and her telephone number is 234-5678. Each one of these pieces of information is called a FIELD. If you used dBASE III to set up a telephone directory (which you could), the RECORDS you'd see as you entered the information would look something like this:

```
LNAME :Jones      :
FNAME :Sally      :
INITIAL :K:
ADDRESS :43 Uptown Pike      :
CITY :Notown      :
PHONE :234-5678:
```

Each line is a FIELD and in order for dBASE III to file and retrieve the information, we've had to give each field a name; LNAME, FNAME, INITIAL, etc. dBASE III will let us use up to 10 characters for each field name, but no spaces, so we sometimes have to abbreviate the name of the type of information that a field will hold.

The advantage of having information in a computer database is the ease with which we can retrieve or analyze it. For instance, suppose you were Sally Jones and actually had a directory database for all the people in Notown. You could find out very quickly the names and telephone numbers of all the people who live on Uptown Pike. If there were a lot of them, you could find out who lives on Uptown Pike between street number 1 and street number 100, or for that matter, just who lives across the street and next door. If you got a lot of wrong numbers, you could find out who has phone numbers almost like yours (try doing that with your phone book!).

The database you're about to use has 29 FIELDs in each RECORD. Of those fields, we have selected 14 FIELDs that we were able to get good information for to be used in normal use. Starting on the next page is a glossary which explains the contents of each of the 14 fields and the codes, if any, needed to interpret the information. In the reference section of this manual, there is a list of the remaining fields and descriptions of the information they are intended to contain.

14 FIELD GLOSSARY FOR LER DATABASE

Field Name — Definition

DATABNUM Unique four-digit number assigned to each record by PNL. Think of it is as a serial number.

LERNUM Number assigned to the Licensee Event Report (LER) by the NRC. The first two digits are the year of the LER.

TYPEMAIN V indicates a valve failure, P a penetration failure

TYPESUB1
For a valve:

A = electric motor operated (AC)
B = electric motor operated (DC)
C = hydraulic operated
D = pneumatic diaphragm/cylinder operated
E = solenoid operated (AC)
F = solenoid operated (DC)
G = float operated
H = explosive squib operated
J = mechanically operated
K = electric motor operated (unspecified)
L = solenoid operated (unspecified)
M = manually operated
N = remotely operated
P = damper
Q = vacuum breaker
R = relief or safety
S = check
X = other

TYPESUB1
For a penetration:

A = personal access
B = fuel handling
C = equipment access
D = electrical
E = instrument line
F = process piping
G = access (unspecified)
X = other

REACNAME

CODE ½	CIS CLASS ½	REACTOR NAME ½ ½
AR1,2	1	Ark Nuc. One 1,2
BF1-3	5	Browns Ferry 1-3
BP1	8	Big Rock Point
BR1,2	5	Brunswick 1,2
BV1	2	Beaver Valley 1
CC1,2	1	Calvert Clf 1,2
CO1	5	Cooper Station
CR3	1	Crystal River 3
DA1	5	Duane Arnold
DB1	3	Davis-Besse
DC1,2	4	D.C. Cook 1,2
DO1,2	1	Diablo Canyon 1,2
DR1	8	Dresden 1
DR2,3	5	Dresden 2,3
EF2	5	Enrico Fermi 2
EN1,2	5	E.I. Hatch 1,2
FC1	1	Fort Calhoun
FP1	5	J.A. Fitzpatrick
FV1	8	Fort St. Vrain
GG1	7	Grand Gulf 1
HB3	1	Humboldt Bay 3
HN1	1	Haddam Neck
IP2,3	1	Indian Point 2,3
JF1,2	1	J.M. Farley 1,2
KE1	3	Kewaunee
LB1	8	LaCrosse BWR
LS1,2	6	LaSalle 1,2
MG1,2	4	McGuire 1,2
MI1	5	Millstone 1
MI2	1	Millstone 2
MO1	5	Monticello
MY1	1	Maine Yankee
NA1,2	2	North Anna 1,2
NM1	5	Nine Mile Pt. 1
OC1	5	Oyster Creek 1
OE1-3	1	Oconee 1-3
PA1	1	Palisades
PB2,3	5	Peach Bottom 2,3
PI1	5	Pilgrim 1
PR1,2	3	Prairie Is. 1,2
PT1,2	1	Point Beach 1,2
PV1	1	Palo Verde 1
QC1,2	5	Quad Cities 1,2
RG1	1	R.E. Ginna
RO2	1	H.B. Robinson 2
RS1	1	Rancho Seco
SA1,2	1	Salem 1,2
SE1,2	4	Sequoyah 1,2
SL1,2	3	St. Lucie 1,2
SM1	6	Shoreham
SO1	8	San Onofre 1
SO2,3	1	San Onofre 2,3
SS1,2	6	Susquehanna 1,2
SU1,2	2	Surry 1,2
TI1,2	1	Three Mi. Is. 1,2
TR1	1	Trojan
TU3,4	1	Turkey Point 3,4
VS1	1	V.C. Summer
VY1	5	Vermont Yankee
WF3	3	Waterford 3
WP2	6	WNP 2
YR1	8	Yankee Rowe
ZI1,2	1	Zion 1,2

Newer reactors continued on next page...

Field Name
REACNAME, cont'd

BL1,2	Bellefonte 1,2	CL1	Clinton 1	SH1	Shearon Harris
BW1,2	Braidwood 1,2	CP1,2	Commanche Pk 1,2	ST1,2	S. Texas Proj 1,2
BY1,2	Byron 1,2	HC1	Hope Creek 1	VG1,2	Vogtle 1,2
CW1,2	Callaway 1,2	LM1,2	Limerick 1,2	WB1,2	Watts Bar 1,2
CA1,2	Catawba 1,2	PY1,2	Perry 1,2	WC1	Wolf Creek
CT1,2	Carroll County 1,2	RB1	River Bend 1	ZM1	Zimmer 1

REACTYPE One of the following: B = BWR
H = HTGR (Fort St. Vrain)
P = PWR

CISCLASS Class of Containment Isolation System (CIS)

Class 1. PWR - Large Dry Containment
Class 2. PWR - Subatmospheric Containment
Class 3. PWR - Dual (Double) Containment
Class 4. PWR - Ice Condenser Containment
Class 5. BWR - Mark I Containment
Class 6. BWR - Mark II Containment
Class 7. BWR - Mark III Containment
Class 8. Other CIS

SYSPRIMA Primary system involved in failure.
Designations are different for PWR's and BWR's.

List of SYSPRIMA codes for PWR's

01 = reactor coolant
02 = main steam
03 = high pressure injection/recirc.
04 = low pressure injection/recirc.
05 = instrument air
06 = service air
07 = air (unspecified)
08 = service water
09 = residual heat removal
10 = containment HVAC
11 = containment pressure
12 = integrated leak rate test
13 = fire protection
14 = containment atmosphere
15 = component cooling water
16 = radwaste
17 = containment waste gas
18 = main feedwater
19 = auxiliary feedwater
20 = pressurizer
21 = safety injection
22 = demineralized water
23 = containment sump
24 = steam generator
25 = containment large - volume purge
26 = containment small - volume purge
27 = containment hydrogen purge
28 = containment purge (unspecified)
29 = nitrogen supply
30 = containment spray
31 = chemical volume control
32 = refueling canal
33 = containment instrumentation (elec.)
99 = other

Field Name
SYSPRIMA

List of SYSPRIMA codes for BWR's

01 = reactor coolant
02 = main steam
03 = high pressure injection/recirc.
04 = low pressure injection/recirc.
05 = instrument air
06 = service air
07 = air (unspecified)
08 = service water
09 = residual heat removal
10 = containment HVAC
11 = drywell pressure
12 = integrated leak rate test
13 = fire protection
14 = drywell atmosphere
15 = component cooling water
16 = radwaste
17 = drywell waste gas
18 = main feedwater
19 = auxiliary feedwater
20 = reactor core isolation cooling
21 = standby liquid control
22 = reactor cleanup
23 = drywell purge
24 = drywell vent
25 = drywell equipment sump
26 = drywell floor sump
27 = drywell sump (unspecified)
28 = control rod drive
29 = core spray
30 = vessel head spray
31 = containment cooling
32 = traversing incore probe
33 = torus (wetwell) vent
34 = vacuum relief
35 = drywell instrumentation (elec.)
36 = torus (wetwell) inst. (elec.)
99 = other

NUMFAILS — Number of failures reported in the LER, 1 unless specified

DATE — Date of failure event in six-digit code, e.g., 830812 = August 12, 1983.

MODE — One of the following failure modes:
A = leakage (fail to seal)
B = fail to close
C = unplanned opening (fail to remain closed)

Failure mode B also refers to failures in which the component does not close within a reasonable time limit, thereby constituting a potential failure to isolate containment.

Field Name

CAUSEPRI Primary failure cause, one of the following:

00 = unknown
01 = personnel (operation)
02 = personnel (maintenance)
03 = personnel (testing)
04 = design error
05 = fabrication/construction/QC
06 = procedural discrepancy
07 = normal wear
08 = excessive wear
09 = corrosion
10 = foreign material contamination
11 = excessive vibration
12 = mechanical control/parts; failed or out of adjustment
13 = seal/gasket fail/prob.
14 = packing fail/prob.
15 = bellows/boot fail/prob.
16 = electrical input fail/prob. (electrical power interrupt)
17 = bearing/bushing fail/prob.
18 = weld failure
19 = lack of lubrication
20 = electric motor operator fail/prob.
21 = electric solenoid fail/prob.
22 = leaking/ruptured diaphragm
23 = torque switch fail/prob.
24 = failure of component supply system (air supply interrupt)
25 = seat/disc fail/prob.
26 = limit switch fail/prob.
27 = pilot valve fail/prob.
28 = air solenoid fail/prob.
29 = solenoid (unspecified) fail/prob.
30 = operator (unspecified) fail/prob.
31 = penetration sealant fail/prob.
32 = personnel (construction)
33 = rupture

ISOLATED Despite the failure, did containment remain isolated? Yes/No

COMMENTS Summary and/or additional information.

GETTING STARTED

There are some fairly complicated steps to go through to install the database and reporting program on your computer. These instructions assume that your computer has been configured for the program and that the program has been configured for your computer. If the program doesn't work as this manual says it will, call the person listed at the end of the manual for technical assistance.

If the computer is off when you sit down to work, slide the master boot disk into drive A, close the disk drive door, and turn the computer on. Enter the date and time when and if you are asked. If the computer is already on and the A> prompt is showing on the screen, check to make sure that the time and date are set correctly. Just type 'date' and enter; if the date is incorrect, enter the right one, otherwise, just enter again and type 'time' and do the same thing. The program will work even if you don't do this, but if the date and time are always set, you can go back to a file later and see when it was created or last modified. Especially in database work, it can be very valuable to tell which is the latest version of a file or be able to go back weeks or months later and reconstruct what was done on a particular day.

Once you have the A> prompt, put the dBASE III disk marked 'RACISP Reporting' in drive A and type 'RACISP' and enter. That will activate a customized instruction program which will tell you how to proceed.

The rest of the job is easy, because there are explanatory messages on the screen and all you have to do in most places is choose items from a menu. We have done our best to make this manual unnecessary.

Below is the first message you will see on the screen. The numbers in parentheses are the page numbers in this manual to turn to for more explanation.

Welcome to the reporting system for the Containment Isolation System (CIS) LER database. This database contains information extracted from LER's related to CIS. If you are unfamiliar with the database, you should start by reading the glossary which explains the contents of the database. If you elect to continue, you will have opportunities to look at the glossary when you are called on to enter field names. Numbers in parentheses refer to page numbers in the user's manual.

G	Look at glossary of field names.	(9)
C	Columnar lists of selected fields on screen or printed.	(10,13)
D	Display entire record(s) on screen.	(10)
L	List all or selected records on printer.	(10)
S	Search the database, make onscreen or printed reports.	(16)
E	Edit record(s) on screen.	(20)
P	Purge unwanted searches from disk.	(24)
R	Reset program defaults.	(25)
X	Exit back to dBASE III.	

"Enter your choice"

ACCESSING THE ON-LINE GLOSSARY

If you enter 'G', you will get the first screen of the online glossary.

SCREEN 0

DATABNUM Unique four-digit number assigned to each record by PNL. Think of it is as a serial number.

LERNUM Number assigned to the Licensee Event Report (LER) by the NRC. The first two digits are the year of the LER.

TYPEMAIN V indicates a valve failure, P a penetration failure

TYPESUB1
For a valve:
A = electric motor operated (AC)
B = electric motor operated (DC)
C = hydraulic operated
D = pneumatic diaphragm/cylinder operated
E = solenoid operated (AC)
F = solenoid operated (DC)
G = float operated
H = explosive squib operated
J = mechanically operated
K = electric motor operated (unspecified)
L = solenoid operated (unspecified)
M = manually operated
N = remotely operated
P = damper
Q = vacuum breaker
R = relief or safety
S = check
X = other

TYPESUB1
For a penetration:
A = personal access
B = fuel handling
C = equipment access
D = electrical
E = instrument line
F = process piping
G = access (unspecified)
X = other

Screen Number (0-4); N - Next Screen; X - Exit

Simply enter the key for the option you want at the bottom of the screen. It is your choice whether to use the on-line glossary or to refer to the one printed in this manual. You might want to make a copy of the one in the manual for planning or interpreting searches while you're not on the computer.

SIMPLE SEARCHES

When you enter any of the options for simple searches, you will first get a message asking whether you sant to work with the whole database or only selected records.

Unless you just want to look at records for a while or are intending to make a printed listing of one or more FIELDS for the whole database, you should choose the 'S', or Selected option. Even if you choose the 'All' option, you can terminate the process by entering 'X' on a display screen or pressing Esc if the printer is trying to print the whole database and you don't want it to. (If you do press Esc while the printer is running, it probably won't stop immediately, and may go on for quite a while since many printers have a buffer that stores data to be printed so the computer can be doing other things.)

When you choose the 'S' option, this is what you'll see.

```
   List of database FIELDS with field widths shown
1  DATABNUM 4    4  TYPESUB1 1    7  CISCLASS 1   10  DATE      8   13 ISOLATED 1
2  LERNUM   6    5  REACNAME 3    8  SYSPRIMA 2   11  MODE      1   14 COMMENTS 240
3  TYPEMAIN 1    6  REACTYPE 1    9  NUMFAILS 2   12  CAUSEPRI  2

Would you like to look at a glossary of FIELD names? : :
```

This is your opportunity to refresh your memory of the field definitions before you set the conditions for the search. It is optional. If you answer 'N' or when you exit from the glossary subroutine, this is what you'll see:

```
   List of database FIELDS with field widths shown
1  DATABNUM 4    4  TYPESUB1 1    7  CISCLASS 1   10  DATE      8   13 ISOLATED 1
2  LERNUM   6    5  REACNAME 3    8  SYSPRIMA 2   11  MODE      1   14 COMMENTS 240
3  TYPEMAIN 1    6  REACTYPE 1    9  NUMFAILS 2   12  CAUSEPRI  2

   List of possible RELATIONS (up to three can be chosen for one search)
=   equal to                  Relations apply to letters as well as numbers
<   less than                 The search string you enter will be matched with
>   greater than              The same number of characters from the beginning
<=  less than or equal to     of the field data, for example data BR1 would
>=  greater than or equal to  satisfy the relation = B, also >= A, < C, <> BR2
<>  not equal to
                    This relation will search the whole field for the string
HAS                 you specify.  i.e. abcdefghij HAS def.  If you enter in
                    ALL CAPS, case will be ignored.  i.e. abcdefghi HAS FGH.

FIELD NUMBER:  : RELATION :   : VALUE :                    :  :AND:
FIELD NUMBER:  : RELATION :   : VALUE :                    :  :AND:
FIELD NUMBER:  : RELATION :   : VALUE :                    :  :AND:
```

For less than three conditions, just <RETURN> without entering anything
Note: you can change the AND's connecting the conditions to OR's or NOT's

All you have to do to select the conditions you want to search for is fill in the blanks. You don't have to type the field names, just the numbers next to them in the field list at the top of the screen. If you make a typing error and you don't notice it until you've gone on to the next blank, just use the backspace key to get back to the error and type over it.

For RELATION, you can choose any one of the seven listed on the screen. For character data, the relations are evaluated alphabetically, i.e. A < B, R <= U, Y <> N, HPCI < HPSI, etc.

The HAS relation is a shorthand way for you to use dBASE III's substring search feature. The field whose number you enter will be searched from beginning to end for the characters you enter after VALUE. A special feature allows you to find all occurrances of a word or other character string whether it was capitalized when entered into the database or not. Any values you enter in ALL CAPS will cause the program to ignore the case of any characters in the field.

For instance, if you specified that you wanted to see all records where the COMMENTS HAS OPERATOR, you would find the records with operator, Operator, or OPERATOR (or any non-standard way of capitalizing). If, on the other hand, you specified COMMENTS HAS Operator, you would only find the occurances where the first letter is capitalized and the rest are lower case.

Notice that among the other pieces of information is the width of each field. This is a reminder so you won't enter too many characters. In the case of the SYSPRIMA, CAUSEPRI, and some other fields not included in the basic 14, the codes are numbers, but these numbers are entered as string values. What this means is that if the code you are looking for is '03', you will not find a match by entering just a '3'. Instead you would find all the values between '30' and '39'. Except in the case of the HAS relation, the first character you enter will be compared with the first character in the field, the second with the second, etc.

If you want less than three conditions, just press the return key, leaving the blanks empty until you have exited the last one. Then wait; if you're searching the whole database, the search will take some time, probably more than enough for some sips of coffee, but not enough to go make a phone call.

What you'll see next depends on what you're doing. If you're using Option C, you'll get messages asking you to make choices about the content and formatting of your output. For more instructions on option C see page (13).

If you're using option D, you'll get a message asking you to wait followed by the time and date and some information about the number of hits the search found and an opportunity to print that information out on the printer. After that, you'll see the first record in the database which satisfies your conditions. The menu at the bottom of the page will give you your options on viewing the rest. A sample record is shown below:

```
Identification Information for Record #          1
  Database Number: 0401  LER Number: 82-008

Component Information
  Type: Pneumatic diaphragm/cylinder operated Valve
  Reactor Name: Ark Nuc. One 1   Reactor Type: PWR
  CIS Class 1:   PWR - Large Dry Containment
  Primary System involved: 10, Containment HVAC

Failure Information:
  Date: 820329      Number of Failures  1
  Failure Mode: Mode B, Failure to close within a reasonable time,
    constituting a potential failure to isolate containment.
  Primary Cause of Failure: 24, failure of component supply system (air supply i
nterrupt)
  Containment was isolated

Comments: Containment cooler isolation valve fails to close.  Valve CV-6202 wou
  ld not close due to air relay problem.


N - Next, P - Previous, F - First, L - Last, S - Specify #, X - eXit : :
```

If you're using option L, you'll have an opportunity to type in a line of notes to be printed as part of the first page heading and after a minute your printer will start the listing, three records to a page. If you're printing very many records, it could take quite a while.

If you decide it's just too much to print, you can push the Esc key and the printer will stop (maybe not right away). dBASE III will ask you if you want to end the program and you'll want to enter 'y' if you really do want to quit. As soon as you get back the . on the left edge of the screen, you can type in DO REPORT if you want to get back into the program. No data will be lost by doing this and any temporary search files you might have created up to that point will be intact.

REPORT FORMATTING WITH OPTION 'C'

If you've entered Option C on a simple search, you'll first be given an opportunity to select conditions for the records you want to see as explained above in SIMPLE SEARCHES. Below is the massage:

Do you want to list all the records in the database or would you like to list only selected records? A - All S - Selected : :

If you choose 'S', you'll see

List of database FIELDS with field widths shown

1	DATABNUM	4	4	TYPESUB1	1	7	CISCLASS	1	10	DATE	8	13	ISOLATED 1
2	LERNUM	6	5	REACNAME	3	8	SYSPRIMA	2	11	MODE	1	14	COMMENTS 240
3	TYPEMAIN	1	6	REACTYPE	1	9	NUMFAILS	2	12	CAUSEPRI	2		

Would you like to look at a glossary of FIELD names? : :

If you choose 'Y', you'll go into the On-Line Glossary. If you choose 'N', or after you exti the glossary, you'll see:

This subroutine allows you to print or display columns of data from the database. There are three preset formats which you can choose or you can easily create your own combination of fields to list.

1 - Format 1, All 14 fields.

2 - Format 2, DATABNUM, LERNUM, REACNAME, TYPEMAIN, TYPESUB1, SYSPRIMA, CAUSEPRI, MODE, & ISOLATED.

3 - Format 3, Just Print or Display number of Hits and Failures along with Selection Parameters. (Note: you'll be returned to this menu)

C - Custom Report format.

X - Exit back to previous menu.

Your Choice : :

If you choose the custom report format, you'll see:

Most computer screens will display 80 characters on one line. Computer printers, by using 12, 15 or more characters to the inch or wide paper, can often print many more characters per line. Please enter right margin you want to use (left margin is 4). If you start any new columns after the 75th, you will not be able to customize headings.

Right margin to use :80 :

If 80 is OK just press enter. Next, you'll get the field name listing:

```
   List of database FIELDS with field widths shown
1  DATABNUM 4    4  TYPESUB1 1    7  CISCLASS 1   10  DATE      8   13 ISOLATED 1
2  LERNUM   6    5  REACNAME 3    8  SYSPRIMA 2   11  MODE      1   14 COMMENTS 240
3  TYPEMAIN 1    6  REACTYPE 1    9  NUMFAILS 2   12  CAUSEPRI  2

Would you like to look at a glossary of FIELD names? : :
```

As you can see, we're not about to let you miss any chance you might want to look at the glossary. After you say 'N' or exit, you'll see:

```
This subroutine lets you make custom formats for onscreen or printed reports.
In this subprogram, just enter the numbers of the fields you want to see and
enter a blank for the last one (unless you get the 'Page Full' message first).
If COMMENTS is one of the fields you want, please enter the number for it last,
since it will use up any remaining page width.


              Width of remaining space on page  : 80:
Number of FIELD for Column # 01 <RETURN> to end :  :
```

As soon as you enter a number for the first field you want reported, you'll see a new number for the width of the remaining space on the page and a chance to enter another field number. If you enter the number for the COMMENTS field, that will be the last field and at the bottom of the screen you'll see:

```
Enter A to see All of COMMENTS, T to truncate to one line : :
```

If you choose 'T', you'll only get the number of characters from COMMENTS which will fit on the remainder of the line. Normally, this will be enough. Next, you'll have an opportunity to customize your column headings:

```
Here are your standard column headings

 DATABNUM LERNUM REACNAME TYPEMAIN TYPESUB1 COMMENTS  (for example)

Are these headings OK?, if not, you can enter new ones.
Y - Headings are OK   N - Not OK, Make make new ones : :
```

This shows an example of the headings the program will choose for your report assuming you decide to list the fields shown in that order. The program has two different sets of headings; if you choose only a few fields, the headings will be just the field names. If there isn't room for them, the program has some narrower headings it will give you.

If you choose to customize your headings, you'll see a message like this:

The space shown for your heading is the widest space you can use without making the report too wide to fit on the page. The underlined part of the area shows the field width. Any spaces you use beyond the underline are subtracted from the extra space that will be available for the next column's heading, so use the extra space judiciously.

```
Field Number  1          Field Width
  DATABNUM                    4

:DATABNUM                     :
:____                         :
:____                         :
```

The cursor will be at the first letter of the 'canned' heading. If you want to change the heading, just type over what is displayed. Notice that your heading can take up to three lines, but if you only type on one or two lines, the resulting blank lines will not show in the report.

If you want to keep the 'canned' heading for a field, just press return three times and the program will display the 'canned' heading for the next field unless it was the last field.

Once you have finished customizing your headings, you'll get a message asking you whether you want printed output or just screen output. If you choose printed output, you'll also have the opportunity to type in a line of notes to appear on the first page heading. You can choose a screen report and later choose to print it or vice versa. When the screen listing or printer listing is complete you'll be given an opportunity to rerun the report on either the screen or the printer.

PROGRESSIVE SEARCHES

The progressive search feature allows you to interactively select groups of RECORDs by a large number of conditions. For instance, suppose you wanted to get information relating to a particular reactor subsystem, let's say the high pressure safety injection system on PWRs. To find those records, you would specify SYSPRIMA = 03 AND REACTYPE = P. However, you might find that this search would yield too many 'hits' to study easily and you might want to further subcategorize. If you did a simple search, you'd have to start over and you could add only one more condition. But if you made that search the first of a series of progressive searches, you could try different things to narrow the search to a more manageable (or more pertinent) selection of records. For instance, maybe what you're really interested in is only those PWR's with large dry containment and only those LER's filed before 1981. You could easily make that a subsearch of your first search and see how many records you find. You might find that there are still too many, or you might find very few or no records at all. Too many records still would suggest another subsearch while too few or no records would indicate you need to back up and broaden you categories a little. The point is that the progressive search feature lets you adapt your search as you go.

Now, let's see how it works. If you enter 'S', the next message you get will be the following:

This part of the program displays a catalog of the searches of the database which have been performed up to now. The searches are organized into Series. Each Series begins with a search of the whole database. Subsequent searches search only the records picked out by the search listed immediately above them. Up to 99 different Series are possible (assuming your disk has that much room) and each series can have up to 99 searches in it. If you want a report on one of the searches you see listed in the catalog, simply enter its series number and search number. You may also choose any of the listed searches as a place to start your own series of inquiries. If you choose a search before the end of the series and make additional searches from it, you will erase subsearches previously made. To CANCEL further appearances of this message, enter 'C'. If don't want to search the database now, enter 'X'. Press any other key to just continue. : :

If you are using the program for the first time, or if all previous searches have been erased, you will not get any catalog listing, but will go directly to the menu which lets you choose parameters for the first search. If you do get a catalog, first you will get a message asking you if you want to print it out on the printer. After you choose that, the next thing you'll see on screen will be a display something like this:

```
#  HITS #FL  SELECTION PARAMETERS                                    SERIES 01
01   45   52  ISOLATED = N AND COMMENTS HAS BUILDING AND REACTYPE = B

#  HITS #FL  SELECTION PARAMETERS                                    SERIES 02
01 950 1023  REACTYPE = P AND CAUSEPRI <> 05 AND CAUSEPRI<> 31
02 542  559  DATE > 82

#  HITS #FL  SELECTION PARAMETERS                                    SERIES 03
01 128  145  CAUSEPRI = 01 AND MODE = A AND ISOLATED = N
02  13   13  REACNAME = BR



Enter number of series you want to use or continue. :  :
To start a new search of the whole database, enter a new number
You can enter 'X' now if you don't want to continue
```

If you want a series less than 10, the use of the leading zero is optional. Entering '02' is just the same as entering '2' or ' 2'. As soon as you enter a series number and press the enter key, the message at the bottom of the screen will be replaced by:

```
Enter number of the search you want to use or continue. :  :
If you continue from any but the last one, each continuation
will erase one previous subsearch.
```

The number under the heading '#' is number of the search. The series number appears near the right hand edge of the screen.

The number under the heading 'HITS' is the number of records the search found.

The number under the heading '#FL' is the number of failures the search found. Some LER's report on multiple failures, indicated in the database field NUMFAILS. This number, which is the sum of NUMFAILS for the records the search found, should always be greater than or equal to the number of HITS.

Under the heading 'SELECTION PARAMETERS', is an expression of the conditions a record had to satisfy to be found by the search. Each selection parameter can have up to three conditions. Each condition consists of a FIELD name, a REALTION, and a VALUE. If the information in the named FIELD of a RECORD satisfies the RELATION to the VALUE, that RECORD will be found by the search. We've already discussed FIELD names, and the rest is simple. Let's look at some examples:

ISOLATED = N AND COMMENTS HAS BUILDING AND REACTYPE = B

Translation:

ISOLATED = N
The field ISOLATED has an N as its first character;

AND COMMENTS HAS BUILDING
AND the character string BUILDING appears somewhere in the COMMENTS field;

(When all the letters in the VALUE , which is BUILDING here, are uppercase, the search will find any occurrance of the word building, whether any letters are capitalized or not.)

AND REACTYPE = B
AND the field REACTYPE has B as its first character.

Notice that these conditions are cumulative, as indicated by the AND's. All three conditions must be met for a record to be found. Other combinations are also possible, as in the example below:

COMMENTS HAS isolated OR ISOLATED = N

Translation:

COMMENTS HAS isolated
The word 'isolated' appears somewhere in the COMMENTS FIELD. Note that this will not accept 'Isolated' or 'ISOLATED' because it is not entered in uppercase.

OR ISOLATED = N

Or the first character of the FIELD named ISOLATED is 'N'.

Since the two conditions are joined by an OR, records which satisfy either condition will be found.

Once you have entered the numbers of a series and a search, different things can happen, depending on whether you picked a pre-existing search to report on or search from. If you picked a new search, the next step is the same as choosing the conditions for a simple search, covered on page 10. After you've completed selecting the conditions you want, or if you've selected an existing search, you'll get a screen like the example shown below (possibly after a message telling you that a temporary file is being created). Notice that the current file is highlighted, but previous conditions are shown, too.

```
                    SERIES 01
#  HITS  #FL  SELECTION PARAMETERS"
01 950  1023  REACTYPE = P AND CAUSEPRI <> 05 AND CAUSEPRI<> 31
02 542   559  DATE > 82

                    REPORT OPTIONS

     A - CHANGE Selection Parameters or use a different Search.    (20)
     L - LOOK at Entire Records on Screen, one at a time.         (12)
     P - PRINT Entire Records in Input Format.                    (12)
     C - COLUMNS of Selected Data Fields On Screen or to Print.   (13)
         Or only listing of selection parameters & vital statistics
     R - RESET Program defaults.                                  (25)
     X - EXIT To 1st Menu in Report program.

      Your Choice? : :
```

Numbers in parentheses refer to page numbers in the user's manual.

Most of these options are identical to the Options presented on the first menu. Options C and R haven't changed and Option P is the same as Option L on the first menu. Option L is the same as Option D was on the first menu and Option X is self explanatory. Only Option A is new, so let's look at how it works. When you choose Option A, the next message you see is:

```
                    OPTIONS

A - Save the search you're currently working with and use it as the basis
    for a new one with different selection parameters.

B - Replace the current search with one that has different selection
    parameters.

C - Save your current search and look at the list of searches available on
    the disk with the option to choose one of them or start a new search.
          (Note: your current search will be on the list)

        Your Choice : :
```

Any one of these options leads back to screens we've already covered.

When you enter 'E' to edit the database, the first message you will get will be:

WARNING, This command will alter the database ENTER PASSWORD : :

This is to prevent any casual or absentminded users from changing the information in the database. Naturally, you will keep a backup copy of the database and PNL will have a backup copy too, but unauthorized modifications to the database without your knowledge could yield erroneous reports when you access the database. If you really want to edit the database, the password to use is 'ADEPT'. Simply type it in and you will enter the database editing program and see the message below.

```
E - Edit any record in the database          (explanation below)
S - Select certain records to edit           (21)
A - Add new records to the database          (23)
    Your Choice : :
```

Choosing option E will bring up the first record in the format shown in the example below.

```
Identification Information for Record #          1
  Database Number: :0401:
  LER #:82-008:

Component Information
  Valve/Penetration :V:
 Type               :D:
  CIS Class         :1:
  Reactor Name      :AR1:
  Reactor Type      :P:
  Primary System    :10:

Failure Information
  Date              :820329  :
  Failure Mode      :B:
  Primary Cause     :24:
  # of Failures     : 1:
  Containment Isol? :Y:
Comments :Containment cooler isolation valve fails to close.  Valve CV-6202 woul
         d not close due to air relay problem.

                                              :
To skip to end of record, type CTRL-C  or PgDn
```

The cursor will be under the first character in Database Number. To make

changes, just type over the data which is there. If record # 1 is not one of the records you want to edit, press CTRL-C or PgDn and you'll get the option line:

N Next, P Previous, F First, L Last, S Specify #, D Delete, X - eXit : :

Unless you know the record numbers of the records you want and can reach them with the S option, it could prove very time consuming to find the records you want to edit. Note that the number you specify with Option S is not the contents of the field DATABNUM, but the dBASE III record number, which can change if the database if sorted or updated.

If you want to use DATABNUM to find the records you want to edit, choose the S Option from the opening edit menu shown on the previous page.

Option S for Editing Selected Records

After choosing the S Option from the opening Edit Menu, the next message you'll see is:

```
   List of database FIELDS with field WIDTHS shown
1  DATABNUM 4    4  TYPESUB1 1    7  CISCLASS 1   10  DATE      8    13  ISOLATED 1
2  LERNUM   6    5  REACNAME 3    8  SYSPRIMA 2   11  MODE      1    14  COMMENTS 240
3  TYPEMAIN 1    6  REACTYPE 1    9  NUMFAILS 2   12  CAUSEPRI  2
```

Would you like to look at a glossary of FIELD names? : :

After you enter 'N' or exit the glossary, th following will be added:

```
List of possible RELATIONS
=    equal to                    Relations apply to letters as well as numbers
<    less than                   The search string you enter will be matched with
>    greater than                The same number of characters from the beginning
<=   less than or equal to       of the field data, for example data BR1 would
>=   greater than or equal to    satisfy the relation = B, also >= A, < C, <> BR2
<>   not equal to
                      This relation will search the whole field for the string
HAS                   you specify.  i.e. abcdefghij HAS def.  If you enter in
                      ALL CAPS, case will be ignored.  i.e. abcdefghi HAS FGH.


FIELD NUMBER :  : RELATION :   :  VALUE :                          : :AND:
FIELD NUMBER :  : RELATION :   :  VALUE :                          : :AND:
FIELD NUMBER :  : RELATION :   :  VALUE :                          :
```

For less than three conditions, just <RETURN> without entering anything

---

This works exactly the same way as the simple search, detailed on page (10).

One thing to stress, however is what to do if you're editing specific records which you have the value of DATABNUM for. You will enter '1' for FIELD NUMBER, '=' for RELATION, and the value(s) you want for VALUE, remembering to include any leading zeros ('401' is not the same as '0401' here). If you're looking for more than one specific record, you must change the ANDs linking the conditions to ORs. Simply type over the ANDs when the cursor goes to them.

Next, you'll get a message like the one below:

```
02/21/85  09:58:45
REACNAME = A
HITS=  99   TOTAL NUMFAILS=    99

Do you want this information printed on the printer? : :
```

After you've chosen whether to print or not, you'll see:

```
Press X to Exit back to previous menu or any other key to continue : :
```

Assuming you've decided to continue, you will next see the first record which satisfies your conditions in the format like the sample below:

```
Identification Information for Record #          1
  Database Number: :0401:
  LER #:82-008:

Component Information
  Valve/Penetration :V:
 Type               :D:
  CIS Class         :1:
  Reactor Name      :AR1:
  Reactor Type      :P:
  Primary System    :10:

Failure Information
  Date              :820329  :
  Failure Mode      :B:
  Primary Cause     :24:
  # of Failures     : 1:
  Containment Isol? :Y:
Comments :Containment cooler isolation valve fails to close.  Valve CV-6202 woul
         d not close due to air relay problem.

                                                :
To skip to end of record, type CTRL-C  or PgDn
```

After you've typed or down arrowed through the whole record, you'll hve the

following options for what to do next:

N - Next, P - Previous, F - First, D - Delete, X - eXit : :

If you choose to delete the record, it will come back on the screen in dimmer colors (so you'll know it's fading) and after getting to the end of the record, you'll get a bright message saying:

Record marked for deletion, U to Undelete, RETURN to leave as is. :d:

If you choose to leave the record deleted, it will still be in the database, but you won't see it. To really get rid of it, you'll have to use the dBASE III command PACK. See your dBASE III manual for an explanation of this.

Option A for Adding New Records

If you choose Option A from the opening edit menu, you'll see a blank record like the one below:

```
Identification Information for Record #        183
  Database Number: :    :
  LER #:     :

Component Information
  Valve/Penetration : :
 Type               : :
  CIS Class         : :
  Reactor Name      :   :
  Reactor Type      : :
  Primary System    :  :

Failure Information
  Date              :       :
  Failure Mode      : :
  Primary Cause     :  :
  # of Failures     :  :
  Containment Isol? : :
Comments :

                                        :
To skip to end of record, type CTRL-C  or PgDn
```

After you've finished typing in the data for the new record, you'll get the following message:

A - Add another record, D - Delete this record, X - eXit : :

ERASING SEARCH FILES FROM YOUR DISK

After you've used the progressive search feature for a while, you may decide that you have more temporary search files on your disk than you want (or have room for). Option P is designed to take care of the problem. An example of the first message you'll see is:

```
                    SERIES 01
#  HITS  File DATE   SELECTION PARAMETERS
01 950    02/01/85   REACTYPE = P AND CAUSEPRI <> 05 AND CAUSEPRI<> 31
02 542    02/01/85   DATE > 82

        Purge Options

     A - PURGE the whole series.
     P - PURGE part of the series.
     N - SKIP to next series.
     X - EXIT From Purge program.

     Your Choice : :
```

If you choose option A, you'll get one additional message:

```
Number of first search in series to purge? : :
```

Please note that this does not in any way affect the original database, but it does erase temporary databases you've created while using the progressive search options. Note that the date when each temporary file was created appears with it so you can see how long ago a particular search was made.

CHANGING THE SETTINGS FOR COLORS, DEFAULT DISK, ETC.

When you choose Option R, you'll see the following screen:

```
Type over any program default setting you want to change
Just press the RETURN for any you want unchanged

Do you want to work with all 29 fields or only 14 :        14:
You can have the program act as soon as you enter the commands,
or you can have the computer wait for a confirming RETURN
Do you want to confirm?  :N:
Will you be using a color screen? :Y:
What is the designation of the disk and subdirectory (if any)
where your database files will be?  :C:          :
What is the name of your Master File?  :NLER1:
```

If you choose to work with only 14 fields, in the cases where the program displays entire records on the screen or outputs them to the printer, the program will decode the coded fields, such as the type of component, the name of the reactor, the name of the system which the failure occured in, and the primary cause of the failure.

If you choose any number other than 14 or 29 for number of fields, the program will not work. All options we've discussed for the 14 field database work similarly for the 29 field database, but some of the messages are a little different and the field list shows 29 fields. If you're working with 29 fields, the on-line glossary will show all 29 fields.

While learning to use the program, you should probably choose to confirm each action with the return key. Otherwise, you may not realize you've entered the wrong option for what you're trying to do until the program is doing something else.

Don't try using the color screen option if you're using a monochrome screen. The results will be illegible.

You shouldn't need to change the values for disk and subdirectory or Master File. If you do, you need to know a little about DOS. If you mess up (or change on purpose) the values currently in these blanks, the program will revert to the beginning values the next time it is started. If new starting values are needed, contact the technical assistance person named at the end of the manual.

```
* REPORT.PRG 5-02-85 KRA
* PROGRAM TO CALL OTHER PROGRAMS AND SET DEFAULTS
* VERSION WHICH STORES DECODING DATA IN MEMORY
* VERSION FOR PETE PELTO HARD DISK AND COLOR SCREEN
* PUBLIC VARIABLES CREATED
* CF
* CF1
* CF2
* COL1 - 5 Color control variables.
* CONF  Toggle variable for CONFIRM
* DBD   Drive and subdirectory where permanent & temporary database files are.
* GCV   Glossary control Variable, controls entry/exit to/from Glossary
* HITS  Count of records in temporary file, stored as FHITS in &DBD±R3TFCAT.
* ID    MSERIES+TFNUM for temporary reference file.
* MCV   Master Control Variable, 14 or 29 depending on number of fields in use.
* MCV2  BASE if main file is in use, TEMP if temporary files are used.
* MF    Name of Master File, i.e. NLER1.
* MN
* MSERIES       Temporary file series, used in listing catalog.
* N     Counter.
* NF    Sum of NUMFAILS for temporary file, stored as FNF in &DBD±R3TFCAT.
* NID   MSERIES+TFNUM for the temporary file being created or reported.
* OPT   Primary option variable used to select menu items.
* PH
* PH2   Page heading, column headings for columnar printouts.
* PN    Page number, used in print routines.
* PRF
* SCV   Logic variable that tells whether memory variables are stored.
* SP    Selection parameter, dbase III format
* SPU   Selection parameter, user format, stored as UPARAM in &DBD±R3TFCAT.
* TFNUM Temporary file number, sometimes used as a counter
* YN    Y/N variable reused, often from one file to the next.
* 31 Public variables created

* PRIVATE VARIABLES CREATED
* PSWD
RELEASE ALL
SET CONFIRM OFF
SET DELETED ON
SET DELIMITER ON
SET TALK OFF
SET BELL OFF
SET DEVICE TO SCREEN
PUBLIC SCV
IF .NOT. SCV
PUBLIC OPT,YN,TFNUM,SP,SPU,PH2,PH,PN,HITS,CF1,CF2,CF,N,NF,PRF,GCV,MF,ICV3
PUBLIC CONF,DBD,MSERIES,ID,NID,GCV,COL1,COL2,COL3,COL4,MCV,MCV2,MN,COL5
STORE 'N' TO CONF
ENDIF
IF .NOT. FILE('RNCODE.MEM')
CLEAR
@ 10,10 SAY 'Storing memory variables, please wait'
DO R1MI
ENDIF
STORE .T. TO SCV
```

```
* SETTING DEFAULTS
STORE ' ' TO YN,MN
STORE 14 TO MCV
STORE 'NLER4' TO MF
STORE 'D:±RACISP' TO DBD
STORE '6+/1,3+/1,1' TO COL1
STORE '3+/1,6+/1,1' TO COL2
STORE '7+/4,3+/1,1' TO COL3
STORE '6/1,3/1,1' TO COL4
STORE '2+/1,6+/1,1' TO COL5

ENDIF

STORE ' ' TO OPT

DO WHILE UPPER(OPT)<>'X1'

SET COLOR TO &COL1
CLEAR
STORE ' ' TO OPT
STORE 'BASE' TO MCV2

TEXT
Welcome to the reporting system for the Containment Isolation System (CIS)
LER database.  This database contains information extracted from LER's
related to CIS.  If you are unfamiliar with the database, you should start
by reading the glossary which explains the contents of the database.  If
you elect to continue, you will have opportunities to look at the glossary
when you are called on to enter field names.

          G  Look at glossary of field names.
          S  Search the database, make onscreen or printed reports.
          C  Columnar lists of selected fields on screen or printed.
          D  Display entire record(s) on screen.
          L  List all or selected records on printer.
          E  Edit record(s) on screen.
          P  Purge unwanted searches from disk.
          R  Reset program defaults.
          X  Exit back to dBASE III.
ENDTEXT
@ 18,11 SAY "Enter your choice"
@ 18,30 GET OPT
READ

 IF UPPER(OPT)='X'
 STORE 'X1' TO OPT
 LOOP
 ENDIF

 IF UPPER(OPT)='L'
  DO R1PRINT
 STORE ' ' TO OPT,YN
 ENDIF

 IF UPPER(OPT)='G'
```

```
 DO R1GLOS
 ENDIF

IF UPPER(OPT)<>'X'.AND.UPPER(OPT)<>'R'.AND.UPPER(OPT)<>'P'
 IF .NOT. FILE('&DBD±&MF .DBF')
 SET COLOR TO &COL3
 @ 20,0 SAY 'You must reset Master File name or drive designation before proceeding.'
 @ 21,0 SAY 'The one currently set,'+DBD+'±'+MF+' does not exist'
 SET COLOR TO &COL1
 STORE 'RF' TO OPT
 ENDIF
ENDIF

 IF UPPER(OPT)='C'
  DO R1UCR
 STORE ' ' TO YN,OPT
 ENDIF

 IF UPPER(OPT)='D'
  DO D18
 STORE ' ' TO YN,OPT
 ENDIF

 IF UPPER(OPT)='E'
 STORE '      ' TO PSWD
 @ 20,0 SAY 'WARNING, This command will alter the database ENTER PASSWORD' GET PSWD
 READ
  IF UPPER(PSWD) <>'ADEPT'
  @ 22,0 SAY 'Sorry, that is not the correct password, access denied'
  ELSE
   DO E38
  ENDIF
 STORE ' ' TO YN,OPT
 ENDIF

 IF UPPER(OPT)='P'
  IF .NOT. FILE('&DBD±R3TFCAT.DBF')
  SET COLOR TO &COL3
  @ 20,0 SAY 'You must reset drive designation before proceeding.'
  @ 21,0 SAY 'There is no catalog of search files on the one currently set.'
  SET COLOR TO &COL1
  STORE 'RP' TO OPT
   DO R1SET
  ENDIF
 DO P3URGE
 STORE ' ' TO OPT
 ENDIF

 IF UPPER(OPT)='S'
  DO R3CAT1
  IF UPPER(OPT)<>'X'
   DO R1SEL
  ENDIF
  DO WHILE UPPER(OPT)<>'X'
   DO R1OPT
```

```
  ENDDO
 ENDIF

 IF UPPER(OPT)='R'
  DO R1SET
 ENDIF

ENDDO

CLEAR
SET CONFIRM OFF
SET TALK ON
RETURN
```

```
* R1GLOS.PRG 11-28-84 KRA
PUBLIC NS
STORE 0 TO NS
STORE 'Y' TO GCV
DO CASE
CASE MCV=14
 DO WHILE UPPER(GCV)<>'X'.AND.NS<=4
 STORE STR(NS,1) TO SN
 CLEAR
 SET COLOR TO &COL1
  DO R1GLOS&SN
 SET COLOR TO &COL2
 @ 0,72 SAY 'SCREEN '+SN
  IF NS=0
  STORE ' ' TO GCV
  @ 24,0 SAY 'Screen Number (0-4); N - Next Screen; X - Exit' GET GCV
  READ
  ELSE
   IF NS<>4
   @ 24,0 SAY 'Screen Number (0-4); N - Next Screen; P - Previous Screen; X - Exit' GET
   ELSE
   @ 24,0 SAY 'Screen Number (0-4); P - Previous Screen; X - Exit' GET GCV
   ENDIF
  READ
  ENDIF
 SET COLOR TO &COL1
  IF GCV>='0'.AND.GCV<='4'
  STORE VAL(GCV) TO NS
  STORE 'A' TO GCV
  ENDIF

  IF NS>1.AND.UPPER(GCV)='P'
  STORE NS-1 TO NS
  ENDIF

  IF UPPER(GCV)='N'
  STORE NS+1 TO NS
  ENDIF

  IF UPPER(GCV)<>'A'.AND.UPPER(GCV)<>'P'.AND.UPPER(GCV)<>'N'
  STORE 'X' TO GCV
  ENDIF
 ENDDO

CASE MCV=29

 DO WHILE UPPER(GCV)<>'X'.AND.NS<10
 STORE STR(NS,1) TO SN
 CLEAR
 SET COLOR TO &COL1
  DO R3GLOS&SN
 SET COLOR TO &COL2
 @ 0,72 SAY 'SCREEN '+SN
  IF NS=0
```

```
  STORE ' ' TO GCV
  @ 24,0 SAY 'Screen Number (0-9); N - Next Screen; X - Exit' GET GCV
  READ
  ELSE
   IF NS<>9
   @ 24,0 SAY 'Screen Number (0-9); N - Next Screen; P - Previous Screen; X - Exit' GET
   ELSE
   @ 24,0 SAY 'Screen Number (0-9); P - Previous Screen; X - Exit' GET GCV
   ENDIF
  READ
  ENDIF
 SET COLOR TO &COL1
  IF GCV>='0'.AND.GCV<='9'
  STORE VAL(GCV) TO NS
  STORE 'A' TO GCV
  ENDIF

  IF NS>1.AND.UPPER(GCV)='P'
  STORE NS-1 TO NS
  ENDIF

  IF UPPER(GCV)='N'
  STORE NS+1 TO NS
  ENDIF

  IF UPPER(GCV)<>'A'.AND.UPPER(GCV)<>'P'.AND.UPPER(GCV)<>'N'
  STORE 'X' TO GCV
  ENDIF
 ENDDO
ENDCASE
RETURN
```

```
* R1GLOSO.PRG 11-9-84 KRA
* SCREEN NUMBER 0
TEXT
DATABNUM  Unique four-digit serial number assigned to each record by PNL.

LERNUM    Number assigned to the Licensee Event Report (LER) by the NRC.
          The first two digits are the year of the LER.

TYPEMAIN  V indicates a valve failure, P a penetration failure

TYPESUB1
For a valve:
A = electric motor operated (AC)
B = electric motor operated (DC)
C = hydraulic operated
D = pneumatic diaphragm/cylinder operated
E = solenoid operated (AC)
F = solenoid operated (DC)
G = float operated
H = explosive squib operated
J = mechanically operated
K = electric motor operated (unspecified)
L = solenoid operated (unspecified)
M = manually operated
N = remotely operated
P = damper
Q = vacuum breaker
R = relief or safety
S = check
X = other

TYPESUB1
For a penetration:
A = personal access
B = fuel handling
C = equipment access
D = electrical
E = instrument line
F = process piping
G = access (unspecified)
X = other
ENDTEXT
RETURN
```

```
* R1GLOS1.PRG 1-17-85 KRA
* SCREEN NUMBER 1
@ 1,0 SAY  'REACNAME                    FP1   5 J.A. Fitzpatrick  PT1,2 1 Point Beach 1,
@ 2,0 SAY  '                            FV1   8 Fort St. Vrain    PV1   1 Palo Verde 1'
@ 3,0 SAY  'CODE                        GG1   7 Grand Gulf 1      QC1,2 5 Quad Cities 1,
@ 4,0 SAY  '½     CIS CLASS             HB3   1 Humboldt Bay 3    RG1   1 R.E. Ginna'
@ 5,0 SAY  '½     ½ REACTOR NAME        HN1   1 Haddam Neck       RO2   1 H.B. Robinson
@ 6,0 SAY  '½     ½ ½                   IP2,3 1 Indian Point 2,3  RS1   1 Rancho Seco'
@ 7,0 SAY  'AR1,2 1 Ark Nuc. One 1,2    JF1,2 1 J.M. Farley 1,2   SA1,2 1 Salem 1,2'
@ 8,0 SAY  'BF1-3 5 Browns Ferry 1-3    KE1   3 Kewaunee          SE1,2 4 Sequoyah 1,2'
@ 9,0 SAY  'BP1   8 Big Rock Point      LB1   8 LaCrosse BWR      SL1,2 3 St. Lucie 1,2'
@ 10,0 SAY 'BR1,2 5 Brunswick 1,2       LS1,2 6 LaSalle 1,2       SM1   6 Shoreham'
@ 11,0 SAY 'BV1   2 Beaver Valley 1     MG1,2 4 McGuire 1,2       SO1   8 San Onofre 1'
@ 12,0 SAY 'CC1,2 1 Calvert Clf 1,2     MI1   5 Millstone 1       SO2,3 1 San Onofre 2,3
@ 13,0 SAY 'CO1   5 Cooper Station      MI2   1 Millstone 2       SS1,2 6 Susquehanna 1,
@ 14,0 SAY 'CR3   1 Crystal River 3     MO1   5 Monticello        SU1,2 2 Surry 1,2'
@ 15,0 SAY 'DA1   5 Duane Arnold        MY1   1 Maine Yankee      TI1,2 1 Three Mi. Is.
@ 16,0 SAY 'DB1   3 Davis-Besse         NA1,2 2 North Anna 1,2    TR1   1 Trojan'
@ 17,0 SAY 'DC1,2 4 D.C. Cook 1,2       NM1   5 Nine Mile Pt. 1   TU3,4 1 Turkey Point 3
@ 18,0 SAY 'DO1,2 1 Diablo Canyon 1,2   OC1   5 Oyster Creek 1    VS1   1 V.C. Summer'
@ 19,0 SAY 'DR1   8 Dresden 1           OE1-3 1 Oconee 1-3        VY1   5 Vermont Yankee
@ 20,0 SAY 'DR2,3 5 Dresden 2,3         PA1   1 Palisades        WF3   3 Waterford 3'
@ 21,0 SAY 'EF2   5 Enrico Fermi 2      PB2,3 5 Peach Bottom 2,3  WP2   6 WNP 2'
@ 22,0 SAY 'EN1,2 5 E.I. Hatch 1,2      PI1   5 Pilgrim 1         YR1   8 Yankee Rowe'
@ 23,0 SAY 'FC1   1 Fort Calhoun        PR1,2 3 Prairie Is. 1,2   ZI1,2 1 Zion 1,2'
SET COLOR TO &COL2
WAIT'1984 Current List, do you want list for newer plants? Y/N' TO GCV
SET COLOR TO &COL1
IF UPPER(GCV)='Y'
CLEAR
@ 1,0 SAY  'REACNAME'
@ 3,0 SAY  'CODE'
@ 4,0 SAY  '½     CIS CLASS'
@ 5,0 SAY  '½     ½ REACTOR NAME'
@ 6,0 SAY  'BL1,2   Bellefonte 1,2'
@ 7,0 SAY  'BW1,2   Braidwood 1,2'
@ 8,0 SAY  'BY1,2   Byron 1,2'
@ 9,0 SAY  'CW1,2   Callaway 1,2'
@ 10,0 SAY 'CA1,2   Catawba 1,2'
@ 11,0 SAY 'CT1,2   Carroll County 1,2'
@ 12,0 SAY 'CL1     Clinton 1'
@ 13,0 SAY 'CP1,2   Commanche Peak 1,2'
@ 14,0 SAY 'HC1     Hope Creek 1'
@ 15,0 SAY 'LM1,2   Limerick 1,2'
@ 16,0 SAY 'PY1,2   Perry 1,2'
@ 17,0 SAY 'RB1     River Bend 1'
@ 18,0 SAY 'SH1     Shearon Harris'
@ 19,0 SAY 'ST1,2   S. Texas Project 1,2'
@ 20,0 SAY 'VG1,2   Vogtle 1,2'
@ 21,0 SAY 'WB1,2   Watts Bar 1,2'
@ 22,0 SAY 'WC1     Wolf Creek'
@ 23,0 SAY 'ZM1     Zimmer 1'
STORE ' ' TO GCV
ELSE
```

```
STORE ' ' TO GCV
RETURN
ENDIF
```

```
* R1GLOS2.PRG 11-9-84 KRA
* SCREEN NUMBER 2A
STORE ' ' TO NNS
TEXT
REACTYPE  One of the following:  B = BWR
                                 H = HTGR (Fort St. Vrain)
                                 P = PWR

CISCLASS   Class of Containment Isolation System (CIS)

Class 1. PWR - Large Dry Containment
Class 2. PWR - Subatmospheric Containment
Class 3. PWR - Dual (Double) Containment
Class 4. PWR - Ice Condenser Containment
Class 5. BWR - Mark I Containment
Class 6. BWR - Mark II Containment
Class 7. BWR - Mark III Containment
Class 8. Other CIS

SYSPRIMA  Primary system involved in failure.
          Designations are different for PWR's and BWR's.
ENDTEXT
@ ROW()+1,8 SAY 'To see PWR list type P or to see BWR list type B.'GET NNS
READ
CLEAR
IF UPPER(NNS)='P'

* SCREEN NUMBER 2B
TEXT
SYSPRIMA Primary system involved in failure.  For a PWR:
01 = reactor coolant                    22 = demineralized water
02 = main steam                         23 = containment sump
03 = high pressure injection/recirc.    24 = steam generator
04 = low pressure injection/recirc.     25 = containment large - volume purge
05 = instrument air                     26 = containment small - volume purge
06 = service air                        27 = containment hydrogen purge
07 = air (unspecified)                  28 = containment purge (unspecified)
08 = service water                      29 = nitrogen supply
09 = residual heat removal              30 = containment spray
10 = containment HVAC                   31 = chemical volume control
11 = containment pressure               32 = refueling canal
12 = integrated leak rate test          33 = containment instrumentation (elec.)
13 = fire protection                    99 = other
14 = containment atmosphere
15 = component cooling water
16 = radwaste
17 = containment waste gas
18 = main feedwater
19 = auxiliary feedwater
20 = pressurizer
21 = safety injection
ENDTEXT
ELSE
* SCREEN NUMBER 2C
TEXT
```

SYSPRIMA Primary system involved in failure. For a BWR:

01 = reactor coolant
02 = main steam
03 = high pressure injection/recirc.
04 = low pressure injection/recirc.
05 = instrument air
06 = service air
07 = air (unspecified)
08 = service water
09 = residual heat removal
10 = containment HVAC
11 = drywell pressure
12 = integrated leak rate test
13 = fire protection
14 = drywell atmosphere
15 = component cooling water
16 = radwaste
17 = drywell waste gas
18 = main feedwater
19 = auxiliary feedwater
20 = reactor core isolation cooling
21 = standby liquid control
22 = reactor cleanup
23 = drywell purge
24 = drywell vent
25 = drywell equipment sump
26 = drywell floor sump
27 = drywell sump (unspecified)
28 = control rod drive
29 = core spray
30 = vessel head spray
31 = containment cooling
32 = traversing incore probe
33 = torus (wetwell) vent
34 = vacuum relief
35 = drywell instrumentation (elec.)
36 = torus (wetwell) inst. (elec.)
37 = nitrogen supply
38 = torus (wetwell) purge
99 = other

ENDTEXT
ENDIF
RETURN

```
* R1GLOS3.PRG 1-17-85 KRA
* SCREEN NUMBER 3
TEXT
NUMFAILS  Number of failures reported in the LER, 1 unless specified

DATE          Date of failure event in six-digit code, e.g.,
              830812 = August 12, 1983.

MODE          One of the following failure modes:
              A = leakage (fail to seal)
              B = fail to close
              C = unplanned opening (fail to remain closed)

Failure mode B refers to failures in which the component does not close
within a reasonable time limit, thereby constituting a potential failure to
isolate containment.

ENDTEXT

RETURN
```

```
* R1GLOS4.PRG 11-9-84 KRA
* SCREEN NUMBER 4
TEXT
CAUSEPRI Primary cause, one of the following:
00 = unknown                              17 = bearing/bushing fail/prob.
01 = personnel (operation)                18 = weld failure
02 = personnel (maintenance)              19 = lack of lubrication
03 = personnel (testing)                  20 = electric motor operator fail/prob.
04 = design error                         21 = electric solenoid fail/prob.
05 = fabrication/construction/QC          22 = leaking/ruptured diaphragm
06 = procedural discrepancy               23 = torque switch fail/prob.
07 = normal wear                          24 = failure of component supply system
08 = excessive wear                            (air supply interrupt)
09 = corrosion                            25 = seat/disc fail/prob.
10 = foreign material contamination       26 = limit switch fail/prob.
11 = excessive vibration                  27 = pilot valve fail/prob.
12 = mechanical control/parts;            28 = air solenoid fail/prob.
     failed or out of adjustment          29 = solenoid (unspecified) fail/prob.
13 = seal/gasket fail/prob.               30 = operator (unspecified) fail/prob.
14 = packing fail/prob.                   31 = penetration sealant fail/prob.
15 = bellows/boot fail/prob.              32 = personnel (construction)
16 = electrical input fail/prob.          33 = rupture
                                          34 = equalizing valve (on air lock)
                                          35 = hydraulic operator fail/prob.
ISOLATED   Despite the failure, did containment remain isolated?  Yes/No
COMMENTS   Summary and/or additional information.
ENDTEXT
RETURN
```

```
* R3CAT1.PRG 5-03-85 KRA
* Program segment to show list of previously created temporary files at the
* beginning of the R3PORT program.

* variables created:
* TFNUM(n) a temporary counter of temporary files
* L(n) a temporary counter of lines
* YN(c) a temporary decision variable

* files called: R1SEL

SET DEVICE TO SCREEN
STORE ' ' TO YN,ICV3
IF OPT='A'.OR.OPT='a'
 * IF this is not the first time through

 IF UPPER(SUBSTR(OPT,2,1))='A'
  * IF the current search is being continued
  * find the next number for ID

 STORE NID TO ID
 STORE '&DBD±R3T&ID' TO PRF
 STORE VAL(NID)+1 TO IDN
 STORE STR(IDN,4) TO NID


  IF VAL(NID)<1000
   IF SUBSTR(NID,1,1)<>'0'
    STORE '0'+SUBSTR(NID,2,3) TO NID
   ENDIF
  ENDIF

* IF THERE'S ALREADY A R3T&NID FILE EXISTING, WE NEED TO ERASE IT

  STORE DBD+'R3T'+NID+'.DBF' TO FN
  IF FILE('&FN')=.T.
  ERASE &FN
  ENDIF


 STORE SUBSTR(NID,1,2) TO MSERIES
 STORE SUBSTR(NID,3,3) TO TFNUM

 RETURN
 * jump out and select parameters for new temporary file, &DBD±R3T&ID.DBF
 ENDIF

 IF UPPER(SUBSTR(OPT,2,1))='B'
 * IF the current temporary file is being overwritten
 * Need to wipe out current record in &DBD±R3TFCAT since the file is being changed
 STORE DBD+'R3T'+NID+'.DBF' TO FN
 ERASE &FN
 RETURN
 * jump out and select new parameters, using the same ID
 ENDIF
```

```
ENDIF

STORE 'R' TO ICV

IF UPPER(MN)<>'C'
CLEAR

TEXT
This part of the program displays a catalog of the searches of the database
which have been performed up to now.  The searches are organized into Series.
Each Series begins with a search of the whole database.  Subsequent searches
search only the records picked out by the search listed immediately above
them.  Up to 99 different Series are possible (assuming your disk has that
much room) and each series can have up to 99 searches in it.  If you want a
report on one of the searches you see listed in the catalog, simply enter its
series number and search number.  You may also choose any of the listed
searches as a place to start your own series of inquiries.  If you choose a
search before the end of the series and make additional searches from it, you
will erase subsearches previously made.  To CANCEL further appearances of this
message, enter 'C'.  If don't want to search the database now, enter 'X'.
Press any other key to just continue.
ENDTEXT

STORE ' ' TO MN
 DO WHILE MN=' '
 @ 13,75 GET MN
 READ
 ENDDO
ENDIF
IF UPPER(MN)='X'
STORE 'X' TO OPT
RETURN
ENDIF

IF .NOT.FILE('&DBD±R3TFCAT.DBF')
USE R1CAT
COPY STRU TO &DBD±R3TFCAT
ENDIF

USE &DBD±R3TFCAT

*************** GET R3TFCAT IN ORDER
GO BOTTOM
IF RECNO()>1
STORE 'Z3Z.DBF' TO FN
 IF FILE('&FN')
 ERASE &FN
 ENDIF
SORT TO &FN ON SERIES,FNUM
USE &FN
COPY TO &DBD±R3TFCAT
USE &DBD±R3TFCAT
ERASE &FN
ELSE
```

```
GO TOP
ENDIF
***************

STORE ' ' TO ICV2
* subroutine to identify missing files in catalog database
DO WHILE .NOT. EOF()
STORE SERIES+FNUM TO A

 IF FILE('&DBD±R3T&A .DBF')=.T.
 STORE 'Y' TO ICV2
 SKIP
 ELSE
 DELETE
 SKIP
 ENDIF

ENDDO

PACK

DO WHILE UPPER(ICV)='R'
GO TOP
 IF EOF()=.T.
 STORE 'X' TO ICV
 ELSE
 SET COLOR TO &COL3
 STORE ' ' TO ICV3,LV
 @ 20,0 SAY 'Ready to list search files on screen, do you want printed list too?'
 @ 20,70 SAY 'Y/N ' GET ICV3
 READ
 SET COLOR TO &COL1
 ENDIF
STORE 1 TO L
GO TOP

CLEAR

 DO WHILE .NOT. EOF()
 SET COLOR TO &COL2
 @ L,70 SAY "SERIES "+SERIES
 SET COLOR TO &COL1
 @ L,0 SAY "#  HITS  #FL  SELECTION PARAMETERS"
 * display header for catalog
 STORE L+1 TO L
 STORE VAL(SERIES) TO S
 STORE SERIES TO MSERIES

  DO WHILE (.NOT. EOF()).AND.VAL(SERIES)=S

  @ L,0 SAY FNUM PICTURE '99'
  @ L,3 SAY FHITS PICTURE '9999'
  @ L,8 SAY FNF PICTURE '9999'
  STORE TRIM(UPARAM) TO SPU
  @ L,14 SAY SUBSTR(SPU,1,65)
```

```
  IF LEN(SPU)>65
  STORE L+1 TO L
  @ L,14 SAY SUBSTR(SPU,66,49)
  ENDIF

 STORE L+1 TO L

 SKIP

  IF L>23.AND.(.NOT.EOF())
  WAIT 'Too many searches for one screen, press any key to continue'
  CLEAR
  GO TOP
  STORE 'XX' TO LV
  STORE 1 TO L
  ENDIF

 ENDDO
STORE L+1 TO L
 IF LV='XX'
  DO WHILE VAL(SERIES)<S
  SKIP
  ENDDO
  STORE ' ' TO LV
 ENDIF
ENDDO


IF ROW()>21
WAIT 'List complete, press any key to continue'
ENDIF

IF UPPER(ICV3)='Y'
GO TOP
STORE 5 TO L
SET DEVICE TO PRINT
SET MARGIN TO 4
ENDIF


DO WHILE .NOT. EOF().AND.UPPER(ICV3)='Y'
@ L,0 SAY DATE()
@ L,10 SAY TIME()
STORE L+1 TO L
@ L,70 SAY "SERIES "+SERIES
SET COLOR TO &COL1
@ L,0 SAY "#  HITS  #FL  DATE    SELECTION PARAMETERS"
* display header for catalog
STORE L+1 TO L
STORE VAL(SERIES) TO S

 DO WHILE (.NOT. EOF()).AND.VAL(SERIES)=S

 @ L,0 SAY FNUM PICTURE '99'
```

```
 @ L,3 SAY FHITS PICTURE '9999'
 @ L,8 SAY FNF PICTURE '9999'
 @ L,13 SAY FDATE
 STORE TRIM(UPARAM) TO SPU
 @ L,22 SAY SUBSTR(SPU,1,58)

  IF LEN(SPU)>58
  STORE L+1 TO L
  @ L,14 SAY SUBSTR(SPU,59,56)
  ENDIF

 STORE L+1 TO L

 SKIP

  IF L>60
  STORE 5 TO L
  EJECT
  STORE S-1 TO S
  ENDIF

 ENDDO
STORE L+1 TO L
ENDDO
 IF UPPER(ICV3)='Y'
 EJECT
 ENDIF
SET DEVICE TO SCREEN

IF ICV2='Y'

* IF THERE IS A CATALOG FILE TO LOOK AT

STORE MSERIES TO LV
STORE '   ' TO MSERIES
STORE '   ' TO TFNUM
SET CONFIRM ON
@ 22,0 SAY "Enter number of series you want to use or continue." GET MSERIES
@ 23,0 SAY "To start a new search of the whole database, enter a new number"
SET COLOR TO &COL3
@ 24,0 SAY "You can enter 'X' now if you don't want to continue"
SET COLOR TO &COL1
READ
IF UPPER(MSERIES)='X'
STORE 'X' TO OPT
 IF UPPER(CONF)='N'
 SET CONFIRM OFF
 ENDIF
RETURN
ENDIF
IF VAL(MSERIES)>VAL(LV)
STORE '01' TO TFNUM
@ 24,0 SAY 'Starting new series
ELSE
@ 22,0 CLEAR
```

```
@ 22,0 SAY "Enter number of the search you want to use or continue." GET TFNUM
@ 23,0 SAY "If you continue from any but the last one, each continuation"
@ 24,0 SAY "will erase one previous subsearch."
READ
ENDIF
IF UPPER(CONF)='N'
SET CONFIRM OFF
ENDIF
* MAKE SURE MSERIES AND TFNUM ARE IN THE RIGHT FORMAT

 IF VAL(MSERIES)<10
 STORE '0'+STR(VAL(MSERIES),1) TO MSERIES
 ENDIF

 IF VAL(TFNUM)<10
 STORE '0'+STR(VAL(TFNUM),1) TO TFNUM
 ENDIF

* SET UP THE VARIABLE ID, for IDentification

STORE MSERIES+TFNUM TO ID

* SET UP THE VARIABLE RID, FOR Reference IDentification

STORE VAL(ID)-1 TO IDR
STORE STR(IDR,4) TO RID
 IF VAL(RID)<1000
  IF SUBSTR(RID,1,1)<>'0'
  STORE '0'+SUBSTR(RID,2,3) TO RID
  ENDIF
 ENDIF

* AT THIS POINT, THERE ARE FOUR POSSIBILITIES
*  1. AN EXISTING FILE HAS BEEN CHOSEN
*  2. THE NEXT NUMBER IN AN EXISTING SERIES HAS BEEN CHOSEN
*  3. A NEW SERIES WITH TFNUM = '01' HAS BEEN CHOSEN
*  4. NONE OF THE ABOVE HAS BEEN CHOSEN

* THE CASES WILL BE HANDLED ONE AT A TIME

* CASE 1 AN EXISTING FILE HAS BEEN CHOSEN

GO TOP
 DO WHILE SERIES+FNUM <> ID.AND.(.NOT.EOF())
 SKIP
 ENDDO

 IF SERIES+FNUM=ID
 STORE 'N' TO YN
 STORE ID TO NID
  IF SUBSTR(ID,3,2)='01'
  STORE '&DBD±&MF ' TO PRF
  ELSE
  STORE '&DBD±R3T&RID' TO PRF
  ENDIF
```

```
 STORE 'X' TO ICV
 ENDIF

* CASE 2 THE NEXT NUMBER IN AN EXISTING SERIES HAS BEEN CHOSEN

 IF ICV<>'X'
 GO TOP
  DO WHILE SERIES+FNUM <> RID.AND.(.NOT.EOF())
  SKIP
  ENDDO

  IF SERIES+FNUM=RID
  STORE ID TO NID
  STORE RID TO ID
  STORE '&DBD±R3T&ID' TO PRF
  STORE 'X' TO ICV
  ENDIF
 ENDIF

* CASE 3 A NEW SERIES WITH TFNUM = '01' HAS BEEN CHOSEN

 IF ICV<>'X'
  IF TFNUM='01'.AND.MSERIES>='01'.AND.MSERIES<='99'
  STORE '&DBD±&MF ' TO PRF
  STORE ID TO NID
  STORE 'X' TO ICV
  ENDIF
 ENDIF

* CASE 4 NONE OF THE ABOVE HAS BEEN CHOSEN

 IF ICV<>'X'
 @ 21,0 CLEAR
 @ 21,0 SAY 'The number you entered is not a currently available search.'
 @ 22,0 SAY 'Press "R" to look at the catalog again or press "S" to start'
 @ 23,0 SAY 'a new series' GET ICV
 READ

  IF UPPER(ICV)='S'
  GO BOTTOM
  STORE STR(VAL(SERIES)+1,2) TO MSERIES
  STORE '01' TO TFNUM
   IF VAL(MSERIES)<10
    IF SUBSTR(MSERIES,1,1)<>'0'
    STORE '0'+SUBSTR(MSERIES,2,1) TO MSERIES
    ENDIF
   ENDIF
   STORE '&DBD±&MF ' TO PRF
   STORE MSERIES+TFNUM TO NID
   STORE 'X' TO ICV

  ENDIF
 ENDIF

ELSE
```

```
 * THIS IS THE CASE WHERE THE CATALOG FILE WAS FOUND TO BE EMPTY

 STORE '01' TO MSERIES,TFNUM
 STORE '0101' TO NID
 STORE '&DBD±&MF ' TO PRF
 ENDIF

ENDDO

CLEAR

* AT THIS POINT, ID, IF ANY, MATCHES PRF
* NID MATCHES THE NEXT FILE TO BE CREATED, MSERIES AND TFNUM MATCH NID
* IF AN EXISTING FILE HAS BEEN CHOSEN, YN = 'N' AND NID MATCHES THE EXISTING
* FILE.  THAT WAY, IF OPTION AB IS CHOSEN IN R3OPT, THE EXISTING FILE WILL BE
* ERASED AND RECREATED.

RETURN
```

```
* R1S.PRG 5-02-85 Ken Ames

STORE ' ' TO ICV
PUBLIC IV1,IV2,IV3

TEXT
List of possible RELATIONS
=    equal to                    Relations apply to letters as well as numbers
<    less than                   The search string you enter will be matched with
>    greater than                The same number of characters from the beginning
<=   less than or equal to       of the field data, for example data BR1 would
>=   greater than or equal to    satisfy the relation = B, also >= A, < C, <> BR2
<>   not equal to
                        This relation will search the whole field for the string
HAS                     you specify.  i.e. abcdefghij HAS def.  If you enter in
                        ALL CAPS, case will be ignored.  i.e. abcdefghi HAS FGH.

ENDTEXT

STORE '   ' TO CF1,CF2,CF3
STORE '    ' TO R1,R2,R3
STORE '                          ' TO V1,V2,V3
STORE 'AND' TO J2,J3
SET COLOR TO &COL3
 IF UPPER(CONF)='Y'
 @ 19,0 SAY "Enter 'X' if you don't want to continue" GET OPT
 READ
 ENDIF
IF UPPER(OPT)='X'
SET COLOR TO &COL1
RETURN
ENDIF
SET COLOR TO &COL1

DO CASE
CASE MCV=14
RESTORE FROM FNLCODE ADDITIVE
CASE MCV=29
RESTORE FROM FNCODE ADDITIVE
ENDCASE

STORE 'N' TO FOK
DO WHILE FOK='N'
STORE 'Y' TO FOK
SET CONFIRM ON
@ 19,0 CLEAR
@ 19,0 SAY 'FIELD NUMBER' GET CF1
@ 19,18 SAY 'RELATION' GET R1
@ 19,34 SAY 'VALUE' GET V1
@ 19,67 GET J2
@ 20,0 SAY 'FIELD NUMBER' GET CF2
@ 20,18 SAY 'RELATION' GET R2
@ 20,34 SAY 'VALUE' GET V2
@ 20,67 GET J3
@ 21,0 SAY 'FIELD NUMBER' GET CF3
```

```
@ 21,18 SAY 'RELATION' GET R3
@ 21,34 SAY 'VALUE' GET V3
IF UPPER(CONF)='N'
SET CONFIRM OFF
ENDIF
@ 23,0 SAY 'For less than three conditions, just <RETURN> without entering anything'
@ 24,0 SAY "Note: you can change the AND's connecting the conditions to OR's"
READ

* CHECKING SECTION TO MAKE SURE FIELD NUMBERS HAVE BEEN ENTERED CORRECTLY

IF CF1='  '
STORE 'X ' TO OPT
RETURN
ENDIF

STORE UPPER(R1) TO R1
STORE UPPER(R2) TO R2
STORE UPPER(R3) TO R3
STORE UPPER(J2) TO J2
STORE UPPER(J3) TO J3

IF VAL(CF1)>MCV.OR.VAL(CF2)>MCV.OR.VAL(CF3)>MCV
STORE 'N' TO FOK
@ 19,0 CLEAR
SET COLOR TO &COL3
@ 18,0 SAY 'TYPING ERROR IN FIELD NUMBER(S), PLEASE CORRECT'
SET COLOR TO &COL1
ENDIF

IF CF1<>' 0'.AND.CF1<>'0 '.AND.CF1<>'00'
 IF VAL(CF1)<=0.AND.LEN(TRIM(CF1))<>0
 STORE 'N' TO FOK
 @ 19,0 CLEAR
 SET COLOR TO &COL3
 @ 18,0 SAY 'TYPING ERROR IN FIELD NUMBER(S), PLEASE CORRECT'
 SET COLOR TO &COL1
 ENDIF
ENDIF

IF CF2<>' 0'.AND.CF2<>'0 '.AND.CF2<>'00'
 IF VAL(CF2)<=0.AND.LEN(TRIM(CF2))<>0
 STORE 'N' TO FOK
 @ 19,0 CLEAR
 SET COLOR TO &COL3
 @ 18,0 SAY 'TYPING ERROR IN FIELD NUMBER(S), PLEASE CORRECT'
 SET COLOR TO &COL1
 ENDIF
ENDIF

IF CF3<>' 0'.AND.CF3<>'0 '.AND.CF3<>'00'
 IF VAL(CF3)<=0.AND.LEN(TRIM(CF3))<>0
 STORE 'N' TO FOK
 @ 19,0 CLEAR
 SET COLOR TO &COL3
```

```
 @ 18,0 SAY 'TYPING ERROR IN FIELD NUMBER(S), PLEASE CORRECT'
 SET COLOR TO &COL1
 ENDIF
ENDIF

IF FOK='N'
STORE 'N' TO FOK2
ENDIF
IF R1<>'=  '
IF R1<>'<  '
IF R1<>'>  '
IF R1<>'<= '
IF R1<>'>= '
IF R1<>'<> '
IF R1<>'HAS'
STORE 'N' TO FOK
@ 19,0 CLEAR
SET COLOR TO &COL3
IF FOK2='N'
@ 18,0 SAY 'TYPING ERROR IN FIELD NUMBER(S) AND RELATIONS, PLEASE CORRECT'
ELSE
@ 18,0 SAY 'TYPING ERROR IN RELATIONS, PLEASE CORRECT'
ENDIF
SET COLOR TO &COL1
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF

IF CF2<>' '
IF R2<>'=  '
IF R2<>'<  '
IF R2<>'>  '
IF R2<>'<= '
IF R2<>'>= '
IF R2<>'<> '
IF R2<>'HAS'
STORE 'N' TO FOK
@ 19,0 CLEAR
SET COLOR TO &COL3
IF FOK2='N'
@ 18,0 SAY 'TYPING ERROR IN FIELD NUMBER(S) AND RELATIONS, PLEASE CORRECT'
ELSE
@ 18,0 SAY 'TYPING ERROR IN RELATIONS, PLEASE CORRECT'
ENDIF
SET COLOR TO &COL1
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF
```

```
ENDIF
ENDIF

IF CF3<>' '
IF R3<>'=  '
IF R3<>'<  '
IF R3<>'>  '
IF R3<>'<= '
IF R3<>'>= '
IF R3<>'<> '
IF R3<>'HAS'
STORE 'N' TO FOK
@ 19,0 CLEAR
SET COLOR TO &COL3
IF FOK2='N'
@ 18,0 SAY 'TYPING ERROR IN FIELD NUMBER(S) AND RELATIONS, PLEASE CORRECT'
ELSE
@ 18,0 SAY 'TYPING ERROR IN RELATIONS, PLEASE CORRECT'
ENDIF
SET COLOR TO &COL1
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF

ENDDO

 IF VAL(CF1)<10
 STORE '0'+STR(VAL(CF1),1) TO CF1
 ENDIF

 IF VAL(CF2)<10.AND.CF2<>'  '
 STORE '0'+STR(VAL(CF2),1) TO CF2
 ENDIF

 IF VAL(CF3)<10.AND.CF3<>'  '
 STORE '0'+STR(VAL(CF3),1) TO CF3
 ENDIF

STORE FN&CF1 TO CF1
 IF CF2<>' '
 STORE FN&CF2 TO CF2
 ENDIF

 IF CF3<>' '
 STORE FN&CF3 TO CF3
 ENDIF

STORE TRIM(R1) TO R1
STORE TRIM(R2) TO R2
STORE TRIM(R3) TO R3
```

```
IF V1=' '
STORE ' ' TO V1
ELSE
STORE TRIM(V1) TO V1
 IF UPPER(V1)=V1
 STORE .T. TO IV1
 ENDIF
ENDIF
IF V2=' '
STORE ' ' TO V2
ELSE
STORE TRIM(V2) TO V2
 IF UPPER(V2)=V2
 STORE .T. TO IV2
 ENDIF
ENDIF
IF V3=' '
STORE ' ' TO V3
ELSE
STORE TRIM(V3) TO V3
 IF UPPER(V3)=V3
 STORE .T. TO IV3
 ENDIF
ENDIF
 IF J2='ORD'
 STORE 'OR' TO J2
 ENDIF
 IF J3='ORD'
 STORE 'OR' TO J3
 ENDIF
STORE '.'+TRIM(J2)+'.' TO J2
STORE '.'+TRIM(J3)+'.' TO J3

STORE ' ' TO SP
STORE CF1+' '+R1+' '+V1 TO SPU

 IF R1='HAS'
  IF IV1=.T.
  STORE "'&V1'$UPPER(&CF1)" TO SP
  ELSE
  STORE "'&V1'$&CF1" TO SP
  ENDIF
 ENDIF

 IF CF1='NUMFAILS'.OR.CF1='RECNO()'
 STORE '&CF1'+'&R1'+'&V1' TO SP
 ENDIF

 IF SP=' '
 STORE '&CF1'+'&R1'+"'"+'&V1'+"'" TO SP
 ENDIF

STORE 0 TO ICV

 IF CF2<>' '
```

```
 STORE SPU+' '+SUBSTR(J2,2,LEN(J2)-2)+' '+CF2+' '+R2+' '+V2 TO SPU
 STORE SP + J2 TO SP
  IF R2='HAS'
   IF IV2=.T.
   STORE SP+"'&V2'$UPPER(&CF2)" TO SP
   ELSE
   STORE SP+"'&V2'$&CF2" TO SP
   ENDIF
  STORE 1 TO ICV
  ENDIF

  IF CF2='NUMFAILS'.OR.CF2='RECNO()'
  STORE SP + '&CF2'+'&R2'+'&V2' TO SP
  STORE 1 TO ICV
  ENDIF

  IF ICV<>1
  STORE SP + '&CF2'+'&R2'+"'"+'&V2'+"'" TO SP
  ENDIF

 STORE 0 TO ICV
  IF CF3<>' '
  STORE SPU+' '+SUBSTR(J3,2,LEN(J3)-2)+' '+CF3+' '+R3+' '+V3 TO SPU
  STORE SP + J3 TO SP

   IF R3='HAS'
    IF IV3=.T.
    STORE SP+"'&V3'$UPPER(&CF3)" TO SP
    ELSE
    STORE SP+"'&V3'$&CF3" TO SP
    ENDIF
   STORE 1 TO ICV
   ENDIF

   IF CF3='NUMFAILS'.OR.CF3='RECNO()'
   STORE SP + '&CF3'+'&R3'+'&V3' TO SP
   STORE 1 TO ICV
   ENDIF

   IF ICV<>1
   STORE SP + '&CF3'+'&R3'+"'"+'&V3'+"'" TO SP
   ENDIF
  ENDIF
 ENDIF
RETURN
```

```
* R1FD.PRG 1-3-85 KRA
* PROGRAM TO DISPLAY LIST OF FIELDS AND WIDTHS ON SCREEN
SET DEVICE TO SCREEN
CLEAR
@ 1,3 SAY "List of database        with field        shown"
@ 2,0 SAY '1 '
@ 3,0 SAY '2 '
@ 4,0 SAY '3 '
@ 5,0 SAY '4 '
@ 6,0 SAY '5 '
@ 7,0 SAY '6 '
@ 2,15 SAY '7 '
@ 3,15 SAY '8 '
@ 4,15 SAY '9 '
@ 5,15 SAY '10'
@ 6,15 SAY '11'
@ 7,15 SAY '12'
@ 2,31 SAY '13'
@ 3,31 SAY '14'
@ 4,31 SAY '15'
@ 5,31 SAY '16'
@ 6,31 SAY '17'
@ 7,31 SAY '18'
@ 2,47 SAY '19'
@ 3,47 SAY '20'
@ 4,47 SAY '21'
@ 5,47 SAY '22'
@ 6,47 SAY '23'
@ 7,47 SAY '24'
@ 2,64 SAY '25'
@ 3,64 SAY '26'
@ 4,64 SAY '27'
@ 5,64 SAY '28'
@ 6,64 SAY '29'
SET COLOR TO &COL2
@ 1,20 SAY 'FIELDS'
@ 2,3 SAY 'DATABNUM'
@ 3,3 SAY 'LERNUM   '
@ 4,3 SAY 'REVISNUM'
@ 5,3 SAY 'ACCESNUM'
@ 6,3 SAY 'ENTRYNUM'
@ 7,3 SAY 'TYPEMAIN'
@ 2,19 SAY 'TYPESUB1'
@ 3,19 SAY 'TYPESUB2'
@ 4,19 SAY 'LOCATION'
@ 5,19 SAY 'MFG      '
@ 6,19 SAY 'REACNAME'
@ 7,19 SAY 'REACTYPE'
@ 2,35 SAY 'REACNSSS'
@ 3,35 SAY 'CISCLASS'
@ 4,35 SAY 'SYSPRIMA'
@ 5,35 SAY 'SYSSECON'
@ 6,35 SAY 'SYSDES   '
@ 7,35 SAY 'NUMFAILS'
```

```
@ 2,51 SAY 'DATE     '
@ 3,51 SAY 'POWERLEV'
@ 4,51 SAY 'MODE     '
@ 5,51 SAY 'CAUSEPRI'
@ 6,51 SAY 'CAUSESEC'
@ 7,51 SAY 'DURATION'
@ 2,68 SAY 'ISOLATED'
@ 3,68 SAY 'DISCOVER'
@ 4,68 SAY 'CORRECTS'
@ 5,68 SAY 'RELLER   '
@ 6,68 SAY 'COMMENTS'
SET COLOR TO &COL5
@ 1,38 SAY 'WIDTHS'
@ 2,12 SAY '4'
@ 3,12 SAY '6'
@ 4,12 SAY '2'
@ 5,12 SAY '6'
@ 6,12 SAY '2'
@ 7,12 SAY '1'
@ 2,28 SAY '1'
@ 3,28 SAY '1'
@ 4,28 SAY '1'
@ 5,28 SAY '4'
@ 6,28 SAY '3'
@ 7,28 SAY '1'
@ 2,43 SAY ' 1'
@ 3,43 SAY ' 1'
@ 4,43 SAY ' 2'
@ 5,43 SAY ' 5'
@ 6,43 SAY '36'
@ 7,43 SAY ' 2'
@ 2,60 SAY ' 8'
@ 3,60 SAY ' 3'
@ 4,60 SAY ' 1'
@ 5,60 SAY ' 2'
@ 6,60 SAY ' 2'
@ 7,60 SAY '10'
@ 2,77 SAY '  1'
@ 3,77 SAY '  1'
@ 4,77 SAY '  3'
@ 5,77 SAY ' 28'
@ 6,77 SAY '240'
@ 7,76 SAY ' '
SET COLOR TO &COL1
RETURN
```

```
* R1FDL.PRG 1-17-85 KRA
* PROGRAM TO DISPLAY LIST OF 14 FIELDS AND WIDTHS ON SCREEN
SET DEVICE TO SCREEN
CLEAR
@ 1,3 SAY "List of database        with field        shown"
@ 2,0 SAY '1 '
@ 3,0 SAY '2 '
@ 4,0 SAY '3 '
@ 2,16 SAY '4 '
@ 3,16 SAY '5 '
@ 4,16 SAY '6 '
@ 2,32 SAY '7 '
@ 3,32 SAY '8 '
@ 4,32 SAY '9 '
@ 2,47 SAY '10'
@ 3,47 SAY '11'
@ 4,47 SAY '12'
@ 2,64 SAY '13'
@ 3,64 SAY '14'
SET COLOR TO &COL2
@ 1,20 SAY 'FIELDS'
@ 2,3  SAY 'DATABNUM'
@ 3,3  SAY 'LERNUM  '
@ 4,3  SAY 'TYPEMAIN'
@ 2,19 SAY 'TYPESUB1'
@ 3,19 SAY 'REACNAME'
@ 4,19 SAY 'REACTYPE'
@ 2,35 SAY 'CISCLASS'
@ 3,35 SAY 'SYSPRIMA'
@ 4,35 SAY 'NUMFAILS'
@ 2,51 SAY 'DATE    '
@ 3,51 SAY 'MODE    '
@ 4,51 SAY 'CAUSEPRI'
@ 2,68 SAY 'ISOLATED'
@ 3,68 SAY 'COMMENTS'
SET COLOR TO &COL5
@ 1,38 SAY 'WIDTHS'
@ 2,12 SAY '4'
@ 3,12 SAY '6'
@ 4,12 SAY '1'
@ 2,28 SAY '1'
@ 3,28 SAY '3'
@ 4,28 SAY '1'
@ 2,44 SAY '1'
@ 3,44 SAY '2'
@ 4,44 SAY '2'
@ 2,60 SAY '8'
@ 3,60 SAY '1'
@ 4,60 SAY '2'
@ 2,77 SAY '1'
@ 3,77 SAY '240'
@ 4,77 SAY ' '
SET COLOR TO &COL1
RETURN
```

```
* R1OPT.PRG 2-6-85 KRA
* display number of hits along with selection parameters and filename.
SET DEVICE TO SCREEN
CLEAR

USE &DBD±R3TFCAT

STORE 1 TO L
GO TOP

DO WHILE SERIES<>SUBSTR(NID,1,2).AND.(.NOT.EOF())
SKIP
ENDDO

DO WHILE SERIES=SUBSTR(NID,1,2).AND.FNUM<=SUBSTR(NID,3,2).AND.(.NOT.EOF())
@ L,20 SAY "SERIES "+SERIES
STORE L+1 TO L
@ L,0 SAY "#  HITS  #FL  SELECTION PARAMETERS"
* display header for catalog
STORE L+1 TO L

 DO WHILE L<=22.AND.(.NOT.EOF())
  IF FNUM=SUBSTR(NID,3,2)
  SET COLOR TO &COL1
  ELSE
  SET COLOR TO &COL2
  ENDIF

  IF SERIES=SUBSTR(NID,1,2).AND.FNUM<=SUBSTR(NID,3,2)
  @ L,0 SAY FNUM PICTURE '99'
  @ L,3 SAY FHITS PICTURE '9999'
  @ L,8 SAY FNF PICTURE '9999'
  STORE TRIM(UPARAM) TO SPU
  @ L,14 SAY SUBSTR(SPU,1,65)

   IF LEN(SPU)>65
   STORE L+1 TO L
   @ L,14 SAY SUBSTR(SPU,66,49)
   ENDIF
  STORE L+1 TO L
  ENDIF
 SKIP
 ENDDO

 IF L>22
 WAIT 'Series too long for one screen, press any key to continue'
 CLEAR
 STORE 1 TO L
 ENDIF

ENDDO

SET COLOR TO &COL1
```

```
STORE ' ' TO OPT
STORE 'TEMP' TO MCV2
* Present options to exit, print, display, or change selection parameters.
@ L+1,0 CLEAR
TEXT
                        REPORT OPTIONS

     A - CHANGE Selection Parameters or use a different Search.
     L - LOOK at Entire Records on Screen, one at a time.
     P - PRINT Entire Records in Input Format.
     C - COLUMNS of Selected Data Fields On Screen or to Print.
         or print only search vital statistics.
     R - RESET Program defaults.
     X - EXIT To 1st Menu in Report program.

ENDTEXT
WAIT "       Your Choice? " TO OPT
READ

IF UPPER(OPT)='X'
RETURN
ENDIF

IF UPPER(OPT)="P"
DO R1PRINT
RETURN
ENDIF

IF UPPER(OPT)='L'
DO D18
RETURN
ENDIF

IF UPPER(OPT)='C'
DO R1UCR
RETURN
ENDIF

IF UPPER(OPT)='A'
STORE ' ' TO SUBOPT
CLEAR
TEXT
                        OPTIONS

A - Save the search you're currently working with and use it as the basis
    for a new one with different selection parameters.

B - Replace the current search with one that has different selection
    parameters.

C - Save your current search and look at the list of searches available on
    the disk with the option to choose one of them or start a new search.
            (Note: your current search will be on the list)
ENDTEXT
```

```
@ 13,0 SAY '          Your Choice' GET SUBOPT

READ

STORE '&OPT'+'&SUBOPT' TO OPT
DO R3CAT1
DO R1SEL
ENDIF

IF UPPER(OPT)='R'
 DO R1SET
ENDIF

RETURN
```

```
* R1UCR.PRG 5-02-85 Ken Ames
* Ultimate custom report program for RACISP database
* Maximizes both speed and flexibility for onscreen or printed reports
* Choose between default and custom report formats
PUBLIC LCV0,LCV2,LCV3
STORE ' ' TO LCV2,LCV0,LCV3,ICV3
CLEAR
IF MCV2='BASE'
 DO WHILE ICV3=' '
 @ 1,0 SAY 'Do you want to list all the records in the database or would you'
 @ 2,0 SAY 'like to list only selected records? A - All S - Selected' GET ICV3
  IF UPPER(ICV3)<>'A'.AND.UPPER(ICV3)<>'S'
  STORE ' ' TO ICV3
  ENDIF
 READ

 ENDDO

 IF UPPER(ICV3)='S'

 * IF THE 'SELECTED' OPTION IS CHOSEN, PRESENT MENUS LIKE REPORT PROGRAM

 STORE ' ' TO GCV
  DO WHILE UPPER(GCV)<>'X1'
  CLEAR
   DO CASE

   CASE MCV=14
    DO R1FDL
    IF UPPER(GCV)<>'X'
    @ 6,0 SAY 'Would you like to look at a glossary of FIELD names?' GET GCV
    READ
    @ 6,0 CLEAR
    ENDIF

   CASE MCV=29
    DO R1FD
    IF UPPER(GCV)<>'X'
    @ 8,0 SAY 'Would you like to look at a glossary of FIELD names?' GET GCV
    READ
    @ 8,0 CLEAR
    ENDIF
   ENDCASE

   IF UPPER(GCV)='X'.OR.UPPER(GCV)='N'
   STORE 'X1' TO GCV
   ENDIF

   IF UPPER(GCV)='Y'
    DO R1GLOS
   ENDIF
  ENDDO

  DO R1S
  IF UPPER(OPT)='X'
```

```
 RETURN
 ENDIF

 ENDIF
ENDIF

CLEAR
STORE '3' TO LCV0
DO WHILE LCV0='3'
STORE ' ' TO LCV0

 DO CASE
 CASE MCV=14
 TEXT
 This subroutine allows you to print or display columns of data from the
 database.  There are three preset formats which you can choose or you can
 easily create your own combination of fields to list.

 1 - Format 1, All 14 fields.

 2 - Format 2, DATABNUM, LERNUM, REACNAME, TYPEMAIN, TYPESUB1, SYSPRIMA,
               CAUSEPRI, MODE, & ISOLATED.

 3 - Format 3, Just Print or Display number of Hits and Failures along with
               Selection Parameters.  (Note: you'll be returned to this menu)

 C - Custom Report format.

 X - Exit back to previous menu.
 ENDTEXT
 STORE ' ' TO LCV0
  DO WHILE LCV0=' '
  @ 17,0 SAY 'Your Choice' GET LCV0
  READ
   IF UPPER(LCV0)<>'C'.AND.LCV0<>'1'.AND.LCV0<>'2'.AND.LCV0<>'3'.AND.UPPER(LCV0)<>'X'
   STORE ' ' TO LCV0
   ENDIF
  ENDDO
  IF UPPER(LCV0)='X'
  RETURN
  ENDIF
  IF LCV0='3'.AND.MCV2='TEMP'.OR.UPPER(ICV3)='S'.AND.LCV0='3'
  STORE ' ' TO LCV3
  @ 19,0 SAY 'P - Print, S - Screen, B - Both' GET LCV3
  READ
   IF UPPER(LCV3)='P'.OR.UPPER(LCV3)='B'
   @ 21,0 SAY "You can type in below any notes you'd like printed in the heading"
   STORE SPACE(78) TO PH2
   @ 22,0 GET PH2
   READ
   SET DEVICE TO PRINT
   SET MARGIN TO 4
   * Print condition headings

   STORE 4 TO L
```

```
@ L,0 SAY DATE()
@ L,10 SAY TIME()
STORE L+1 TO L

 IF LEN(TRIM(PH2))>0
 @ L,0 SAY PH2
 STORE L+1 TO L
 ENDIF

 IF MCV2='TEMP'
 USE &DBD±R3TFCAT

  DO WHILE SERIES<>MSERIES
  SKIP
  ENDDO

  DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
  @ L,0 SAY SUBSTR(UPARAM,1,80)
  STORE L+1 TO L
   IF LEN(TRIM(UPARAM))>80
   @ L,0 SAY SUBSTR(UPARAM,81,34)
   STORE L+1 TO L
   ENDIF
  SKIP
  ENDDO

 @ L,0 SAY 'HITS='
 @ L,5 SAY HITS PICTURE '9999'
 @ L,12 SAY 'TOTAL NUMFAILS= '
 @ L,28 SAY NF PICTURE '99999'
 STORE L+2 TO L

 ELSE

 USE &DBD±&MF
 SET FILTER TO &SP
 COUNT TO HITS
 SUM NUMFAILS TO NF
 @ L,0 SAY SUBSTR(SPU,1,80)
 STORE L+1 TO L
  IF LEN(TRIM(SPU))>80
  @ L,0 SAY SUBSTR(SPU,81,34)
  STORE L+1 TO L
  ENDIF
 @ L,0 SAY 'HITS='
 @ L,5 SAY HITS PICTURE '9999'
 @ L,12 SAY 'TOTAL NUMFAILS= '
 @ L,28 SAY NF PICTURE '99999'
 STORE L+2 TO L
 ENDIF
EJECT
SET DEVICE TO SCREEN
ENDIF

IF UPPER(LCV3)='S'.OR.UPPER(LCV3)='B'
```

```
 CLEAR
 STORE 1 TO L
 @ L,0 SAY DATE()
 @ L,10 SAY TIME()
 STORE L+1 TO L

  IF MCV2='TEMP'
  USE &DBD±R3TFCAT

   DO WHILE SERIES<>MSERIES
   SKIP
   ENDDO

   DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
   @ L,0 SAY SUBSTR(UPARAM,1,80)
   STORE L+1 TO L
    IF LEN(TRIM(UPARAM))>80
    @ L,0 SAY SUBSTR(UPARAM,81,34)
    STORE L+1 TO L
    ENDIF
   SKIP
   ENDDO

  @ L,0 SAY 'HITS='
  @ L,5 SAY HITS PICTURE '9999'
  @ L,12 SAY 'TOTAL NUMFAILS= '
  @ L,28 SAY NF PICTURE '99999'
  STORE L+2 TO L

  ELSE

   IF UPPER(LCV3)<>'B'
   USE &DBD±&MF
   SET FILTER TO &SP
   COUNT TO HITS
   SUM NUMFAILS TO NF
   ENDIF
  @ L,0 SAY SUBSTR(SPU,1,80)
  STORE L+1 TO L
   IF LEN(TRIM(SPU))>80
   @ L,0 SAY SUBSTR(SPU,81,34)
   STORE L+1 TO L
   ENDIF
  @ L,0 SAY 'HITS='
  @ L,5 SAY HITS PICTURE '9999'
  @ L,12 SAY 'TOTAL NUMFAILS= '
  @ L,28 SAY NF PICTURE '99999'
  STORE L+2 TO L
  ENDIF
 ENDIF
CLOSE DATABASES
WAIT
CLEAR
ENDIF
CASE MCV=29
```

```
TEXT
This subroutine allows you to print or display columns of data from the
database.  There are three preset formats which you can choose or you can
easily create your own combination of fields to list.

1 - Format 1, All 14 fields used in the abbreviated database:
              DATABNUM, LERNUM, TYPEMAIN, TYPESUB1, REACNAME, REACTYPE,
              CISCLASS, SYSPRIMA, NUMFAILS, DATE, MODE, CAUSEPRI, ISOLATED, &
              COMMENTS.

2 - Format 2, DATABNUM, LERNUM, REACNAME, TYPEMAIN, TYPESUB1, SYSPRIMA,
              CAUSEPRI, MODE, & ISOLATED.

3 - Format 3, Just Print or Display number of Hits and Failures along with
              Selection Parameters.  (Note: you'll be returned to this menu)

C - Custom Report format.

X - Exit back to previous menu.
ENDTEXT
STORE ' ' TO LCV0
 DO WHILE LCV0=' '
 @ 17,0 SAY 'Your Choice' GET LCV0
 READ
  IF UPPER(LCV0)<>'C'.AND.LCV0<>'1'.AND.LCV0<>'2'.AND.LCV0<>'3'
   IF UPPER(LCV0)<>'X'
   STORE ' ' TO LCV0
   ENDIF
  ENDIF
 ENDDO
 IF UPPER(LCV0)='X'
 RETURN
 ENDIF
 IF LCV0='3'.AND.MCV2='TEMP'.OR.UPPER(ICV3)='S'.AND.LCV0='3'
 STORE ' ' TO LCV3
 @ 19,0 SAY 'P - Print, S - Screen, B - Both' GET LCV3
 READ
  IF UPPER(LCV3)='P'.OR.UPPER(LCV3)='B'
  @ 21,0 SAY "You can type in below any notes you'd like printed in the heading"
  STORE SPACE(78) TO PH2
  @ 22,0 GET PH2
  READ

  SET DEVICE TO PRINT
  SET MARGIN TO 4
  * Print condition headings

  STORE 4 TO L
  @ L,4 SAY DATE()
  @ L,14 SAY TIME()
  STORE L+1 TO L

   IF LEN(TRIM(PH2))>0
   @ L,0 SAY PH2
   STORE L+1 TO L
```

```
ENDIF

IF MCV2='TEMP'
USE &DBD±R3TFCAT

 DO WHILE SERIES<>MSERIES
 SKIP
 ENDDO

 DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
 @ L,0 SAY SUBSTR(UPARAM,1,80)
 STORE L+1 TO L
  IF LEN(TRIM(UPARAM))>80
  @ L,0 SAY SUBSTR(UPARAM,81,34)
  STORE L+1 TO L
  ENDIF
 SKIP
 ENDDO

@ L,0 SAY 'HITS='
@ L,5 SAY HITS PICTURE '9999'
@ L,12 SAY 'TOTAL NUMFAILS= '
@ L,28 SAY NF PICTURE '99999'
STORE L+2 TO L

ELSE

USE &DBD±&MF
SET FILTER TO &SP
COUNT TO HITS
SUM NUMFAILS TO NF
@ L,0 SAY SUBSTR(SPU,1,80)
STORE L+1 TO L
 IF LEN(TRIM(SPU))>80
 @ L,0 SAY SUBSTR(SPU,81,34)
 STORE L+1 TO L
 ENDIF
@ L,0 SAY 'HITS='
@ L,5 SAY HITS PICTURE '9999'
@ L,12 SAY 'TOTAL NUMFAILS= '
@ L,28 SAY NF PICTURE '99999'
STORE L+2 TO L
ENDIF
EJECT
SET DEVICE TO SCREEN
ENDIF

IF UPPER(LCV3)='S'.OR.UPPER(LCV3)='B'
CLEAR
STORE 1 TO L
@ L,0 SAY DATE()
@ L,10 SAY TIME()
@ L,51 SAY "Page "
@ L,56 SAY PN
STORE L+1 TO L
```

```
    IF MCV2='TEMP'
    USE &DBD±R3TFCAT

     DO WHILE SERIES<>MSERIES
     SKIP
     ENDDO

     DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
     @ L,0 SAY SUBSTR(UPARAM,1,80)
     STORE L+1 TO L
      IF LEN(TRIM(UPARAM))>80
      @ L,0 SAY SUBSTR(UPARAM,81,34)
      STORE L+1 TO L
      ENDIF
     SKIP
     ENDDO

    @ L,0 SAY 'HITS='
    @ L,5 SAY HITS PICTURE '9999'
    @ L,12 SAY 'TOTAL NUMFAILS= '
    @ L,28 SAY NF PICTURE '99999'
    STORE L+2 TO L

    ELSE

     IF UPPER(LCV3)<>'B'
     USE &DBD±&MF
     SET FILTER TO &SP
     COUNT TO HITS
     SUM NUMFAILS TO NF
     ENDIF
    @ L,0 SAY SUBSTR(SPU,1,80)
    STORE L+1 TO L
     IF LEN(TRIM(SPU))>80
     @ L,0 SAY SUBSTR(SPU,81,34)
     STORE L+1 TO L
     ENDIF
    @ L,0 SAY 'HITS='
    @ L,5 SAY HITS PICTURE '9999'
    @ L,12 SAY 'TOTAL NUMFAILS= '
    @ L,28 SAY NF PICTURE '99999'
    STORE L+2 TO L
    ENDIF
   ENDIF
  CLOSE DATABASES
  CLEAR
  ENDIF
 ENDCASE
ENDDO

IF LCVO='1'.OR. LCVO='2'
DO R1SR
RETURN
ENDIF
```

```
* Choose the report width
CLEAR
STORE '80 ' TO PW
TEXT
Most computer screens will display 80 characters on one line.  Computer
printers, by using 12, 15 or more characters to the inch or wide paper,
can often print many more characters per line.  Please enter right margin
you want to use (left margin is 4).  If you start any new columns after the
75th, you will not be able to customize headings.
ENDTEXT
@ 6,0 SAY 'Right margin to use' GET PW
READ
* Choose the database fields to be used in the report

STORE 'N' TO GCV
CLEAR
DO WHILE UPPER(GCV)<>'X'
 DO CASE
 CASE MCV=14
  DO R1FDL
  IF UPPER(GCV)<>'X'
  @ 6,0 SAY 'Would you like to look at a glossary of FIELD names?' GET GCV
  READ
  @ 5,0 CLEAR

  STORE "4  DB #         DATABNUM" TO FNO1
  STORE "6  LER #        LERNUM"   TO FNO2
  STORE "1  TYPE    MAINTYPEMAIN" TO FNO3
  STORE "1  TYPE    SUB1TYPESUB1" TO FNO4
  STORE "3  REAC    NAMEREACNAME" TO FNO5
  STORE "1  REAC    TYPEREACTYPE" TO FNO6
  STORE "1  CIS     CLS CISCLASS" TO FNO7
  STORE "2  SYS     PRI SYSPRIMA" TO FNO8
  STORE "2  NUM     FLS NUMFAILS" TO FNO9
  STORE "8  DATE        DATE"     TO FN10
  STORE "1  MODE        MODE"     TO FN11
  STORE "2  CAU     PRI CAUSEPRI" TO FN12
  STORE "1  ISOL     ?  ISOLATED" TO FN13
  STORE "240COMMENTS    COMMENTS" TO FN14

  ENDIF

 CASE MCV=29
  DO R1FD
  IF UPPER(GCV)<>'X'
  @ 8,0 SAY 'Would you like to look at a glossary of FIELD names?' GET GCV
  READ
  @ 8,0 CLEAR

   STORE "4  DB #         DATABNUM" TO FNO1
   STORE "6  LER #        LERNUM"   TO FNO2
   STORE "2  RV      #    REVISNUM" TO FNO3
   STORE "6  ACCESS  #    ACCESNUM" TO FNO4
   STORE "2  EN      #    ENTRYNUM" TO FNO5
```

```
   STORE "1  T       M   TYPEMAIN" TO FN06
   STORE "1  T       1   TYPESUB1" TO FN07
   STORE "1  T       2   TYPESUB2" TO FN08
   STORE "1  L       C   LOCATION" TO FN09
   STORE "4  MFG         MFG"      TO FN10
   STORE "3  RTR     NAM REACNAME" TO FN11
   STORE "1  R       T   REACTYPE" TO FN12
   STORE "1  N       S   REACNSSS" TO FN13
   STORE "1  C       C   CISCLASS" TO FN14
   STORE "2  SY      1   SYSPRIMA" TO FN15
   STORE "5  SY      2   SYSSECON" TO FN16
   STORE "36 SYSTEM  D   SYSDES"   TO FN17
   STORE "2  #       F   NUMFAILS" TO FN18
   STORE "8  DATE        DATE"     TO FN19
   STORE "3  PWR     %   POWERLEV" TO FN20
   STORE "1  M       D   MODE"     TO FN21
   STORE "2  CS      1   CAUSEPRI" TO FN22
   STORE "2  CS      2   CAUSESEC" TO FN23
   STORE "10 DURATION    DURATION" TO FN24
   STORE "1  I       ?   ISOLATED" TO FN25
   STORE "1  D       C   DISCOVER" TO FN26
   STORE "3  COR     ?   CORRECTS" TO FN27
   STORE "28 RELATED LER RELLER"   TO FN28
   STORE "240COMMENTS    COMMENTS" TO FN29

  ENDIF
 ENDCASE

 IF UPPER(GCV)='N'
 STORE 'X' TO GCV
 ENDIF

 IF UPPER(GCV)='Y'
  DO R1GLOS
 ENDIF

ENDDO

TEXT
This subroutine lets you make custom formats for onscreen or printed reports.
In this subprogram, just enter the numbers of the fields you want to see and
enter a blank for the last one (unless you get the 'Page Full' message first).
If COMMENTS is one of the fields you want, please enter the number for it last,
since it will use up any remaining page width.
ENDTEXT

IF UPPER(CONF)='N'
SET CONFIRM ON
ENDIF
IF MCV=29
@ 14,0 CLEAR
ELSE
@ 12,0 CLEAR
ENDIF
STORE VAL(PW) TO CRPW
```

```
STORE 1 TO NN
SET COLOR TO &COL2
STORE ' ' TO LCV2,LCV4
STORE 'Y' TO LCV
SET COLOR TO &COL1
STORE '' TO CRDEL
STORE 0 TO CRAPW

DO WHILE LCV<>'X'
 IF NN<10
 STORE STR(NN,1) TO N
 STORE '0'+N TO N
 ELSE
 STORE STR(NN,2) TO N
 ENDIF
STORE '  ' TO FN
SET COLOR TO &COL2
IF MCV=14
@ 12,15 SAY 'Width of remaining space on page: '
SET COLOR TO &COL1
@ 12,49 SAY STR(CRPW-CRAPW,3)
ELSE
@ 14,15 SAY 'Width of remaining space on page: '
SET COLOR TO &COL1
@ 14,49 SAY STR(CRPW-CRAPW,3)
ENDIF
SET COLOR TO &COL2
IF ROW()+NN<=22
@ ROW()+NN,0 SAY 'Number of FIELD for Column #'+N+' <RETURN> to end' GET FN
ELSE
@ 22,0 SAY 'Number of FIELD for Column #'+N+' <RETURN> to end' GET FN
ENDIF
READ
 IF FN='  '
 STORE NF-1 TO NF
 EXIT
 ENDIF
STORE NN+1 TO NN
STORE NN TO NF
STORE TRIM(FN) TO FN
 IF VAL(FN)<10
 STORE '0'+FN TO FN
 ENDIF
STORE FN TO FNO&N
 IF SUBSTR(FN&FN,16,8)='COMMENTS'
 STORE 'X' TO LCV
  IF UPPER(CONF)='N'
  SET CONFIRM OFF
  ENDIF
 SET COLOR TO &COL1
 STORE ' ' TO LCV3
  DO WHILE LCV3=' '
  @ ROW()+1,0 SAY 'Enter A to see All of COMMENTS, T to truncate to one line' GET LCV3
  READ
   IF UPPER(LCV3)<>'A'.AND.UPPER(LCV3)<>'T'
```

```
   STORE ' ' TO LCV3
   ENDIF
  ENDDO
 STORE NF-1 TO NF
 STORE UPPER(LCV3) TO LCV3
 ELSE
 STORE CRAPW+VAL(SUBSTR(FN&FN,1,3))+1 TO CRAPW
  IF CRAPW>CRPW+1
 STORE CRAPW-(VAL(SUBSTR(FN&FN,1,3))+1) TO CRAPW
  SET COLOR TO &COL3
  @ 23,0 SAY 'Last Field entered will not fit, entries terminated'
  STORE NF-1 TO NF
  WAIT 'Press any key to continue or X to start over' TO LCV1
  SET COLOR TO &COL1
   IF UPPER(LCV1)='X'
   RETURN
   ENDIF
  ENDIF
 ENDIF
ENDDO

IF UPPER(CONF)='N'
SET CONFIRM OFF
ENDIF
*  End of section selecting fields

*  Next, get headings set.
* There are three options for headings
*  1. Use field names for headings.
*  2. Use canned headings stored along with the field names.
*  3. Let the user select his own headings.
*  In order to choose, first we have to check to see if option #1 is viable.
*  To do this, we sum the widths of the field names +1, or the field widths if
* they're wider and see if that value exceeds the selected page width.
STORE 1 TO NN,CCP
STORE 0 TO EW
DO WHILE NN<=NF
 IF NN<10
 STORE STR(NN,1) TO N
 STORE '0'+N TO N
 ELSE
 STORE STR(NN,2) TO N
 ENDIF
STORE FNO&N TO N
* N is no longer an echo of NN, but the number of the current field
STORE VAL(SUBSTR(FN&N,1,3))-LEN(SUBSTR(FN&N,16,8)) TO EW
IF EW<0
STORE 0 TO EW
ENDIF
 IF NN=NF.AND.LCV3<>' '
 * If it's the last field and it's COMMENTS, don't add EW, just add 24
 STORE CCP+1+LEN(SUBSTR(FN&N,16,8))+24 TO CCP
 ELSE
 STORE CCP+1+LEN(SUBSTR(FN&N,16,8))+EW TO CCP
 ENDIF
```

```
STORE NN+1 TO NN
ENDDO

STORE '' TO LS1,CRDEL
IF CCP<=CRPW
*  If the field names fit, display the resulting column headings and ask the
* user if he wants to change them.
STORE .F. TO LCV1
STORE 1 TO NN,CCP
STORE 0 TO EW,EW2
STORE '' TO CH1
DO WHILE NN<=NF
 IF NN<10
 STORE STR(NN,1) TO N
 STORE '0'+N TO N
 ELSE
 STORE STR(NN,2) TO N
 ENDIF
STORE FNO&N TO N
STORE CH1+' '+SPACE(EW2)+SUBSTR(FN&N,16,8) TO CH1
STORE LEN(SUBSTR(FN&N,16,8))-VAL(SUBSTR(FN&N,1,3)) TO EW
 IF EW<0
 STORE -EW TO EW2
 STORE 0 TO EW
 ELSE
 STORE 0 TO EW2
 ENDIF
STORE EW2+LEN(SUBSTR(FN&N,16,8)) TO CCW
*  At the same time, get together the listing string, in case the user chooses
* the default headings
 IF EW>0.AND.NN<>NF
 STORE LS1+CRDEL+SUBSTR(FN&N,16,8)+',"'+SPACE(EW-1)+'"' TO LS1
 STORE CCP+CCW+1 TO CCP
 ELSE
  IF LCV3<>' '.AND.NN=NF
  STORE LS1 TO LST
  STORE LS1+CRDEL+'SUBSTR(COMMENTS,1,(CRPW-CCP-1))' TO LS1
  STORE LST+CRDEL+'COMMENTS' TO LS2
  ELSE
  STORE LS1+CRDEL+SUBSTR(FN&N,16,8) TO LS1
  ENDIF
  IF NN<>NF
  STORE CCP+CCW+1 TO CCP
  ENDIF
 ENDIF
STORE ',' TO CRDEL
STORE NN+1 TO NN
ENDDO
STORE '' TO CH2
ELSE
*  If the field names don't fit, make a heading from the 'canned' column
* headings and ask the user if he wants to change them.
STORE .T. TO LCV1
STORE 0 TO EW,EW2,EW3
STORE 1 TO NN,CCP
```

```
STORE '' TO CH1,CH2,CRDEL
DO WHILE NN<=NF
 IF NN<10
 STORE STR(NN,1) TO N
 STORE '0'+N TO N
 ELSE
 STORE STR(NN,2) TO N
 ENDIF
STORE FNO&N TO N
STORE CH1+' '+SPACE(EW)+TRIM(SUBSTR(FN&N,4,8)) TO CH1
STORE CH2+' '+SPACE(EW+EW2)+TRIM(SUBSTR(FN&N,12,4)) TO CH2
STORE LEN(TRIM(SUBSTR(FN&N,4,8)))-LEN(TRIM(SUBSTR(FN&N,12,4))) TO EW2
STORE VAL(SUBSTR(FN&N,1,3))-LEN(TRIM(SUBSTR(FN&N,4,8))) TO EW
* Notice that EW is added before the heading, so no trailing blanks
STORE LEN(TRIM(SUBSTR(FN&N,4,8)))+EW TO CCW

*  At the same time, get together the listing string, in case the user chooses
* the default headings
  IF EW<0.AND.NN<>NF
  STORE LS1+CRDEL+SUBSTR(FN&N,16,8)+',"'+SPACE(-EW-1)+'"' TO LS1
  ELSE
   IF LCV3<>' '.AND.NN=NF
   STORE LS1 TO LST
   STORE LS1+CRDEL+'SUBSTR(COMMENTS,1,(CRPW-CCP-1))' TO LS1
   STORE LST+CRDEL+'COMMENTS' TO LS2
   ELSE
   STORE LS1+CRDEL+SUBSTR(FN&N,16,8) TO LS1
   ENDIF
  ENDIF
  IF NN<>NF
  STORE CCP+CCW+1 TO CCP
  ENDIF
STORE ',' TO CRDEL
STORE NN+1 TO NN
IF EW<0
STORE 0 TO EW
ENDIF
ENDDO
ENDIF
STORE '' TO CH3

CLEAR
@ 1,0 SAY 'Here are your standard column headings'
SET COLOR TO &COL2
@ 3,0 SAY CH1
IF LCV1
@ 4,0 SAY CH2
ENDIF
SET COLOR TO &COL1
IF CCP<75.OR.CRPW<81
STORE ' ' TO LCV0
 DO WHILE LCV0=' '
 @ 6,0 SAY 'Are these headings OK?, if not, you can enter new ones.'
 @ 8,0 SAY 'Y - Headings are OK   N - Not OK, Make make new ones' GET LCV0
 READ
```

```
  IF UPPER(LCVO)<>'Y'.AND.UPPER(LCVO)<>'N'
  STORE ' ' TO LCVO
  ENDIF
 ENDDO
ELSE
@ 6,0 SAY 'Your report is too wide to allow the program to display the headings'
@ 7,0 SAY 'properly on the screen, so the standard headings will be used.'
STORE 'Y' TO LCVO
ENDIF

*  If the user decides to change the column headings, show him the present
* heading, its width, the maximum amount he can widen the heading without going
* off the edge of the page, and a place to type a heading up to 3 lines high.
IF UPPER(LCVO)='N'
CLEAR
SET COLOR TO &COL2
@ 1,0 SAY 'The space shown for your heading is the widest space you can use without making'
@ 2,0 SAY 'the report too wide to fit on the page.  The underlined part of the area shows'
@ 3,0 SAY 'the field width.  Any spaces you use beyond the underline are subtracted from'
@ 4,0 SAY "the extra space that will be available for the next column's heading, so use"
@ 5,0 SAY 'the extra space judiciously.'
STORE '' TO CH1,CH2,CH3,LS1,CRDEL
STORE 1 TO NN,CCP
STORE '_____' TO LI
*  Figure out just how many extra spaces are available
 IF LCV3=' '
 STORE CRPW-CRAPW TO ESA
 ELSE
 STORE CRPW-(CRAPW+16) TO ESA
  IF ESA<0
  STORE 0 TO ESA
  ENDIF
 ENDIF

 DO WHILE NN<=NF
  IF NN<10
  STORE STR(NN,1) TO N
  STORE '0'+N TO N
  ELSE
  STORE STR(NN,2) TO N
  ENDIF
 SET COLOR TO &COL2
 @ 7,0 SAY 'Field Number            Field Width'
 SET COLOR TO &COL1
 @ 7,13 SAY NN PICTURE '99'
 STORE FNO&N TO FN
 @ 8,2 SAY SUBSTR(FN&FN,16,8)+SPACE(5)
 @ 8,28 SAY SUBSTR(FN&FN,1,3)+SPACE(2)
  IF LCV3<>' '.AND.NN=NF
  * If we're at the last field and it is COMMENTS
  STORE CRPW-CCP-2 TO UL
  STORE 'COMMENTS'+SUBSTR(LINE,1,(UL-8)) TO HL1
  STORE SUBSTR(LINE,1,UL) TO HL2,HL3
  ELSE
   IF LCV1
```

```
  * If canned headings are being used
  STORE VAL(SUBSTR(FN&FN,1,3))-LEN(TRIM(SUBSTR(FN&FN,4,8))) TO UL
   IF UL<0
   STORE ESA+UL TO ESA1
   STORE 0 TO UL
   ELSE
   STORE ESA TO ESA1
   ENDIF
  STORE TRIM(SUBSTR(FN&FN,4,8))+SUBSTR(LINE,1,UL)+SPACE(ESA1) TO HL1
  STORE VAL(SUBSTR(FN&FN,1,3))-LEN(TRIM(SUBSTR(FN&FN,12,4))) TO UL
   IF UL<0
   STORE ESA+UL TO ESA1
   STORE 0 TO UL
   ELSE
   STORE ESA TO ESA1
   ENDIF
  STORE TRIM(SUBSTR(FN&FN,12,4))+SUBSTR(LINE,1,UL)+SPACE(ESA1) TO HL2
  STORE VAL(SUBSTR(FN&FN,1,3)) TO UL
  STORE SUBSTR(LINE,1,UL)+SPACE(ESA) TO HL3
  ELSE
  * If field name headings are being used
  STORE VAL(SUBSTR(FN&FN,1,3))-LEN(TRIM(SUBSTR(FN&FN,16,8))) TO UL
   IF UL<0
   STORE ESA+UL TO ESA1
   STORE 0 TO UL
   ENDIF
  STORE TRIM(SUBSTR(FN&FN,16,8))+SUBSTR(LINE,1,UL)+SPACE(ESA1) TO HL1
  STORE VAL(SUBSTR(FN&FN,1,3)) TO UL
  STORE SUBSTR(LINE,1,UL)+SPACE(ESA) TO HL2,HL3
  ENDIF
 ENDIF

SET COLOR TO &COL2
IF CCP+LEN(HL1)>78
STORE SUBSTR(HL1,1,(78-CCP)) TO HL1
STORE SUBSTR(HL2,1,(78-CCP)) TO HL2
STORE SUBSTR(HL3,1,(78-CCP)) TO HL3
ENDIF
@ 10,CCP GET HL1
@ 11,CCP GET HL2
@ 12,CCP GET HL3
READ
 IF LEN(TRIM(HL3))<=LEN(TRIM(HL2))
  IF LEN(TRIM(HL2))<=LEN(TRIM(HL1))
  STORE LEN(TRIM(HL1)) TO CCW
  ELSE
  STORE LEN(TRIM(HL2)) TO CCW
  ENDIF
 ELSE
  IF LEN(TRIM(HL3))<=LEN(TRIM(HL1))
  STORE LEN(TRIM(HL1)) TO CCW
  ELSE
  STORE LEN(TRIM(HL3)) TO CCW
  ENDIF
 ENDIF
```

```
  IF HL2='_'
  STORE SPACE(CCW) TO HL2
  ENDIF
  IF HL3='_'
  STORE SPACE(CCW) TO HL3
  ENDIF
 STORE CH1+' '+SUBSTR(HL1,1,CCW) TO CH1
 STORE CH2+' '+SUBSTR(HL2,1,CCW) TO CH2
 STORE CH3+' '+SUBSTR(HL3,1,CCW) TO CH3
 STORE CCW-VAL(SUBSTR(FN&FN,1,3)) TO EW
 *  Once the heading is set, generate the string to be used in the LIST command
 * with the appropriate number of spaces and substring commands
  IF EW>0.AND.NN<>NF
  STORE LS1+CRDEL+SUBSTR(FN&FN,16,8)+',"'+SPACE(EW-1)+'"' TO LS1
  ELSE
   IF LCV3<>' '.AND.NN=NF
   STORE LS1 TO LST
   STORE LS1+CRDEL+'SUBSTR(COMMENTS,1,(CRPW-CCP-1))' TO LS1
   STORE LST+CRDEL+'COMMENTS' TO LS2
   ELSE
   STORE LS1+CRDEL+SUBSTR(FN&FN,16,8) TO LS1
   ENDIF
  ENDIF
 STORE ',' TO CRDEL
 STORE ESA-EW-1 TO ESA
 IF NN<>NF
 STORE CCP+CCW+1 TO CCP
 ENDIF
 STORE NN+1 TO NN
 ENDDO
ENDIF

*  After the list command is set, ask the user to choose between screen output
* and printer output.
SET COLOR TO &COL1
STORE ' ' TO LCV2
 DO WHILE LCV2=' '
 @ 14,0 SAY 'Enter P to Print Report or S to See on Screen' GET LCV2
 READ
  IF UPPER(LCV2)<>'P'.AND.UPPER(LCV2)<>'S'
  STORE ' ' TO LCV2
  ENDIF
 ENDDO
*  If the user has chosen screen output, display one screenful at a time with
* the option to page back and forth through the output or exit without seeing
* it all.
* Set variable CL to indicate how many lines are in the column headings
IF LEN(TRIM(CH3))<>0
STORE 3 TO CL
ELSE
 IF LEN(TRIM(CH2))<>0
 STORE 2 TO CL
 ELSE
 STORE 1 TO CL
 ENDIF
```

```
ENDIF

SET HEADING OFF

DO WHILE UPPER(LCV2)<>'X'
IF UPPER(LCV2)='S'
CLEAR

STORE 1 TO NN
* Display condition headings

SET COLOR TO &COL2
STORE 0 TO L
STORE 1 TO PN
 IF MCV2='TEMP'
 USE &DBD±R3TFCAT

  DO WHILE SERIES<>MSERIES
  SKIP
  ENDDO

  DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
  STORE TRIM(UPARAM) TO SPU
  SKIP
  ENDDO

 USE &DBD±R3T&NID

 ELSE

 USE &DBD±&MF
  IF UPPER(ICV3)='S'
  SET FILTER TO &SP
  GO TOP
  ENDIF
 ENDIF

 DO WHILE .NOT. EOF().AND.UPPER(LCV4)<>'X'
 CLEAR
  IF MCV2='TEMP'.AND.PN=1.OR.UPPER(ICV3)='S'
  SET COLOR TO &COL2
  @ 0,0 SAY SPU
  STORE 1 TO NN
   DO WHILE NN<=CL
   STORE STR(NN,1) TO N
   @ VAL(N),0 SAY CH&N
   STORE NN+1 TO NN
   ENDDO
  SET COLOR TO &COL1
   IF LCV3='T'.OR.LCV3=' '
   LIST OFF NEXT 23-CL &LS1
   ELSE
   LIST OFF NEXT 5 &LS2
   ENDIF
   IF .NOT. EOF()
```

```
 SKIP
 ENDIF
ELSE
SET COLOR TO &COL2
STORE 1 TO NN
 DO WHILE NN<=CL
 STORE STR(NN,1) TO N
 @ VAL(N),0 SAY CH&N
 STORE NN+1 TO NN
 ENDDO
SET COLOR TO &COL1
 IF LCV3='T'.OR.LCV3=' '
 LIST OFF NEXT 23-CL &LS1
 ELSE
 LIST OFF NEXT 5 &LS2
 ENDIF
 IF .NOT. EOF()
 SKIP
 ENDIF
ENDIF
IF .NOT. EOF()
SET COLOR TO &COL5
@ 24,0 SAY 'Screen '
@ 24,7 SAY PN PICTURE '999'
 IF PN<>1
 @ 24,11 SAY 'N - Next Screen, P - Previous Screen, X - Exit' GET LCV4
 ELSE
 @ 24,11 SAY 'N - Next Screen, X - Exit' GET LCV4
 ENDIF
READ
STORE PN+1 TO PN
 IF UPPER(LCV4)='P'.AND. PN<>2
 STORE PN-2 TO PN
  IF LCV3='T'.OR.LCV3=' '
  SKIP -(45-(2*CL))
   IF .NOT. BOF()
   SKIP -1
   ENDIF
  ELSE
  SKIP -10
  ENDIF
 SET COLOR TO &COL1
 ENDIF
ELSE
SET COLOR TO &COL5
@ 24,0 SAY 'Screen '
@ 24,7 SAY PN PICTURE '999'
 IF PN<>1
 @ 24,11 SAY 'P - Previous Screen, X - Exit' GET LCV4
 READ
 ELSE
 @ 24,11 SAY 'Listing complete, press any key to continue' GET LCV4
 READ
 STORE 'X' TO LCV4
 ENDIF
```

```
   IF UPPER(LCV4)='P'
   STORE PN-1 TO PN
    IF LCV3='T'.OR.LCV3=' '
    SKIP -(45-(2*CL))
     IF .NOT. BOF()
     SKIP -1
     ENDIF
    ELSE
    SKIP -10
    ENDIF
   SET COLOR TO &COL1
   ELSE
   STORE 'X' TO LCV4
   ENDIF
  ENDIF
 ENDDO
SET COLOR TO &COL1
ENDIF

*  If the user has chosen printed ouput, print the report with the selection
* parameters if it is from a search file.

IF UPPER(LCV2)='P'.AND.LCV3<>'A'
@ 16,0 SAY "You can type in below any notes you'd like printed in the heading"
STORE SPACE(78) TO PH2
@ 17,0 GET PH2
READ

SET DEVICE TO PRINT
SET MARGIN TO 4
STORE 1 TO NN
STORE 1 TO PN
STORE 'Y' TO LCV
* Print condition headings

* PRINT FIRST HEADING
 DO WHILE LCV<>'X'

 STORE 4 TO L
 @ L,4 SAY DATE()
 @ L,14 SAY TIME()
 @ L,55 SAY "Page "
 @ L,60 SAY PN
 STORE L+1 TO L

  IF PN=1
   IF LEN(TRIM(PH2))>0
   @ L,0 SAY PH2
   STORE L+1 TO L
   ENDIF

   IF MCV2='TEMP'
   USE &DBD±R3TFCAT

    DO WHILE SERIES<>MSERIES
```

```
    SKIP
    ENDDO

    DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
    @ L,0 SAY TRIM(UPARAM)
    STORE L+1 TO L
    SKIP
    ENDDO

   USE &DBD±R3T&NID

   @ L,0 SAY 'HITS='
   @ L,5 SAY HITS PICTURE '9999'
   @ L,12 SAY 'TOTAL NUMFAILS= '
   @ L,28 SAY NF PICTURE '99999'
   STORE L+2 TO L

   ELSE

   USE &DBD±&MF
    IF UPPER(ICV3)='S'
    SET FILTER TO &SP
    COUNT TO HITS
    SUM NUMFAILS TO NF
    GO TOP
    @ L,0 SAY 'HITS='
    @ L,5 SAY HITS PICTURE '9999'
    @ L,12 SAY 'TOTAL NUMFAILS= '
    @ L,28 SAY NF PICTURE '99999'
    STORE L+2 TO L
    ENDIF
   ENDIF
  GO TOP
  ENDIF

 @ L,0 SAY CH1
 STORE L+1 TO L
 @ L,0 SAY CH2
 LIST OFF NEXT 60-L &LS1  TO PRINT
 IF EOF()
 STORE 'X' TO LCV
 ELSE
 SKIP
 ENDIF
 STORE PN+1 TO PN
 EJECT
 ENDDO
SET PRINT OFF
ENDIF

IF UPPER(LCV2)='P'.AND.UPPER(LCV3)='A'
* If all of COMMENTS is being printed
@ 16,0 SAY "You can type in below any notes you'd like printed in the heading"
STORE SPACE(78) TO PH2
@ 17,0 GET PH2
```

```
READ
STORE CRPW-CCP TO CCW
IF CCW>=40
STORE CCP TO PCV
ELSE
STORE 0 TO PCV
ENDIF
SET DEVICE TO PRINT
SET MARGIN TO 4
STORE 1 TO NN
STORE 1 TO PN
STORE 'Y' TO LCV
* Print condition headings

* PRINT FIRST HEADING
DO WHILE LCV<>'X'

STORE 4 TO L
@ L,4 SAY DATE()
@ L,14 SAY TIME()
@ L,55 SAY "Page "
@ L,60 SAY PN
STORE L+1 TO L

 IF PN=1
  IF LEN(TRIM(PH2))>0
  @ L,0 SAY PH2
  STORE L+1 TO L
  ENDIF
  IF MCV2='TEMP'
  USE &DBD±R3TFCAT

   DO WHILE SERIES<>MSERIES
   SKIP
   ENDDO

   DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
   @ L,0 SAY TRIM(UPARAM)
   STORE L+1 TO L
   SKIP
   ENDDO

  USE &DBD±R3T&NID

  @ L,0 SAY 'HITS='
  @ L,5 SAY HITS PICTURE '9999'
  @ L,12 SAY 'TOTAL NUMFAILS= '
  @ L,28 SAY NF PICTURE '99999'
  STORE L+2 TO L

  ELSE

  USE &DBD±&MF
   IF UPPER(ICV3)='S'
   SET FILTER TO &SP
```

```
   COUNT TO HITS
   SUM NUMFAILS TO NF
   GO TOP
   @ L,0 SAY 'HITS='
   @ L,5 SAY HITS PICTURE '9999'
   @ L,12 SAY 'TOTAL NUMFAILS= '
   @ L,28 SAY NF PICTURE '99999'
   STORE L+2 TO L
   ENDIF
  ENDIF
 GO TOP
 ENDIF

@ L,0 SAY CH1
STORE L+1 TO L
 IF LEN(TRIM(CH2))<>0
 @ L,0 SAY CH2
 STORE L+1 TO L
  IF LEN(TRIM(CH3))<>0
  @ L,0 SAY CH3
  STORE L+1 TO L
  ENDIF
 ENDIF
 DO WHILE L<58.AND.(.NOT.EOF())
 LIST OFF NEXT 1 &LS1  TO PRINT
 STORE L+1 TO L
 STORE INT(.999+((LEN(TRIM(COMMENTS))-CCW)/(CRPW-PCV))) TO NCL
  IF NCL>0
   IF L<PROW()
   STORE L+1 TO L
   ENDIF
  @ L,PCV SAY SUBSTR(COMMENTS,CCW,CRPW-PCV)
  STORE L+1 TO L
   IF NCL>1
   @ L,PCV SAY SUBSTR(COMMENTS,CCW+CRPW-PCV,CRPW-PCV)
   STORE L+1 TO L
    IF NCL>2
    @ L,PCV SAY SUBSTR(COMMENTS,CCW+2*(CRPW-PCV),CRPW-PCV)
    STORE L+1 TO L
     IF NCL>3
     @ L,PCV SAY SUBSTR(COMMENTS,CCW+3*(CRPW-PCV),CRPW-PCV)
     STORE L+1 TO L
      IF NCL>4
      @ L,PCV SAY SUBSTR(COMMENTS,CCW+4*(CRPW-PCV),CRPW-PCV)
      ENDIF
     ENDIF
    ENDIF
   ENDIF
  ENDIF
  IF .NOT. EOF()
  SKIP
  ELSE
  STORE 'X' TO LCV
  ENDIF
 ENDDO
```

```
STORE PN+1 TO PN
EJECT
 IF EOF()
 STORE 'X' TO LCV
 ENDIF
ENDDO
SET PRINT OFF
ENDIF
*  After the report ouput is finished, allow the user to rerun the report with
* alternate ouput, i.e. printed instead of displayed or vice versa.
SET DEVICE TO SCREEN
SET COLOR TO &COL3
@ 24,0 SAY 'Enter P to rerun Report on Printer, S to rerun on Screen, X to Exit' GET LCV2
READ
 IF UPPER(LCV2)='S'
 STORE 80 TO CRPW
 ENDIF
 IF UPPER(LCV2)='P'
 @ 24,0 CLEAR
 @ 24,0 SAY 'Right margin to use for printer' GET PW
 READ
 STORE VAL(PW) TO CRPW
 ENDIF
CLOSE DATABASES
STORE ' ' TO LCV4
SET COLOR TO &COL1
ENDDO

IF UPPER(CONF)='N'
SET CONFIRM OFF
ENDIF
SET HEADING ON
RETURN

********* Memory variable list
* SPU Screen heading used to show parameters with temporary files
* CH1 Column headings String variable
* CH2 Second line of Column heading string variable
* CH3 Third line of Column heading string variable
* LCV 0-4 Local control variables, usually string
* LCV1 Flag for default heading type, .F. for fieldnames, .T. for canned
* LCV3 Flag for Comments field, ' ' if no COMMENTS, 'T' if trunc, 'A' if not
* NN Local counter, numeric
* N Local pointer, two digit string variable
* NF number of fields in custom report, numeric
* FNO01-NF Numbers of report fields
* EW Extra Width where field is wider than field name, numeric
* EW2 Extra Width where second heading line is shorter than 1st, numeric
* FN Sting indicator of Field Number
* CRPW Numeric page width
* CRAPW Actual page width filled, numeric
* ESA Extra Space Available while entering custom headings
* UL Underline length to use in custom heading enter block
* HL1-3 Lines 1 to 3 of user-entered single column headings
* CCP Current Column Position, numeric
```

```
* CCW Current Column Width, numeric
* LS1,LS2 Listing String, used with LIST command to list out report
* CRDEL Delimiting character, normally comma, but blank for first one
* NCL Number of comment lines for printed report with all of comments
* PCV Print control variable, offset for printing all of comments, numeric
* PH2 User definable print heading
```

```
* D18.PRG 2-21-85 KRA
* DISPLAYS RECORD ON SCREEN IN LER INPUT FORMAT
SET DEVICE TO SCREEN
STORE ' ' TO ICV2,ICV3
CLEAR

IF MCV2='BASE'
 DO WHILE ICV3=' '
 @ 1,0 SAY 'Do you want to have all records in the database available or would you'
 @ 2,0 SAY 'like to look only at certain records? A - All S - Selected' GET ICV3
 READ
  IF UPPER(ICV3)<>'A'.AND.UPPER(ICV3)<>'S'
  STORE ' ' TO ICV3
  ENDIF
 ENDDO

 IF UPPER(ICV3)<>'A'

 * IF THE 'SELECTED' OPTION IS CHOSEN, PRESENT MENUS LIKE REPORT PROGRAM

 STORE ' ' TO GCV
  DO WHILE UPPER(GCV)<>'X1'
  CLEAR
   DO CASE

   CASE MCV=14
    DO R1FDL
    IF UPPER(GCV)<>'X'
    @ 6,0 SAY 'Would you like to look at a glossary of FIELD names?' GET GCV
    READ
    @ 6,0 CLEAR
    ENDIF

   CASE MCV=29
    DO R1FD
    IF UPPER(GCV)<>'X'
    @ 8,0 SAY 'Would you like to look at a glossary of FIELD names?' GET GCV
    READ
    @ 8,0 CLEAR
    ENDIF
   ENDCASE

   IF UPPER(GCV)='X'.OR.UPPER(GCV)='N'
   STORE 'X1' TO GCV
   ENDIF

   IF UPPER(GCV)='Y'
    DO R1GLOS
   ENDIF
  ENDDO

  DO R1S
  IF UPPER(OPT)='X'
  RETURN
```

```
  ENDIF

 ENDIF

CLEAR

USE &DBD±&MF

 IF UPPER(ICV3)='S'
 SET FILTER TO &SP
 COUNT TO HITS
 SUM NUMFAILS TO NF
 GO TOP
 ENDIF

ELSE

USE &DBD±R3T&NID

ENDIF

IF MCV2='TEMP'.OR.UPPER(ICV3)='S'
CLEAR
STORE 1 TO L
@ L,0 SAY DATE()
@ L,10 SAY TIME()
STORE L+1 TO L

 IF MCV2='TEMP'
 USE &DBD±R3TFCAT

  DO WHILE SERIES<>MSERIES
  SKIP
  ENDDO

  DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
  @ L,0 SAY SUBSTR(UPARAM,1,80)
  STORE L+1 TO L
   IF LEN(TRIM(UPARAM))>80
   @ L,0 SAY SUBSTR(UPARAM,81,34)
   STORE L+1 TO L
   ENDIF
  SKIP
  ENDDO

 @ L,0 SAY 'HITS='
 @ L,5 SAY HITS PICTURE '9999'
 @ L,12 SAY 'TOTAL NUMFAILS= '
 @ L,28 SAY NF PICTURE '99999'
 STORE L+2 TO L

 ELSE

 @ L,0 SAY SUBSTR(SPU,1,80)
```

```
 STORE L+1 TO L
  IF LEN(TRIM(SPU))>80
  @ L,0 SAY SUBSTR(SPU,81,34)
  STORE L+1 TO L
  ENDIF
 @ L,0 SAY 'HITS='
 @ L,5 SAY HITS PICTURE '9999'
 @ L,12 SAY 'TOTAL NUMFAILS= '
 @ L,28 SAY NF PICTURE '99999'
 STORE L+2 TO L
 ENDIF

STORE ' ' TO LCV3
@ L,0 SAY 'Do you want this information printed on the printer?' GET LCV3
READ
 IF UPPER(LCV3)='Y'
 STORE L+2 TO L
 @ L,0 SAY "You can type in below any notes you'd like in the heading."
 STORE SPACE(78) TO PH2
 STORE L+1 TO L
 @ L,0 GET PH2
 READ
 SET DEVICE TO PRINT
 SET MARGIN TO 4
 * Print condition headings

 STORE 4 TO L
 @ L,0 SAY DATE()
 @ L,10 SAY TIME()
 STORE L+1 TO L

  IF LEN(TRIM(PH2))>0
  @ L,0 SAY PH2
  STORE L+1 TO L
  ENDIF

  IF MCV2='TEMP'
  GO TOP

   DO WHILE SERIES<>MSERIES
   SKIP
   ENDDO

   DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
   @ L,0 SAY SUBSTR(UPARAM,1,80)
   STORE L+1 TO L
    IF LEN(TRIM(UPARAM))>80
    @ L,0 SAY SUBSTR(UPARAM,81,34)
    STORE L+1 TO L
    ENDIF
   SKIP
   ENDDO

  @ L,0 SAY 'HITS='
```

```
  @ L,5 SAY HITS PICTURE '9999'
  @ L,12 SAY 'TOTAL NUMFAILS= '
  @ L,28 SAY NF PICTURE '99999'
  STORE L+2 TO L

  ELSE

  @ L,0 SAY SUBSTR(SPU,1,80)
  STORE L+1 TO L
   IF LEN(TRIM(SPU))>80
   @ L,0 SAY SUBSTR(SPU,81,34)
   STORE L+1 TO L
   ENDIF
  @ L,0 SAY 'HITS='
  @ L,5 SAY HITS PICTURE '9999'
  @ L,12 SAY 'TOTAL NUMFAILS= '
  @ L,28 SAY NF PICTURE '99999'
  STORE L+2 TO L
  ENDIF
 EJECT
 SET DEVICE TO SCREEN
 ENDIF
ENDIF

STORE ' ' TO LCV3
@ 24,0 SAY 'Press X to Exit back to the previous menu, any other key to continue' GET L
READ
IF UPPER(LCV3)='X'
RETURN
ENDIF

STORE ' ' TO ICV2

IF MCV=14
SET COLOR TO &COL3
@ 14,10 SAY 'Recalling Memory Variables, Please Wait'
RESTORE FROM TMCODE ADDITIVE
RESTORE FROM RNCODE ADDITIVE
RESTORE FROM PSCODE ADDITIVE
RESTORE FROM CAUCODE ADDITIVE
SET COLOR TO &COL1
@ 24,0 CLEAR
ENDIF

IF MCV2='TEMP'
USE &D8D±R3T&NID
ENDIF

DO WHILE UPPER(ICV2)<>'X'.AND.(.NOT.EOF())
SET COLOR TO &COL1
CLEAR

STORE 1 TO L
```

```
IF MCV=14
* FULL-SCREEN DISPLAY OF 14 FIELDS DECODED
STORE 2 TO L
* RECNO()
 IF UPPER(ICV3)='S'
 @ L,0 SAY 'Hits = '
 @ L,7 SAY HITS PICTURE '9999'
 @ L,13 SAY 'Sum of NUMFAILS = '
 @ L,32 SAY NF PICTURE '9999'
 STORE L+1 TO L
 ENDIF
@ L,0 SAY "Identification Information for Record # "
@ L,40 SAY RECNO()
STORE L+1 TO L

* LERNUM
@ L,2 SAY 'Database Number:'
@ L,19 SAY DATABNUM
@ L,25 SAY "LER Number: "
@ L,37 SAY LERNUM PICTURE "XXXXXX"
STORE L+2 TO L

@ L,0 SAY "Component Information"
STORE L+1 TO L
@ L,2 SAY "Type: "
* TYPEMAIN AND TYPESUB1
DO CASE
CASE UPPER(TYPEMAIN)='V'
IF TYPESUB1<>' '
STORE TYPESUB1 TO TM
@ L,COL() SAY TMV&TM
ENDIF
@ L,COL()+1 SAY 'Valve'
CASE UPPER(TYPEMAIN)='P'
IF TYPESUB1<>' '
STORE TYPESUB1 TO TM
@ L,COL() SAY TMP&TM
ENDIF
@ L,COL()+1 SAY 'Penetration'
ENDCASE
STORE L+1 TO L

* REACNAME
@ L,2 SAY "Reactor Name: "
IF REACNAME<>' '
STORE SUBSTR(REACNAME,1,2) TO RC
@ L,COL() SAY RN&RC
IF RN&RC=TRIM(RN&RC)
@ L,COL()+1 SAY SUBSTR(REACNAME,3,1)
ENDIF
ENDIF

* REACTYPE
@ L,COL()+3 SAY "Reactor Type: "
```

```
DO CASE
CASE UPPER(REACTYPE)='B'
@ L,COL() SAY 'BWR'
CASE UPPER(REACTYPE)='P'
@ L,COL() SAY 'PWR'
CASE UPPER(REACTYPE)='H'
@ L,COL() SAY 'HTGR'
ENDCASE
STORE L+1 TO L

* CISCLASS
@ L,2 SAY "CIS Class "
@ L,COL() SAY CISCLASS+': '
DO CASE
CASE CISCLASS='1'
@ L,COL()+2 SAY 'PWR - Large Dry Containment     '
CASE CISCLASS='2'
@ L,COL()+2 SAY 'PWR - Subatmospheric Containment'
CASE CISCLASS='3'
@ L,COL()+2 SAY 'PWR - Dual (Double) Containment '
CASE CISCLASS='4'
@ L,COL()+2 SAY 'PWR - Ice Condenser Containment '
CASE CISCLASS='5'
@ L,COL()+2 SAY 'BWR - Mark I Containment        '
CASE CISCLASS='6'
@ L,COL()+2 SAY 'BWR - Mark II Containment       '
CASE CISCLASS='7'
@ L,COL()+2 SAY 'BWR - Mark III Containment      '
CASE CISCLASS='8'
@ L,COL()+2 SAY 'Other CIS                       '
ENDCASE
STORE L+1 TO L

* SYSPRIMA
@ L,2 SAY "Primary System involved: "
IF SYSPRIMA<>' '
STORE SYSPRIMA TO SYP
DO CASE
CASE SYP<'20'.AND.SYP<>'14'.AND.SYP<>'17'.AND.SYP<>'11'.OR.SYP='99'
@ L,COL() SAY PS&SYP
CASE UPPER(REACTYPE)='B'
@ L,COL() SAY PSB&SYP
CASE UPPER(REACTYPE)='P'
@ L,COL() SAY PSP&SYP
ENDCASE
ENDIF

STORE L+2 TO L

@ L,0 SAY "Failure Information: "
STORE L+1 TO L

* DATE
@ L,2 SAY 'Date: '
```

```
@ L,COL() SAY DATE

* NUMFAILS
@ L,COL()+3 SAY 'Number of Failures '
@ L,COL() SAY NUMFAILS PICTURE '99'
STORE L+1 TO L

* MODE
@ L,2 SAY 'Failure Mode: '
DO CASE
CASE UPPER(MODE)='A'
@ L,COL() SAY 'Mode A, Leakage (failure to seal)'
CASE UPPER(MODE)='B'
@ L,COL() SAY 'Mode B, Failure to close within a reasonable time,'
STORE L+1 TO L
@ L,4 SAY 'constituting a potential failure to isolate containment.'
CASE UPPER(MODE)='C'
@ L,COL() SAY 'Mode C, Unplanned opening (failure to remain closed)'
ENDCASE
STORE L+1 TO L

* CAUSEPRI
@ L,2 SAY 'Primary Cause of Failure: '
IF CAUSEPRI<>' '
STORE CAUSEPRI TO CP
@ L,COL() SAY CAU1&CP
IF LEN(CAU1&CP)>54
STORE L+2 TO L
ELSE
STORE L+1 TO L
ENDIF
ENDIF

* ISOLATED
DO CASE
CASE UPPER(ISOLATED)='Y'
@ L,2 SAY 'Containment was isolated'
CASE UPPER(ISOLATED)='N'
@ L,2 SAY 'Containment was not isolated'
ENDCASE
STORE L+2 TO L

* COMMENTS
@ L,0 SAY "Comments: "
@ L,11 SAY SUBSTR(COMMENTS,1,69)
STORE L+1 TO L
@ L,2 SAY SUBSTR(COMMENTS,70,78)
STORE L+1 TO L
@ L,2 SAY SUBSTR(COMMENTS,148,78)
STORE L+1 TO L
@ L,2 SAY SUBSTR(COMMENTS,226,15)

ELSE
```

```
* FULL-SCREEN DISPLAY OF 29 FIELDS
 IF UPPER(ICV3)='S'
 @ 1,0 SAY 'Hits = '
 @ 1,7 SAY HITS PICTURE '9999'
 @ 1,13 SAY 'Sum of NUMFAILS = '
 @ 1,32 SAY NF PICTURE '9999'
 STORE L+1 TO L
 ENDIF
@ 3,0 SAY "Identification Information for Record # "
@ 3,40 SAY RECNO()
@ 4,2 SAY "Data Base #: "
@ 4,15 SAY DATABNUM PICTURE "9999"
@ 4,22 SAY "LER #: "
@ 4,29 SAY LERNUM PICTURE "XXXXXX"
@ 4,37 SAY "Revision #: "
@ 4,49 SAY REVISNUM PICTURE "XX"
@ 5,2 SAY "Accession #: "
@ 5,15 SAY ACCESNUM PICTURE "XXXXXX"
@ 5,23 SAY "Failure #: "
@ 5,34 SAY ENTRYNUM PICTURE "XX"
@ 7,0 SAY "Component Information"
@ 8,2 SAY "Type: Main: "
@ 8,14 SAY TYPEMAIN PICTURE "X"
@ 8,17 SAY "Sub-1: "
@ 8,24 SAY TYPESUB1 PICTURE "X"
@ 8,27 SAY "Sub-2: "
@ 8,34 SAY TYPESUB2 PICTURE "X"
@ 9,2 SAY "Location: "
@ 9,12 SAY LOCATION PICTURE "X"
@ 9,15 SAY "Manufacturer: "
@ 9,29 SAY MFG PICTURE "XXXX"
@ 9,36 SAY "CIS Class: "
@ 9,47 SAY CISCLASS PICTURE "X"
@ 10,2 SAY "Reactor: Name: "
@ 10,17 SAY REACNAME PICTURE "XXX"
@ 10,22 SAY "Type: "
@ 10,28 SAY REACTYPE PICTURE "X"
@ 10,32 SAY "NSSS Vendor: "
@ 10,45 SAY REACNSSS PICTURE "X"
@ 11,2 SAY "System: Primary: "
@ 11,19 SAY SYSPRIMA PICTURE "XX"
@ 11,24 SAY "Secondary: "
@ 11,35 SAY SYSSECON PICTURE "XXXXX"
@ 12,2 SAY "System Designation: "
@ 12,22 SAY SYSDES PICTURE "XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
@ 14,0 SAY "Failure Information: "
@ 15,2 SAY "Date: "
@ 15,8 SAY DATE PICTURE "XXXXXXXX"
@ 15,19 SAY "Power Level: "
@ 15,32 SAY POWERLEV PICTURE "XXX"
@ 15,35 SAY "%   Failure Mode: "
@ 15,53 SAY MODE PICTURE "X"
@ 16,2 SAY "Cause: Primary: "
@ 16,18 SAY CAUSEPRI PICTURE "XX"
```

```
@ 16,23 SAY "Secondary: "
@ 16,34 SAY CAUSESEC PICTURE "XX"
@ 16,39 SAY "# of Failures: "
@ 16,54 SAY NUMFAILS PICTURE "99"
@ 17,2 SAY "Duration: "
@ 17,12 SAY DURATION PICTURE "XXXXXXXXXX"
@ 17,25 SAY "Containment Isolated?: "
@ 17,48 SAY ISOLATED PICTURE "X"
@ 18,2 SAY "Discovery: "
@ 18,13 SAY DISCOVER PICTURE "X"
@ 18,17 SAY "Corrective Actions: "
@ 18,37 SAY CORRECTS PICTURE "XXX"
@ 19,2 SAY "Related LER's: "
@ 19,17 SAY RELLER PICTURE "XXXXXXXXXXXXXXXXXXXXXXXXXX"
@ 20,0 SAY "Comments: "
@ 20,11 SAY SUBSTR(COMMENTS,1,69)
@ 21,2 SAY SUBSTR(COMMENTS,70,78)
@ 22,2 SAY SUBSTR(COMMENTS,148,78)
@ 23,2 SAY SUBSTR(COMMENTS,226,15)
ENDIF

SET COLOR TO &COL2
STORE ' ' TO ICV2

 IF (UPPER(ICV3)='S'.OR.MCV2='TEMP').AND.HITS=1
  @ 24,0 SAY 'Only one record found, press any key to return to menu.' GET ICV2
  READ
  STORE 'X' TO ICV2
  EXIT
 ENDIF
 IF MCV2='BASE'.AND.UPPER(ICV3)='S'
  IF .NOT.BOF().AND.(.NOT.EOF())
  @ 24,0 SAY 'N - Next, P - Previous, F - First, X - eXit' GET ICV2
  ELSE
   IF BOF()
   @ 24,0 SAY 'N - Next, X - eXit' GET ICV2
   ELSE
   @ 24,0 SAY 'P - Previous, F - First, X - eXit' GET ICV2
   ENDIF
  ENDIF
 READ
  IF UPPER(ICV2)='N'
  SKIP
   IF EOF()
   SKIP -1
   SET COLOR TO &COL3
   @ 24,0 CLEAR
   @ 24,0 SAY 'Already at last record'
   DO DELAY
   ENDIF
  ENDIF
  IF UPPER(ICV2)='P'
  SKIP -1
   IF BOF()
```

```
  SET COLOR TO &COL3
  @ 24,0 CLEAR
  @ 24,0 SAY 'Already at first record'
  DO DELAY
  ENDIF
 ENDIF
 IF UPPER(ICV2)='F'
  IF RECNO()=1
  SET COLOR TO &COL3
  @ 24,0 CLEAR
  @ 24,0 SAY 'Already at first record'
  DO DELAY
  ELSE
  GO TOP
  ENDIF
 ENDIF
 IF UPPER(ICV2)='L'
 SKIP
  IF EOF()
  SKIP -1
  SET COLOR TO &COL3
  @ 24,0 CLEAR
  @ 24,0 SAY 'Already at last record'
  DO DELAY
  ELSE
  GO BOTTOM
  ENDIF
 ENDIF
 IF UPPER(ICV2)='X'
 EXIT
 ENDIF

ELSE

 IF .NOT.BOF().AND.(.NOT.EOF())
 @ 24,0 SAY 'N - Next, P - Previous, F - First, L - Last, S - Specify #, X - eXit' GET
 ELSE
  IF BOF()
  @ 24,0 SAY 'N - Next, L - Last, S - Specify #, X - eXit' GET ICV2
  ELSE
  @ 24,0 SAY 'P - Previous, F - First, S - Specify #, X - eXit' GET ICV2
  ENDIF
 ENDIF
READ
 IF UPPER(ICV2)='N'
 SKIP
  IF EOF()
  SKIP -1
  SET COLOR TO &COL3
  @ 24,0 CLEAR
  @ 24,0 SAY 'Already at last record'
  DO DELAY
  ENDIF
 ENDIF
```

```
   IF UPPER(ICV2)='P'
   SKIP -1
    IF BOF()
    SET COLOR TO &COL3
    @ 24,0 CLEAR
    @ 24,0 SAY 'Already at first record'
    DO DELAY
    ENDIF
   ENDIF
   IF UPPER(ICV2)='F'
    IF RECNO()=1
    SET COLOR TO &COL3
    @ 24,0 CLEAR
    @ 24,0 SAY 'Already at first record'
    DO DELAY
    ELSE
    GO TOP
    ENDIF
   ENDIF
   IF UPPER(ICV2)='L'
   SKIP
    IF EOF()
    SKIP -1
    SET COLOR TO &COL3
    @ 24,0 CLEAR
    @ 24,0 SAY 'Already at last record'
    DO DELAY
    ELSE
    GO BOTTOM
    ENDIF
   ENDIF
   IF UPPER(ICV2)='S'
   STORE 0 TO ICN
   @ 1,0 SAY 'Record number (#) you want to look at' GET ICN
   READ
   GOTO ICN
   ENDIF
  ENDIF
ENDDO
SET COLOR TO &COL1
IF MCV=14
RELEASE ALL LIKE RN*
RELEASE ALL LIKE TM*
RELEASE ALL LIKE PS*
RELEASE ALL LIKE CAU*
ENDIF
RETURN
```

```
* E38.PRG 5-02-85 KRA
* EDITS RECORD(S) ON SCREEN IN LER INPUT FORMAT
PUBLIC ICV3
STORE ' ' TO ICV2,ICV3
SET DEVICE TO SCREEN
CLEAR
SET DELETED OFF

DO WHILE ICV3=' '
@ 1,10 SAY 'E - Edit any record in the database'
@ 2,10 SAY 'S - Select certain records to edit'
@ 3,10 SAY 'A - Add new records to the database'
@ 4,10 SAY '    Your Choice' GET ICV3
READ
ENDDO

IF UPPER(ICV3)='A'
APPEND BLANK
GO BOTTOM
ENDIF

IF UPPER(ICV3)='S'
* IF THE 'SOME' OPTION IS CHOSEN, PRESENT MENUS LIKE REPORT PROGRAM

STORE 0 TO ICN2,ICN3,ICN4,ICN5,ICN6
STORE ' ' TO SPO
STORE 'Y' TO GCV

 DO WHILE UPPER(GCV)<>'X1'
 CLEAR

  IF MCV=14
   DO R1FDL

   IF UPPER(GCV)<>'X'
   @ 6,0 SAY 'Would you like to look at a glossary of FIELD names?' GET GCV
   READ
   @ 6,0 CLEAR
   ENDIF

  ELSE
   DO R1FD

   IF UPPER(GCV)<>'X'
   @ 8,0 SAY 'Would you like to look at a glossary of FIELD names?' GET GCV
   READ
   @ 8,0 CLEAR
   ENDIF
  ENDIF

  IF UPPER(GCV)='X'.OR.UPPER(GCV)='N'
  STORE 'X1' TO GCV
  ENDIF

  IF UPPER(GCV)='Y'
```

```
   DO R1GLOS
  ENDIF
 ENDDO

 DO R1S
 IF UPPER(OPT)='X'
 RETURN
 ENDIF

USE &DBD±&MF
SET FILTER TO &SP
COUNT TO HITS
SUM NUMFAILS TO NF
GO TOP

CLEAR
STORE 1 TO L
@ L,0 SAY DATE()
@ L,10 SAY TIME()
STORE L+1 TO L

@ L,0 SAY SUBSTR(SPU,1,80)
STORE L+1 TO L
 IF LEN(TRIM(SPU))>80
 @ L,0 SAY SUBSTR(SPU,81,34)
 STORE L+1 TO L
 ENDIF
@ L,0 SAY 'HITS='
@ L,5 SAY HITS PICTURE '9999'
@ L,12 SAY 'TOTAL NUMFAILS= '
@ L,28 SAY NF PICTURE '99999'
STORE L+2 TO L

STORE ' ' TO LCV3
@ L,0 SAY 'Do you want this information printed on the printer?' GET LCV3
READ
 IF UPPER(LCV3)='Y'
 SET DEVICE TO PRINT
 SET MARGIN TO 4
 * Print condition headings
 STORE 4 TO L
 @ L,0 SAY DATE()
 @ L,10 SAY TIME()
 STORE L+1 TO L

 @ L,0 SAY SUBSTR(SPU,1,80)
 STORE L+1 TO L
  IF LEN(TRIM(SPU))>80
  @ L,0 SAY SUBSTR(SPU,81,34)
  STORE L+1 TO L
  ENDIF
 @ L,0 SAY 'HITS='
 @ L,5 SAY HITS PICTURE '9999'
 @ L,12 SAY 'TOTAL NUMFAILS= '
 @ L,28 SAY NF PICTURE '99999'
```

```
 STORE L+2 TO L
 EJECT
 ENDIF
SET DEVICE TO SCREEN
ELSE
USE &DBD±&MF
ENDIF

STORE ' ' TO LCV3
@ 24,0 SAY 'Press X to Exit back to the previous menu, any other key to continue' GET LCV3
READ
IF UPPER(LCV3)='X'
RETURN
ENDIF

DO WHILE UPPER(ICV2)<>'X'.AND.(.NOT.EOF())

SET COLOR TO &COL1
CLEAR
STORE 1 TO L

IF DELETED()
SET COLOR TO &COL4
ENDIF

IF MCV=14
* EDITS 14 FIELDS ON SCREEN
@ L,0 SAY "Identification Information for Record # "
@ L,40 SAY RECNO()
STORE L+1 TO L
@ L,2 SAY 'Database Number:'
@ L,19 GET DATABNUM
STORE L+1 TO L
@ L,2 SAY "LER #"
@ L,7 GET LERNUM PICTURE "XXXXXX"
STORE L+2 TO L
@ L,0 SAY "Component Information"
STORE L+1 TO L
@ L,2 SAY "Valve/Penetration"
@ L,20 GET TYPEMAIN PICTURE "X"
STORE L+1 TO L
@ L,1 SAY "Type"
@ L,20 GET TYPESUB1 PICTURE "X"
STORE L+1 TO L
@ L,2 SAY "CIS Class"
@ L,20 GET CISCLASS PICTURE "X"
STORE L+1 TO L
@ L,2 SAY "Reactor Name"
@ L,20 GET REACNAME PICTURE "XXX"
STORE L+1 TO L
@ L,2 SAY "Reactor Type"
@ L,20 GET REACTYPE PICTURE "X"
STORE L+1 TO L
@ L,2 SAY "Primary System"
@ L,20 GET SYSPRIMA PICTURE "XX"
```

```
STORE L+2 TO L
@ L,0 SAY "Failure Information"
STORE L+1 TO L
@ L,2 SAY "Date"
@ L,20 GET DATE PICTURE "XXXXXXXX"
STORE L+1 TO L
@ L,2 SAY "Failure Mode"
@ L,20 GET MODE PICTURE "X"
STORE L+1 TO L
@ L,2 SAY "Primary Cause"
@ L,20 GET CAUSEPRI PICTURE "XX"
STORE L+1 TO L
@ L,2 SAY "# of Failures"
@ L,20 GET NUMFAILS PICTURE "99"
STORE L+1 TO L
@ L,02 SAY "Containment Isol?"
@ L,20 GET ISOLATED PICTURE "X"
STORE L+1 TO L
@ L,0 SAY "Comments "
@ L,9 GET COMMENTS
SET COLOR TO &COL5
STORE L+4 TO L
@ L,0 SAY 'To skip to end of record, type CTRL-C  or PgDn
READ
ELSE
* EDITS ALL 29 FIELDS ON SCREEN
@ L,0 SAY "Identification Information for Record # "
@ L,40 SAY RECNO()
STORE L+1 TO L
@ L,2 SAY "Data Base #"
@ L,13 GET DATABNUM PICTURE "9999"
@ L,22 SAY "LER #"
@ L,27 GET LERNUM PICTURE "XXXXXX"
@ L,37 SAY "Revision #"
@ L,47 GET REVISNUM PICTURE "XX"
STORE L+1 TO L
@ L,2 SAY "Accession #"
@ L,13 GET ACCESNUM PICTURE "XXXXXX"
@ L,23 SAY "Failure #"
@ L,32 GET ENTRYNUM PICTURE "XX"
STORE L+2 TO L
@ L,0 SAY "Component Information"
STORE L+1 TO L
@ L,2 SAY "Type: Main"
@ L,12 GET TYPEMAIN PICTURE "X"
@ L,17 SAY "Sub-1"
@ L,22 GET TYPESUB1 PICTURE "X"
@ L,27 SAY "Sub-2"
@ L,32 GET TYPESUB2 PICTURE "X"
STORE L+1 TO L
@ L,2 SAY "Location"
@ L,10 GET LOCATION PICTURE "X"
@ L,15 SAY "Manufacturer"
@ L,27 GET MFG PICTURE "XXXX"
@ L,36 SAY "CIS Class"
```

```
@ L,45 GET CISCLASS PICTURE "X"
STORE L+1 TO L
@ L,2 SAY "Reactor: Name"
@ L,15 GET REACNAME PICTURE "XXX"
@ L,22 SAY "Type"
@ L,26 GET REACTYPE PICTURE "X"
@ L,31 SAY "NSSS Vendor"
@ L,42 GET REACNSSS PICTURE "X"
STORE L+1 TO L
@ L,2 SAY "System: Primary"
@ L,17 GET SYSPRIMA PICTURE "XX"
@ L,24 SAY "Secondary"
@ L,33 GET SYSSECON PICTURE "XXXXX"
STORE L+1 TO L
@ L,2 SAY "System Designation"
@ L,20 GET SYSDES PICTURE "XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
STORE L+2 TO L
@ L,0 SAY "Failure Information"
STORE L+1 TO L
@ L,2 SAY "Date"
@ L,6 GET DATE PICTURE "XXXXXXXX"
@ L,19 SAY "Power Level"
@ L,30 GET POWERLEV PICTURE "XXX"
@ L,35 SAY "%   Failure Mode"
@ L,51 GET MODE PICTURE "X"
STORE L+1 TO L
@ L,2 SAY "Cause: Primary"
@ L,16 GET CAUSEPRI PICTURE "XX"
@ L,23 SAY "Secondary"
@ L,32 GET CAUSESEC PICTURE "XX"
@ L,39 SAY "# of Failures"
@ L,52 GET NUMFAILS PICTURE "99"
STORE L+1 TO L
@ L,2 SAY "Duration"
@ L,10 GET DURATION PICTURE "XXXXXXXXXX"
@ L,25 SAY "Containment Isol?"
@ L,46 GET ISOLATED PICTURE "X"
STORE L+1 TO L
@ L,2 SAY "Discovery"
@ L,11 GET DISCOVER PICTURE "X"
@ L,17 SAY "Corrective Actions"
@ L,35 GET CORRECTS PICTURE "XXX"
STORE L+1 TO L
@ L,2 SAY "Related LER's"
@ L,15 GET RELLER PICTURE "XXXXXXXXXXXXXXXXXXXXXXXXXXX"
STORE L+1 TO L
@ L,0 SAY "Comments "
@ L,9 GET COMMENTS
STORE L+4 TO L
SET COLOR TO &COL5
@ L,0 SAY 'To skip to end of record, type CTRL-C  or PgDn
READ
ENDIF

IF DELETED()
```

```
SET COLOR TO &COL3
@ L,0 SAY 'Record marked for deletion, U to Undelete, RETURN to leave as is.' GET ICV2
SET COLOR TO &COL2
ENDIF
READ
 IF UPPER(ICV2)='U'
 RECALL
 @ L,0 SAY 'Record has been Undeleted
 ENDIF

STORE ' ' TO ICV2

 IF UPPER(ICV3)='A'
 @ 24,0 SAY 'A - Add another record, D - Delete this record, X - eXit' GET ICV2
 READ
  IF UPPER(ICV2)='A'
  APPEND BLANK
  SKIP
  ENDIF
  IF UPPER(ICV2)='D'
  DELETE
  ENDIF
 ENDIF

 IF UPPER(ICV3)='S'
  IF .NOT.BOF().AND.(.NOT.EOF())
  @ 24,0 SAY 'N - Next, P - Previous, F - First, D - Delete, X - eXit' GET ICV2
  ELSE
   IF BOF()
   @ 24,0 SAY 'N - Next, D - Delete, X - eXit' GET ICV2
   ELSE
   @ 24,0 SAY 'P - Previous, F - First, D - Delete, X - eXit' GET ICV2
   ENDIF
  ENDIF
 READ
  IF UPPER(ICV2)='D'
  DELETE
  ENDIF
  IF UPPER(ICV2)='N'
  SKIP
   IF EOF()
   SKIP -1
   SET COLOR TO &COL3
   @ 24,0 CLEAR
   @ 24,0 SAY 'Already at last record'
   DO DELAY
   ENDIF
  ENDIF
  IF UPPER(ICV2)='P'
  SKIP -1
   IF BOF()
   SET COLOR TO &COL3
   @ 24,0 CLEAR
   @ 24,0 SAY 'Already at first record'
   DO DELAY
```

```
 ENDIF
ENDIF
IF UPPER(ICV2)='F'
 IF RECNO()=1
 SET COLOR TO &COL3
 @ 24,0 CLEAR
 @ 24,0 SAY 'Already at first record'
 DO DELAY
 ELSE
 GO TOP
 ENDIF
ENDIF
IF UPPER(ICV2)='L'
SKIP
 IF EOF()
 SKIP -1
 SET COLOR TO &COL3
 @ 24,0 CLEAR
 @ 24,0 SAY 'Already at last record'
 DO DELAY
 ELSE
 GO BOTTOM
 ENDIF
ENDIF
IF UPPER(ICV2)='X'
EXIT
ENDIF

ENDIF

IF UPPER(ICV3)='E'

 IF .NOT.BOF().AND.(.NOT.EOF())
 @ 24,0 SAY 'N Next, P Previous, F First, L Last, S Specify #, D Delete, X eXit' GET ICV2
 ELSE
  IF BOF()
  @ 24,0 SAY 'N - Next, L - Last, S - Specify #, D - Delete, X - eXit' GET ICV2
  ELSE
  @ 24,0 SAY 'P - Previous, F - First, S - Specify #, D - Delete, X - eXit' GET ICV2
  ENDIF
 ENDIF
READ
 IF UPPER(ICV2)='D'
 DELETE
 ENDIF
 IF UPPER(ICV2)='N'
 SKIP
  IF EOF()
  SKIP -1
  SET COLOR TO &COL3
  @ 24,0 CLEAR
  @ 24,0 SAY 'Already at last record'
  DO DELAY
  ENDIF
 ENDIF
```

```
  IF UPPER(ICV2)='P'
  SKIP -1
   IF BOF()
   SET COLOR TO &COL3
   @ 24,0 CLEAR
   @ 24,0 SAY 'Already at first record'
   DO DELAY
   ENDIF
  ENDIF
  IF UPPER(ICV2)='F'
   IF RECNO()=1
   SET COLOR TO &COL3
   @ 24,0 CLEAR
   @ 24,0 SAY 'Already at first record'
   DO DELAY
   ELSE
   GO TOP
   ENDIF
  ENDIF
  IF UPPER(ICV2)='L'
  SKIP
   IF EOF()
   SKIP -1
   SET COLOR TO &COL3
   @ 24,0 CLEAR
   @ 24,0 SAY 'Already at last record'
   DO DELAY
   ELSE
   GO BOTTOM
   ENDIF
  ENDIF
  IF UPPER(ICV2)='S'
  STORE 0 TO ICN
  @ 1,0 SAY 'Record number (#) you want to edit' GET ICN
  READ
  GOTO ICN
  ENDIF
 ENDIF

ENDDO
SET COLOR TO &COL1
SET DELETED ON
RETURN
```

```
* R1PRINT.PRG 2-20-85 Ken Ames
* PRINTS ENTIRE RECORD IN LER DATA ENTRY FORMAT
* USES  CONDITIONS SET BY R1SEL

STORE ' ' TO ICV3
CLEAR

IF MCV2='BASE'
 DO WHILE ICV3=' '
 @ 1,0 SAY 'Do you want to LIST all records in the database or would you like'
 @ 2,0 SAY 'to LIST only selected records? A - All S - Selected' GET ICV3
 READ
 ENDDO

 IF UPPER(ICV3)='S'

 * IF THE 'SELECTED' OPTION IS CHOSEN, PRESENT MENUS LIKE REPORT PROGRAM

 STORE ' ' TO GCV
  DO WHILE UPPER(GCV)<>'X1'
  CLEAR
   DO CASE

   CASE MCV=14
    DO R1FDL
    IF UPPER(GCV)<>'X'
    @ 6,0 SAY 'Would you like to look at a glossary of FIELD names?' GET GCV
    READ
    @ 6,0 CLEAR
    ENDIF

   CASE MCV=29
    DO R1FD
    IF UPPER(GCV)<>'X'
    @ 8,0 SAY 'Would you like to look at a glossary of FIELD names?' GET GCV
    READ
    @ 8,0 CLEAR
    ENDIF
   ENDCASE

   IF UPPER(GCV)='X'.OR.UPPER(GCV)='N'
   STORE 'X1' TO GCV
   ENDIF

   IF UPPER(GCV)='Y'
    DO R1GLOS
   ENDIF
  ENDDO

  DO R1S
  IF UPPER(OPT)='X'
  RETURN
  ENDIF
 ENDIF
```

```
USE &DBD±&MF

 IF UPPER(ICV3)='S'
 SET FILTER TO &SP
 COUNT TO HITS
 SUM NUMFAILS TO NF
 GO TOP
 ENDIF
ELSE
USE &DBD±R3T&NID

ENDIF

STORE 1 TO PN
DO CASE
CASE MCV=29
@ 21,0 CLEAR
@ 21,0 SAY "You can type in below any notes you'd like printed in the heading"
STORE SPACE(78) TO PH2
@ 22,0 GET PH2
READ

SET DEVICE TO PRINT
 DO WHILE .NOT. EOF()

* PRINTS TWO RECORDS TO A PAGE USING INPUT FORM FORMAT
* PRINTS TOP HALF OF PAGE
STORE 6 TO L
@ L,10 SAY DATE()
@ L,20 SAY TIME()
@ L,55 SAY "page"
@ L,60 SAY PN PICTURE "999"
STORE L+1 TO L
 IF LEN(TRIM(PH2))>0
 @ L,10 SAY PH2
 STORE L+1 TO L
 ENDIF
 IF MCV2='TEMP'.OR.UPPER(ICV3)='S'
 @ L,10 SAY 'HITS='
 @ L,15 SAY HITS PICTURE '9999'
 @ L,20 SAY 'TOTAL NUMFAILS= '
 @ L,35 SAY NF PICTURE '99999'
 STORE L+1 TO L
 ENDIF
IF PN=1
 IF MCV2='TEMP'
 USE &DBD±R3TFCAT
  DO WHILE SERIES<>MSERIES
  SKIP
  ENDDO

  DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
  @ L,10 SAY TRIM(UPARAM)
```

```
  @ 24,0 SAY 'Already at first record'
  DO DELAY
  ENDIF
 ENDIF
 IF UPPER(ICV2)='F'
  IF RECNO()=1
  SET COLOR TO &COL3
  @ 24,0 CLEAR
  @ 24,0 SAY 'Already at first record'
  DO DELAY
  ELSE
  GO TOP
  ENDIF
 ENDIF
 IF UPPER(ICV2)='L'
 SKIP
  IF EOF()
  SKIP -1
  SET COLOR TO &COL3
  @ 24,0 CLEAR
  @ 24,0 SAY 'Already at last record'
  DO DELAY
  ELSE
  GO BOTTOM
  ENDIF
 ENDIF
 IF UPPER(ICV2)='X'
 EXIT
 ENDIF

ENDIF
IF UPPER(ICV3)='E'

 IF .NOT.BOF().AND.(.NOT.EOF())
 @ 24,0 SAY 'N Next, P Previous, F First, L Last, S Specify #, D Delete, X eXit' GET I
 ELSE
  IF BOF()
  @ 24,0 SAY 'N - Next, L - Last, S - Specify #, D - Delete, X - eXit' GET ICV2
  ELSE
  @ 24,0 SAY 'P - Previous, F - First, S - Specify #, D - Delete, X - eXit' GET ICV2
  ENDIF
 ENDIF
READ
 IF UPPER(ICV2)='D'
 DELETE
 ENDIF
 IF UPPER(ICV2)='N'
 SKIP
  IF EOF()
  SKIP -1
  SET COLOR TO &COL3
  @ 24,0 CLEAR
  @ 24,0 SAY 'Already at last record'
  DO DELAY
```

```
   ENDIF
  ENDIF
  IF UPPER(ICV2)='P'
  SKIP -1
   IF BOF()
   SET COLOR TO &COL3
   @ 24,0 CLEAR
   @ 24,0 SAY 'Already at first record'
   DO DELAY
   ENDIF
  ENDIF
  IF UPPER(ICV2)='F'
   IF RECNO()=1
   SET COLOR TO &COL3
   @ 24,0 CLEAR
   @ 24,0 SAY 'Already at first record'
   DO DELAY
   ELSE
   GO TOP
   ENDIF
  ENDIF
  IF UPPER(ICV2)='L'
  SKIP
   IF EOF()
   SKIP -1
   SET COLOR TO &COL3
   @ 24,0 CLEAR
   @ 24,0 SAY 'Already at last record'
   DO DELAY
   ELSE
   GO BOTTOM
   ENDIF
  ENDIF
  IF UPPER(ICV2)='S'
  STORE 0 TO ICN
  @ 1,0 SAY 'Record number (#) you want to edit' GET ICN
  READ
  GOTO ICN
  ENDIF
 ENDIF

ENDDO
SET COLOR TO &COL1
RETURN
```

```
  STORE L+1 TO L
  SKIP
  ENDDO

 USE &DBD±R3T&NID

 ELSE
  IF UPPER(ICV3)='S'
  @ L,10 SAY SPU
  STORE L+1 TO L
  ENDIF
 ENDIF
ENDIF

STORE L+1 TO L
@ L,10 SAY "Identification Information for Record # "
@ L,50 SAY RECNO()
STORE L+1 TO L
@ L,12 SAY "Data Base #"
@ L,26 SAY DATABNUM PICTURE "9999"
@ L,32 SAY "LER #"
@ L,39 SAY LERNUM PICTURE "XXXXXX"
@ L,47 SAY "Revision #"
@ L,59 SAY REVISNUM PICTURE "XX"
STORE L+1 TO L
@ L,12 SAY "Accession #"
@ L,25 SAY ACCESNUM PICTURE "XXXXXX"
@ L,33 SAY "Failure #"
@ L,44 SAY ENTRYNUM PICTURE "XX"
STORE L+2 TO L
@ L,10 SAY "Component Information"
STORE L+1 TO L
@ L,12 SAY "Type: Main"
@ L,24 SAY TYPEMAIN PICTURE "X"
@ L,27 SAY "Sub-1"
@ L,34 SAY TYPESUB1 PICTURE "X"
@ L,37 SAY "Sub-2"
@ L,44 SAY TYPESUB2 PICTURE "X"
STORE L+1 TO L
@ L,12 SAY "Location"
@ L,22 SAY LOCATION PICTURE "X"
@ L,25 SAY "Manufacturer"
@ L,39 SAY MFG PICTURE "XXXX"
@ L,46 SAY "CIS Class"
@ L,57 SAY CISCLASS PICTURE "X"
STORE L+1 TO L
@ L,12 SAY "Reactor: Name"
@ L,27 SAY REACNAME PICTURE "XXX"
@ L,32 SAY "Type"
@ L,39 SAY REACTYPE PICTURE "X"
@ L,42 SAY "NSSS Vendor"
@ L,55 SAY REACNSSS PICTURE "X"
STORE L+1 TO L
@ L,12 SAY "System: Primary"
```

```
@ L,29 SAY SYSPRIMA PICTURE "XX"
@ L,34 SAY "Secondary"
@ L,45 SAY SYSSECON PICTURE "XXXXX"
STORE L+1 TO L
@ L,12 SAY "System Designation"
@ L,33 SAY SYSDES PICTURE "XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
STORE L+2 TO L
@ L,10 SAY "Failure Information"
STORE L+1 TO L
@ L,12 SAY "Date"
@ L,18 SAY DATE PICTURE "XXXXXXXX"
@ L,29 SAY "Power Level"
@ L,42 SAY POWERLEV PICTURE "XXX"
@ L,45 SAY "%   Failure Mode"
@ L,63 SAY MODE PICTURE "X"
STORE L+1 TO L
@ L,12 SAY "Cause: Primary"
@ L,28 SAY CAUSEPRI PICTURE "XX"
@ L,33 SAY "Secondary"
@ L,44 SAY CAUSESEC PICTURE "XX"
@ L,49 SAY "# of Failures"
@ L,64 SAY NUMFAILS PICTURE "99"
STORE L+1 TO L
@ L,12 SAY "Duration"
@ L,22 SAY DURATION PICTURE "XXXXXXXXXX"
@ L,35 SAY "Containment Isolated?"
@ L,58 SAY ISOLATED PICTURE "X"
STORE L+1 TO L
@ L,12 SAY "Discovery"
@ L,23 SAY DISCOVER PICTURE "X"
@ L,27 SAY "Corrective Actions"
@ L,47 SAY CORRECTS PICTURE "XXX"
STORE L+1 TO L
@ L,12 SAY "Related LER's"
@ L,27 SAY RELLER PICTURE "XXXXXXXXXXXXXXXXXXXXXXXXXX"
STORE L+2 TO L
@ L,10 SAY "Comments"
@ L,22 SAY SUBSTR(COMMENTS,1,57)
STORE L+1 TO L
@ L,12 SAY SUBSTR(COMMENTS,58,78)
STORE L+1 TO L
@ L,12 SAY SUBSTR(COMMENTS,136,78)
STORE L+1 TO L
@ L,12 SAY SUBSTR(COMMENTS,214,26)
SKIP
IF EOF()
EJECT
RETURN
ENDIF
* PRINT SECOND RECORD ON PAGE
STORE L+2 TO L
@ L,10 SAY "Identification Information for Record # "
@ L,50 SAY RECNO()
STORE L+2 TO L
```

```
@ L,12 SAY "Data Base #"
@ L,26 SAY DATABNUM PICTURE "9999"
@ L,32 SAY "LER #"
@ L,39 SAY LERNUM PICTURE "XXXXXX"
@ L,47 SAY "Revision #"
@ L,59 SAY REVISNUM PICTURE "XX"
STORE L+1 TO L
@ L,12 SAY "Accession #"
@ L,25 SAY ACCESNUM PICTURE "XXXXXX"
@ L,33 SAY "Failure #"
@ L,44 SAY ENTRYNUM PICTURE "XX"
STORE L+2 TO L
@ L,10 SAY "Component Information"
STORE L+1 TO L
@ L,12 SAY "Type: Main"
@ L,24 SAY TYPEMAIN PICTURE "X"
@ L,27 SAY "Sub-1"
@ L,34 SAY TYPESUB1 PICTURE "X"
@ L,37 SAY "Sub-2"
@ L,44 SAY TYPESUB2 PICTURE "X"
STORE L+1 TO L
@ L,12 SAY "Location"
@ L,22 SAY LOCATION PICTURE "X"
@ L,25 SAY "Manufacturer"
@ L,39 SAY MFG PICTURE "XXXX"
@ L,46 SAY "CIS Class"
@ L,57 SAY CISCLASS PICTURE "X"
STORE L+1 TO L
@ L,12 SAY "Reactor: Name"
@ L,27 SAY REACNAME PICTURE "XXX"
@ L,32 SAY "Type"
@ L,39 SAY REACTYPE PICTURE "X"
@ L,42 SAY "NSSS Vendor"
@ L,55 SAY REACNSSS PICTURE "X"
STORE L+1 TO L
@ L,12 SAY "System: Primary"
@ L,29 SAY SYSPRIMA PICTURE "XX"
@ L,34 SAY "Secondary"
@ L,45 SAY SYSSECON PICTURE "XXXXX"
STORE L+1 TO L
@ L,12 SAY "System Designation"
@ L,33 SAY SYSDES PICTURE "XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
STORE L+2 TO L
@ L,10 SAY "Failure Information"
STORE L+1 TO L
@ L,12 SAY "Date"
@ L,18 SAY DATE PICTURE "XXXXXXXX"
@ L,29 SAY "Power Level"
@ L,42 SAY POWERLEV PICTURE "XXX"
@ L,45 SAY "%   Failure Mode"
@ L,63 SAY MODE PICTURE "X"
STORE L+1 TO L
@ L,12 SAY "Cause: Primary"
@ L,28 SAY CAUSEPRI PICTURE "XX"
```

```
@ L,33 SAY "Secondary"
@ L,44 SAY CAUSESEC PICTURE "XX"
@ L,49 SAY "# of Failures"
@ L,64 SAY NUMFAILS PICTURE "99"
STORE L+1 TO L
@ L,12 SAY "Duration"
@ L,22 SAY DURATION PICTURE "XXXXXXXXXX"
@ L,35 SAY "Containment Isolated?"
@ L,58 SAY ISOLATED PICTURE "X"
STORE L+1 TO L
@ L,12 SAY "Discovery"
@ L,23 SAY DISCOVER PICTURE "X"
@ L,27 SAY "Corrective Actions"
@ L,47 SAY CORRECTS PICTURE "XXX"
STORE L+1 TO L
@ L,12 SAY "Related LER's"
@ L,27 SAY RELLER PICTURE "XXXXXXXXXXXXXXXXXXXXXXXXXX"
STORE L+2 TO L
@ L,10 SAY "Comments"
@ L,22 SAY SUBSTR(COMMENTS,1,57)
STORE L+1 TO L
@ L,12 SAY SUBSTR(COMMENTS,58,78)
STORE L+1 TO L
@ L,12 SAY SUBSTR(COMMENTS,136,78)
STORE L+1 TO L
@ L,12 SAY SUBSTR(COMMENTS,214,26)
STORE PN+1 TO PN
EJECT

  IF .NOT. EOF()
  SKIP
  ENDIF
 ENDDO

CASE MCV=14

* PRINTS THREE RECORDS TO A PAGE USING FORMAT SIMILAR TO INPUT FORM
* PRINTS TOP HALF OF PAGE

CLEAR
@ 12,0 SAY 'Loading decoding data from memory file, please wait'
RESTORE FROM TMCODE ADDITIVE
RESTORE FROM RNCODE ADDITIVE
RESTORE FROM PSCODE ADDITIVE
RESTORE FROM CAUCODE ADDITIVE
@ 21,0 SAY "You can type in below any notes you'd like printed in the heading"
STORE SPACE(78) TO PH2
@ 22,0 GET PH2
READ

SET DEVICE TO PRINT
STORE 4 TO L

DO WHILE .NOT.EOF()
```

```
@ L,10 SAY DATE()
@ L,20 SAY TIME()
@ L,55 SAY "page"
@ L,60 SAY PN PICTURE "999"
STORE L+1 TO L

IF PN=1
 IF LEN(TRIM(PH2))>0
 @ L,10 SAY PH2
 STORE L+1 TO L
 ENDIF

 IF MCV2='TEMP'.OR.UPPER(ICV3)='S'

 @ L,10 SAY 'HITS='
 @ L,15 SAY HITS PICTURE '9999'
 @ L,20 SAY 'TOTAL NUMFAILS= '
 @ L,35 SAY NF PICTURE '99999'
 STORE L+1 TO L

 IF MCV2='TEMP'
  USE &DBD±R3TFCAT
   DO WHILE SERIES<>MSERIES
   SKIP
   ENDDO

   DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
   @ L,10 SAY TRIM(UPARAM)
   STORE L+1 TO L
   SKIP
   ENDDO

  USE &DBD±R3T&NID

 ELSE

 @ L,10 SAY SPU
 STORE L+1 TO L
 ENDIF
ENDIF

STORE L+1 TO L
ENDIF

STORE 1 TO C

DO WHILE .NOT.EOF().AND.C<4.AND.L<44

* RECNO()
@ L,10 SAY "Identification Information for Record # "
@ L,50 SAY RECNO()
STORE L+1 TO L

* LERNUM
```

```
@ L,12 SAY 'Database number:'
@ L,29 SAY DATABNUM
@ L,35 SAY "LER Number: "
@ L,47 SAY LERNUM PICTURE "XXXXXX"
STORE L+1 TO L

@ L,10 SAY "Component Information"
STORE L+1 TO L
@ L,12 SAY "Type: "
* TYPEMAIN AND TYPESUB1
DO CASE
CASE UPPER(TYPEMAIN)='V'
IF TYPESUB1<>' '
STORE TYPESUB1 TO TM
@ L,PCOL() SAY TMV&TM
ENDIF
@ L,PCOL()+1 SAY 'Valve'
CASE UPPER(TYPEMAIN)='P'
IF TYPESUB1<>' '
STORE TYPESUB1 TO TM
@ L,PCOL() SAY TMP&TM
ENDIF
@ L,PCOL()+1 SAY 'Penetration'
ENDCASE
STORE L+1 TO L

* REACNAME
@ L,12 SAY "Reactor Name: "
IF REACNAME<>' '
STORE SUBSTR(REACNAME,1,2) TO RC
@ L,PCOL() SAY RN&RC
IF RN&RC=TRIM(RN&RC)
@ L,PCOL()+1 SAY SUBSTR(REACNAME,3,1)
ENDIF
ENDIF

* REACTYPE
@ L,PCOL()+3 SAY "Reactor Type: "
DO CASE
CASE UPPER(REACTYPE)='B'
@ L,PCOL() SAY 'BWR'
CASE UPPER(REACTYPE)='P'
@ L,PCOL() SAY 'PWR'
CASE UPPER(REACTYPE)='H'
@ L,PCOL() SAY 'HTGR'
ENDCASE
STORE L+1 TO L

* CISCLASS
@ L,12 SAY "CIS Class "
@ L,PCOL() SAY CISCLASS+': '
DO CASE
CASE CISCLASS='1'
@ L,PCOL()+2 SAY 'PWR - Large Dry Containment
```

```
CASE CISCLASS='2'
@ L,PCOL()+2 SAY 'PWR - Subatmospheric Containment'
CASE CISCLASS='3'
@ L,PCOL()+2 SAY 'PWR - Dual (Double) Containment '
CASE CISCLASS='4'
@ L,PCOL()+2 SAY 'PWR - Ice Condenser Containment '
CASE CISCLASS='5'
@ L,PCOL()+2 SAY 'BWR - Mark I Containment        '
CASE CISCLASS='6'
@ L,PCOL()+2 SAY 'BWR - Mark II Containment       '
CASE CISCLASS='7'
@ L,PCOL()+2 SAY 'BWR - Mark III Containment      '
CASE CISCLASS='8'
@ L,PCOL()+2 SAY 'Other CIS                       '
ENDCASE
STORE L+1 TO L

* SYSPRIMA
@ L,12 SAY "Primary System involved: "
IF SYSPRIMA<>' '
STORE SYSPRIMA TO SYP
DO CASE
CASE SYP<'20'.AND.SYP<>'14'.AND.SYP<>'17'.AND.SYP<>'11'.OR.SYP='99'
@ L,PCOL() SAY PS&SYP
CASE UPPER(REACTYPE)='B'
@ L,PCOL() SAY PSB&SYP
CASE UPPER(REACTYPE)='P'
@ L,PCOL() SAY PSP&SYP
ENDCASE
ENDIF

STORE L+1 TO L

@ L,10 SAY "Failure Information: "
STORE L+1 TO L

* DATE
@ L,12 SAY 'Date: '
@ L,PCOL() SAY DATE

* NUMFAILS
@ L,PCOL()+3 SAY 'Number of Failures '
@ L,PCOL() SAY NUMFAILS PICTURE '99'
STORE L+1 TO L

* MODE
@ L,12 SAY 'Failure Mode: '
DO CASE
CASE UPPER(MODE)='A'
@ L,PCOL() SAY 'Mode A, Leakage (failure to seal)'
CASE UPPER(MODE)='B'
@ L,PCOL() SAY 'Mode B, Failure to close within a reasonable time,'
STORE L+1 TO L
@ L,14 SAY 'constituting a potential failure to isolate containment.'
```

```
CASE UPPER(MODE)='C'
@ L,PCOL() SAY 'Mode C, Unplanned opening (failure to remain closed)'
ENDCASE
STORE L+1 TO L

* CAUSEPRI
@ L,12 SAY 'Primary Cause of Failure: '
IF CAUSEPRI<>' '
STORE CAUSEPRI TO CP
@ L,PCOL() SAY CAU1&CP
IF LEN(CAU1&CP)>55
STORE L+2 TO L
ELSE
STORE L+1 TO L
ENDIF
ENDIF

* ISOLATED
DO CASE
CASE UPPER(ISOLATED)='Y'
@ L,12 SAY 'Containment was isolated'
CASE UPPER(ISOLATED)='N'
@ L,12 SAY 'Containment was not isolated'
ENDCASE
STORE L+1 TO L

* COMMENTS
@ L,10 SAY "Comments: "
@ L,21 SAY SUBSTR(COMMENTS,1,69)
STORE L+1 TO L
@ L,12 SAY SUBSTR(COMMENTS,70,78)
STORE L+1 TO L
@ L,12 SAY SUBSTR(COMMENTS,148,78)
STORE L+1 TO L
@ L,12 SAY SUBSTR(COMMENTS,226,15)
***
STORE L+1 TO L
STORE C+1 TO C
SKIP
ENDDO
STORE PN+1 TO PN
IF .NOT. EOF()
EJECT
STORE 2 TO L
ENDIF
ENDDO
EJECT
RELEASE ALL LIKE RN*
RELEASE ALL LIKE TM*
RELEASE ALL LIKE PS*
RELEASE ALL LIKE CAU*

ENDCASE
SET DEVICE TO SCREEN
```

```
SET PRINT OFF
RETURN
```

```
* R1SR.PRG 2-20-85 KEN AMES
* DOES STANDARD REPORT FORMATS ON SCREEN OR TO PRINT
CLEAR
STORE ' ' TO LCV2
DO WHILE LCV2=' '
@ 10,0 SAY 'Enter P to Print report or S to See on Screen' GET LCV2
READ
 IF UPPER(LCV2)<>'P'.AND.UPPER(LCV2)<>'S'
 STORE ' ' TO LCV2
 ENDIF
ENDDO

IF LCVO='1'
SET HEADING OFF
STORE 'DB # LER #  DATE   V:P T REACTOR SY CS #F MODE  COMMENTS' TO PH2
ENDIF

IF UPPER(LCV2)='P'
STORE '80 ' TO PW
@ 12,0 SAY 'Right margin on printer?' GET PW
READ
@ 14,0 SAY "You can type in below any notes you'd like printed in the heading"
STORE SPACE(78) TO PH3
@ 15,0 GET PH2
READ

STORE VAL(PW) TO CRPW
SET DEVICE TO PRINT
SET MARGIN TO 4
* PRINT FIRST HEADING
STORE 4 TO L
STORE 1 TO PN
@ L,0 SAY DATE()
@ L,10 SAY TIME()
@ L,55 SAY "Page "
@ L,60 SAY PN
STORE L+2 TO L
 IF LEN(TRIM(PH3))>0
 @ L,0 SAY PH3
 STORE L+1 TO L
 ENDIF

 IF MCV2='TEMP'
 USE &DBD±R3TFCAT

  DO WHILE SERIES<>MSERIES
  SKIP
  ENDDO

  DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
  @ L,0 SAY UPARAM
  STORE L+1 TO L
  SKIP
  ENDDO
```

```
 @ L,0 SAY 'HITS='
 @ L,5 SAY HITS PICTURE '9999'
 @ L,16 SAY 'TOTAL NUMFAILS= '
 @ L,32 SAY NF PICTURE '99999'
 STORE L+2 TO L

 USE &DBD±R3T&NID
 ELSE
 USE &DBD±&MF
  IF UPPER(ICV3)='S'
  SET FILTER TO &SP
  COUNT TO HITS
  SUM NUMFAILS TO NF
  GO TOP
  @ L,0 SAY 'HITS='
  @ L,5 SAY HITS PICTURE '9999'
  @ L,16 SAY 'TOTAL NUMFAILS= '
  @ L,32 SAY NF PICTURE '99999'
  STORE L+2 TO L
  ENDIF
 ENDIF

 IF LCV0='1'
 @ L,1 SAY PH2
 STORE L+1 TO L
 ENDIF

GO TOP

 DO WHILE .NOT. EOF()
 * PRINT DATA IN COLUMNS
  IF LCV0='1'
  LIST OFF NEXT 60-L DATABNUM,LERNUM,DATE,TYPEMAIN,TYPESUB1,REACNAME,REACTYPE,;
  CISCLASS,SYSPRIMA,CAUSEPRI,NUMFAILS,MODE,ISOLATED,SUBSTR(COMMENTS,1,CRPW-48) TO PRINT
  ELSE
  LIST OFF NEXT 60-L DATABNUM,LERNUM,REACNAME,TYPEMAIN,TYPESUB1,SYSPRIMA,;
  CAUSEPRI,MODE,ISOLATED TO PRINT
  ENDIF
 EJECT
  IF .NOT. EOF()
  SKIP
  STORE 4 TO L
  * PRINT SUBSEQUENT HEADING
  STORE PN+1 TO PN
  STORE 4 TO L
  @ L,0 SAY DATE()
  @ L,10 SAY TIME()
  @ L,55 SAY "Page "
  @ L,60 SAY PN
  STORE L+2 TO L
   IF LCV0='1'
   @ L,1 SAY PH2
   STORE L+1 TO L
   ENDIF
  ELSE
```

```
  SET PRINT OFF
  ENDIF

 ENDDO
SET DEVICE TO SCREEN
ELSE

SET DEVICE TO SCREEN
SET COLOR TO &COL1
CLEAR

STORE 1 TO L
SET COLOR TO &COL2
* DISPLAY FIRST HEADING

IF MCV2='TEMP'
USE &DBD±R3TFCAT

DO WHILE SERIES<>MSERIES
SKIP
ENDDO

DO WHILE SERIES+FNUM<=NID.AND.(.NOT.EOF())
@ L,0 SAY UPARAM
STORE L+1 TO L
SKIP
ENDDO

USE &DBD±R3T&NID
ELSE
USE &DBD±&MF
 IF UPPER(ICV3)='S'
 SET FILTER TO &SP
 GO TOP
 @ L,0 SAY SPU
 STORE L+1 TO L
 ENDIF
ENDIF

STORE ' ' TO LCV
STORE 1 TO PN

DO WHILE UPPER(LCV)<>'X'
STORE ' ' TO LCV

 DO WHILE .NOT. EOF() .AND. UPPER(LCV)<>'X'
 * DISPLAY DATA IN COLUMNS
  IF LCV0='1'
  SET HEADING OFF
  SET COLOR TO &COL2
  @ L,1 SAY PH2
  SET COLOR TO &COL1
  LIST OFF NEXT 23-L DATABNUM,LERNUM,DATE,TYPEMAIN,TYPESUB1,REACNAME,REACTYPE,;
  CISCLASS,SYSPRIMA,CAUSEPRI,NUMFAILS,MODE,ISOLATED,SUBSTR(COMMENTS,1,32)
  ELSE
```

```
 SET COLOR TO &COL1
 LIST OFF NEXT 23-L DATABNUM,LERNUM,REACNAME,TYPEMAIN,TYPESUB1,SYSPRIMA,;
 CAUSEPRI,MODE,ISOLATED
 ENDIF
 IF .NOT. EOF()
 SKIP
 SET COLOR TO &COL5
 @ 24,0 SAY 'Screen '
 @ 24,7 SAY PN PICTURE '999'
  IF PN<>1
  @ 24,11 SAY 'N - Next Screen, P - Previous Screen, X - Exit' GET LCV
  ELSE
  @ 24,11 SAY 'N - Next Screen, X - Exit' GET LCV
  ENDIF
 READ
 STORE PN+1 TO PN
  IF UPPER(LCV)='P'.AND. PN<>2
  STORE PN-2 TO PN
  SKIP -43
   IF .NOT. BOF()
   SKIP -1
   ENDIF
  SET COLOR TO &COL1
  ENDIF
 ELSE
 SET COLOR TO &COL5
 @ 24,0 SAY 'Screen '
 @ 24,7 SAY PN PICTURE '999'
  IF PN<>1
  @ 24,11 SAY 'P - Previous Screen, X - Exit' GET LCV
  READ
  ELSE
  @ 24,11 SAY 'Listing complete, press any key to continue' GET LCV
  READ
  STORE 'X' TO LCV
  ENDIF
  IF UPPER(LCV)='P'
  STORE PN-1 TO PN
  SKIP -43
   IF .NOT. BOF()
   SKIP -1
   ENDIF
  SET COLOR TO &COL1
  ELSE
  STORE 'X' TO LCV
  ENDIF
 ENDIF
SET COLOR TO &COL1
CLEAR
STORE 1 TO L
ENDDO
IF EOF()
STORE 'X' TO LCV
ENDIF
ENDDO
```

```
SET HEADING ON
SET MARGIN TO 0
SET DEVICE TO SCREEN
RETURN
```

```
* P3URGE.PRG KRA 1-9-85
* USED TO CLEAR UNNEEDED RECORDS FROM CATALOG DATABASE
USE &DBD±R3TFCAT

STORE '0101' TO NID
STORE '01' TO MSERIES,TFNUM
SET DEVICE TO SCREEN
SET TALK OFF
STORE ' ' TO OPT

STORE 1 TO NS
DO WHILE .NOT.EOF()
 IF VAL(SERIES)>NS
 STORE VAL(SERIES) TO NS
 ENDIF
SKIP
ENDDO

GO TOP

DO WHILE .NOT.EOF().AND.UPPER(OPT)<>'X'

CLEAR
STORE 1 TO L
GO TOP

 DO WHILE SERIES<>SUBSTR(NID,1,2).AND.(.NOT.EOF())
 SKIP
 ENDDO

 IF EOF()
 GO TOP
 STORE VAL(NID)+100 TO IDN
 STORE STR(IDN,4) TO NID
  IF VAL(NID)<1000
  STORE '0'+SUBSTR(NID,2,3) TO NID
  ENDIF
 LOOP
 ENDIF

 DO WHILE SERIES=SUBSTR(NID,1,2).AND.(.NOT.EOF())
 SET COLOR TO &COL2
 @ L,20 SAY "SERIES "+SERIES
 STORE L+1 TO L
 @ L,0 SAY "#  HITS  File DATE   SELECTION PARAMETERS"
 SET COLOR TO &COL1
 * display header for catalog
 STORE L+1 TO L

  DO WHILE L<=22.AND.(.NOT.EOF())
   IF SERIES=SUBSTR(NID,1,2)
   @ L,0 SAY FNUM PICTURE '99'
   @ L,3 SAY FHITS PICTURE '9999'
   @ L,9 SAY FDATE
```

```
   @ L,21 SAY SUBSTR(TRIM(UPARAM),1,59)

    IF LEN(TRIM(UPARAM))>59
    STORE L+1 TO L
    @ L,21 SAY SUBSTR(TRIM(UPARAM),60,55)
    ENDIF
   STORE L+1 TO L
   ENDIF
  SKIP
  ENDDO

  IF L>22
  WAIT 'Series too long for one screen, press any key to continue'
  CLEAR
  STORE 1 TO L
  ENDIF

 ENDDO
 SKIP -1

STORE ' ' TO OPT
* Present PURGE options
@ L+1,0 CLEAR
TEXT
                          PURGE OPTIONS

     A - PURGE the whole series.
     P - PURGE part of the series.
     N - SKIP to next series.
     X - EXIT From Purge program.

ENDTEXT
WAIT "      Your Choice? " TO OPT
IF UPPER(OPT)='N'
 IF VAL(SUBSTR(NID,1,2))+1>NS
 STORE 'X' TO OPT
 SET COLOR TO &COL3
 @ 24,0 SAY 'There are no more series, returning you to previous menu.'
 STORE 1 TO N
 DO WHILE N<100
 STORE N+1 TO N
 ENDDO
 SET COLOR TO &COL1
 RETURN
 ENDIF
ENDIF
GO TOP
 DO WHILE SERIES<>SUBSTR(NID,1,2)
 SKIP
 ENDDO

 IF UPPER(OPT)="P"
 @ ROW()+2,0 SAY 'Number of first search in series to purge?' GET TFNUM
 READ
```

```
  DO WHILE FNUM<TFNUM
  SKIP
  ENDDO
  DO WHILE SERIES=SUBSTR(NID,1,2).AND.FNUM>=TFNUM.AND.(.NOT.EOF())
  DELETE
  STORE SERIES+FNUM TO ID
  STORE DBD+'±R3T'+ID+'.DBF' TO FN
  ERASE &FN
  SKIP
  ENDDO
 PACK
 ENDIF

 IF UPPER(OPT)='A'
  DO WHILE SERIES=SUBSTR(NID,1,2).AND.(.NOT.EOF())
  DELETE
  STORE SERIES+FNUM TO ID
  STORE DBD+'±R3T'+ID+'.DBF' TO FN
  ERASE &FN
  SKIP
  ENDDO
 PACK
 ENDIF

STORE VAL(NID)+100 TO IDN
STORE STR(IDN,4) TO NID
 IF VAL(NID)<1000
 STORE '0'+SUBSTR(NID,2,3) TO NID
 ENDIF

ENDDO
RETURN
```

```
* R1SET.PRG 1-17-85 KRA
CLEAR
STORE 'N' TO CONF
STORE 'Y' TO COL
STORE DBD+'          ' TO DBD
@ 3,0 SAY 'Type over any program default setting you want to change'
@ 4,0 SAY 'Just press the RETURN for any you want unchanged'
@ 6,0 SAY 'Do you want to work with all 29 fields or only 14' GET MCV
@ 7,0 SAY 'You can have the program act as soon as you enter the commands,'
@ 8,0 SAY 'or you can have the computer wait for a confirming RETURN'
@ 9,0 SAY 'Do you want to confirm? ' GET CONF
@ 10,0 SAY 'Will you be using a color screen?' GET COL
@ 11,0 SAY 'What is the designation of the disk and subdirectory (if any)'
@ 12,0 SAY 'where your database files will be? ' GET DBD
@ 13,0 SAY 'What is the name of your Master File? ' GET MF

TEXT

If you choose to work with only 14 fields, in the cases where the program
displays entire records on the screen or outputs them to the printer, the
program will decode the coded fields, such as the type of component, the
name of the reactor, the name of the system which the failure occured in,
and the primary cause of the failure.
ENDTEXT

IF OPT='RF'
SET COLOR TO &COL3
@ 20,0 SAY 'You must reset Master File name or drive designation before proceeding.'
@ 21,0 SAY 'The one currently set,'+TRIM(DBD)+'±'+MF+', does not exist'
SET COLOR TO &COL1
ENDIF

IF OPT='RP'
SET COLOR TO &COL3
@ 20,0 SAY 'You must reset drive designation before proceeding.'
@ 21,0 SAY 'There is no catalog of search files on the one currently set.'
SET COLOR TO &COL1
STORE 'RP' TO OPT
ENDIF

READ

IF UPPER(CONF)='Y'
SET CONFIRM ON
ELSE
SET CONFIRM OFF
ENDIF

IF UPPER(COL)='Y'
STORE '6+/1,3+/1,1' TO COL1
STORE '3+/1,6+/1,1' TO COL2
STORE '7+/4,3+/1,1' TO COL3
STORE '6/1,3/1,1' TO COL4
STORE '2+/1,6+/1,1' TO COL5
```

```
ELSE
STORE '7+/0,0/7,0' TO COL1
STORE '7/0,0/7,0' TO COL2
STORE '0/7,0/7,0' TO COL3
STORE '0+/0,7/0,0' TO COL4
STORE '7/0,0/7,0' TO COL5
ENDIF

SET COLOR TO &COL1
STORE TRIM(DBD) TO DBD

RETURN
```

```
* R1MI.PRG 2-5-85 KRA
* MEMORY INITIALIZING PROGRAM
STORE 'Electric motor operated (AC)' TO TMVA
STORE 'Electric motor operated (DC)' TO TMVB
STORE 'Hydraulic operated' TO TMVC
STORE 'Pneumatic diaphragm/cylinder operated' TO TMVD
STORE 'Solenoid operated (AC)' TO TMVE
STORE 'Solenoid operated (DC)' TO TMVF
STORE 'Float operated' TO TMVG
STORE 'Explosive squib operated' TO TMVH
STORE 'Mechanically operated' TO TMVJ
STORE 'Electric motor operated (unspecified)' TO TMVK
STORE 'Solenoid operated (unspecified)' TO TMVL
STORE 'Manually operated' TO TMVM
STORE 'Remotely operated' TO TMVN
STORE 'Damper' TO TMVP
STORE 'Vacuum breaker' TO TMVQ
STORE 'Relief or safety' TO TMVR
STORE 'Check' TO TMVS
STORE 'Other' TO TMVX
STORE 'Personal access' TO TMPA
STORE 'Fuel handling' TO TMPB
STORE 'Equipment access' TO TMPC
STORE 'Electrical' TO TMPD
STORE 'Instrument line' TO TMPE
STORE 'Process piping' TO TMPF
STORE 'Access (unspecified)' TO TMPG
STORE 'Other' TO TMPX
STORE 'Ark Nuc. One' TO RNAR
STORE 'Browns Ferry' TO RNBF
STORE 'Bellefonte' TO RNBL
STORE 'Big Rock Point ' TO RNBP
STORE 'Brunswick' TO RNBR
STORE 'Beaver Valley' TO RNBV
STORE 'Braidwood' TO RNBW
STORE 'Byron' TO RNBY
STORE 'Catawba' TO RNCA
STORE 'Calvert Cliffs' TO RNCC
STORE 'Clinton' TO RNCL
STORE 'Cooper Station ' TO RNCO
STORE 'Commanche Peak' TO RNCP
STORE 'Crystal River' TO RNCR
STORE 'Carroll County' TO RNCT
STORE 'Callaway' TO RNCW
STORE 'Duane Arnold ' TO RNDA
STORE 'Davis-Besse ' TO RNDB
STORE 'D.C. Cook' TO RNDC
STORE 'Diablo Canyon' TO RNDO
STORE 'Dresden' TO RNDR
STORE 'Enrico Fermi' TO RNEF
STORE 'E.I. Hatch' TO RNEN
STORE 'Fort Calhoun ' TO RNFC
STORE 'J.A. Fitzpatrick ' TO RNFP
STORE 'Fort St. Vrain ' TO RNFV
```

```
STORE 'Grand Gulf' TO RNGG
STORE 'Humboldt Bay' TO RNHB
STORE 'Hope Creek' TO RNHC
STORE 'Haddam Neck (CT Yankee) ' TO RNHN
STORE 'Indian Point' TO RNIP
STORE 'J.M. Farley' TO RNJF
STORE 'Kewaunee ' TO RNKE
STORE 'LaCrosse BWR ' TO RNLB
STORE 'Limerick' TO RNLM
STORE 'LaSalle' TO RNLS
STORE 'McGuire' TO RNMG
STORE 'Millstone' TO RNMI
STORE 'Monticello ' TO RNMO
STORE 'Maine Yankee ' TO RNMY
STORE 'North Anna' TO RNNA
STORE 'Nine Mile Pt.' TO RNNM
STORE 'Oyster Creek' TO RNOC
STORE 'Oconee' TO RNOE
STORE 'Palisades ' TO RNPA
STORE 'Peach Bottom' TO RNPB
STORE 'Pilgrim' TO RNPI
STORE 'Prairie Is.' TO RNPR
STORE 'Point Beach' TO RNPT
STORE 'Palo Verde' TO RNPV
STORE 'Perry' TO RNPY
STORE 'Quad Cities' TO RNQC
STORE 'River Bend' TO RNRB
STORE 'R.E. Ginna ' TO RNRG
STORE 'H.B. Robinson' TO RNRO
STORE 'Rancho Seco ' TO RNRS
STORE 'Salem' TO RNSA
STORE 'Sequoyah' TO RNSE
STORE 'Shearon Harris' TO RNSH
STORE 'St. Lucie' TO RNSL
STORE 'Shoreham ' TO RNSM
STORE 'San Onofre' TO RNSO
STORE 'Susquehanna' TO RNSS
STORE 'South Texas Project' TO RNST
STORE 'Surry' TO RNSU
STORE 'Three Mile Is.' TO RNTI
STORE 'Trojan ' TO RNTR
STORE 'Turkey Point' TO RNTU
STORE 'Vogtle' TO RNVG
STORE 'V.C. Summer ' TO RNVS
STORE 'Vermont Yankee ' TO RNVY
STORE 'Watts Bar' TO RNWB
STORE 'Waterford' TO RNWF
STORE 'WNP' TO RNWP
STORE 'Yankee Rowe ' TO RNYR
STORE 'Zion' TO RNZI
STORE 'Zimmer' TO RNZM
STORE '01, Reactor coolant' TO PS01
STORE '02, Main steam' TO PS02
STORE '03, High pressure injection/recirc.' TO PS03
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STORE '04, Low pressure injection/recirc.' TO PS04
STORE '05, Instrument air' TO PS05
STORE '06, Service air' TO PS06
STORE '07, Air (unspecified)' TO PS07
STORE '08, Service water' TO PS08
STORE '09, Residual heat removal' TO PS09
STORE '10, Containment HVAC' TO PS10
STORE '12, Integrated leak rate test' TO PS12
STORE '13, Fire protection' TO PS13
STORE '15, Component cooling water' TO PS15
STORE '16, Radwaste' TO PS16
STORE '18, Main feedwater' TO PS18
STORE '19, Auxiliary feedwater' TO PS19
STORE '99, Other' TO PS99
STORE '11, Drywell pressure' TO PSB11
STORE '14, Drywell atmosphere' TO PSB14
STORE '17, Drywell waste gas' TO PSB17
STORE '20, Reactor core isolation cooling' TO PSB20
STORE '21, Standby liquid control' TO PSB21
STORE '22, Reactor cleanup' TO PSB22
STORE '23, Drywell purge' TO PSB23
STORE '24, Drywell vent' TO PSB24
STORE '25, Drywell equipment sump' TO PSB25
STORE '26, Drywell floor sump' TO PSB26
STORE '27, Drywell sump (unspecified)' TO PSB27
STORE '28, Control rod drive' TO PSB28
STORE '29, Core spray' TO PSB29
STORE '30, Vessel head spray' TO PSB30
STORE '31, Containment cooling' TO PSB31
STORE '32, Traversing incore probe' TO PSB32
STORE '33, Torus (wetwell) vent' TO PSB33
STORE '34, Vacuum relief' TO PSB34
STORE '35, Drywell instrumentation (elec.)' TO PSB35
STORE '36, Torus (wetwell) inst. (elec.)' TO PSB36
STORE '37, Nitrogen supply' TO PSB37
STORE '38, Torus (wetwell) purge' TO PSB38
STORE '11, Containment pressure' TO PSP11
STORE '14, Containment atmosphere' TO PSP14
STORE '17, Containment waste gas' TO PSP17
STORE '20, Pressurizer' TO PSP20
STORE '21, Safety injection' TO PSP21
STORE '22, Demineralized water' TO PSP22
STORE '23, Containment sump' TO PSP23
STORE '24, Steam generator' TO PSP24
STORE '25, Containment large - volume purge' TO PSP25
STORE '26, Containment small - volume purge' TO PSP26
STORE '27, Containment hydrogen purge' TO PSP27
STORE '28, Containment purge (unspecified)' TO PSP28
STORE '29, Nitrogen supply' TO PSP29
STORE '30, Containment spray' TO PSP30
STORE '31, Chemical volume control' TO PSP31
STORE '32, Refueling canal' TO PSP32
STORE '33, Containment instrumentation (elec.)' TO PSP33
STORE '00, unknown' TO CAU100
STORE '01, personnel (operation)' TO CAU101
```

```
STORE '02, personnel (maintenance)' TO CAU102
STORE '03, personnel (testing)' TO CAU103
STORE '04, design error' TO CAU104
STORE '05, fabrication/construction/QC' TO CAU105
STORE '06, procedural discrepancy' TO CAU106
STORE '07, normal wear' TO CAU107
STORE '08, excessive wear' TO CAU108
STORE '09, corrosion' TO CAU109
STORE '10, foreign material contamination' TO CAU110
STORE '11, excessive vibration' TO CAU111
STORE '12, mech. control/parts failed or out of adjustment' TO CAU112
STORE '13, seal/gasket fail/prob.' TO CAU113
STORE '14, packing fail/prob.' TO CAU114
STORE '15, bellows/boot fail/prob.' TO CAU115
STORE '16, electrical input fail/prob. (electrical power interrupt)' TO CAU116
STORE '17, bearing/bushing fail/prob.' TO CAU117
STORE '18, weld failure' TO CAU118
STORE '19, lack of lubrication' TO CAU119
STORE '20, electric motor operator fail/prob.' TO CAU120
STORE '21, electric solenoid fail/prob.' TO CAU121
STORE '22, leaking/ruptured diaphragm' TO CAU122
STORE '23, torque switch fail/prob.' TO CAU123
STORE '24, failure of component supply system (air supply interrupt)' TO CAU124
STORE '25, seat/disc fail/prob.' TO CAU125
STORE '26, limit switch fail/prob.' TO CAU126
STORE '27, pilot valve fail/prob.' TO CAU127
STORE '28, air solenoid fail/prob.' TO CAU128
STORE '29, solenoid (unspecified) fail/prob.' TO CAU129
STORE '30, operator (unspecified) fail/prob.' TO CAU130
STORE '31, penetration sealant fail/prob.' TO CAU131
STORE '32, personnel (construction)' TO CAU132
STORE '33, rupture' TO CAU133
STORE '34, equalizing valve (on air lock) fail/prob.' TO CAU134
STORE '35, hydraulic operator fail/prob.' TO CAU135
SAVE ALL LIKE TM* TO TMCODE
SAVE ALL LIKE RN* TO RNCODE
SAVE ALL LIKE PS* TO PSCODE
SAVE ALL LIKE CAU* TO CAUCODE
RELEASE ALL LIKE TM*
RELEASE ALL LIKE RN*
RELEASE ALL LIKE PS*
RELEASE ALL LIKE CAU*
STORE "RECNO()"  TO FN00
STORE "DATABNUM" TO FN01
STORE "LERNUM"   TO FN02
STORE "REVISNUM" TO FN03
STORE "ACCESNUM" TO FN04
STORE "ENTRYNUM" TO FN05
STORE "TYPEMAIN" TO FN06
STORE "TYPESUB1" TO FN07
STORE "TYPESUB2" TO FN08
STORE "LOCATION" TO FN09
STORE "MFG"      TO FN10
STORE "REACNAME" TO FN11
STORE "REACTYPE" TO FN12
```

```
STORE "REACNSSS" TO FN13
STORE "CISCLASS" TO FN14
STORE "SYSPRIMA" TO FN15
STORE "SYSSECON" TO FN16
STORE "SYSDES"   TO FN17
STORE "NUMFAILS" TO FN18
STORE "DATE"     TO FN19
STORE "POWERLEV" TO FN20
STORE "MODE"     TO FN21
STORE "CAUSEPRI" TO FN22
STORE "CAUSESEC" TO FN23
STORE "DURATION" TO FN24
STORE "ISOLATED" TO FN25
STORE "DISCOVER" TO FN26
STORE "CORRECTS" TO FN27
STORE "RELLER"   TO FN28
STORE "COMMENTS" TO FN29
SAVE ALL LIKE FN* TO FNCODE
RELEASE ALL LIKE FN*
STORE "RECNO()"  TO FN00
STORE "DATABNUM" TO FN01
STORE "LERNUM"   TO FN02
STORE "TYPEMAIN" TO FN03
STORE "TYPESUB1" TO FN04
STORE "REACNAME" TO FN05
STORE "REACTYPE" TO FN06
STORE "CISCLASS" TO FN07
STORE "SYSPRIMA" TO FN08
STORE "NUMFAILS" TO FN09
STORE "DATE"     TO FN10
STORE "MODE"     TO FN11
STORE "CAUSEPRI" TO FN12
STORE "ISOLATED" TO FN13
STORE "COMMENTS" TO FN14
SAVE ALL LIKE FN* TO FNLCODE
RELEASE ALL LIKE FN*
RETURN
```

```
* R3GLOS0.PRG 11-8-84 KRA
* SCREEN NUMBER 0
TEXT
          GLOSSARY FOR CIS-RELATED LER DATABASE

DATABNUM  Four digit identification number assigned by PNL.

LERNUM    Number assigned to the Licensee Event Report (LER) by the NRC.
          The first two digits are the year of the LER.

REVISNUM  Some LER's are revised.  This is the number of the revision.
          Original LER's will have a revision number of 0.

ACCESNUM  Last six digits of the accession number assigned by the NRC.

ENTRYNUM  In the case where components have repeated failures, they may
          generate multiple LER's.  For first failures, this will be 1,
          2 for second failures, etc.

TYPEMAIN  V indicates a valve failure, P a penetration failure

ENDTEXT
RETURN

* R3GLOS1.PRG 9-18-84 KRA
* SCREEN NUMBER 1
TEXT
TYPESUB1
For a penetration:
A = personal access
B = fuel handling
C = equipment access
D = electrical
E = instrument line
F = process piping
G = access (unspecified)
X = other

For a valve:
A = electric motor operated (AC)
B = electric motor operated (DC)
C = hydraulic operated
D = pneumatic diaphragm/cylinder operated
E = solenoid operated (AC)
F = solenoid operated (DC)
G = float operated
H = explosive squib operated
J = mechanically operated
K = electric motor operated (unspecified)
L = solenoid operated (unspecified)
M = manually operated
N = remotely operated
P = damper
Q = vacuum breaker
R = relief or safety
S = check
X = other

ENDTEXT
RETURN
```

```
* R3GLOS2.PRG
* SCREEN NUMBER 2
@ 1,0 SAY  'TYPESUB2                    For a valve:   A = ball'
@ 2,0 SAY  '                                           B = butterfly'
@ 3,0 SAY  'No designations                            C = check'
@ 4,0 SAY  'for penetrations                           D = diaphragm'
@ 5,0 SAY  '                                           E = gate'
@ 6,0 SAY  '                                           F = globe'
@ 7,0 SAY  '                                           G = needle'
@ 8,0 SAY  '                                           H = plug'
@ 9,0 SAY  '                                           J = nozzle'
@ 10,0 SAY '                                           K = single blade'
@ 11,0 SAY '                                           L = parallel blade'
@ 12,0 SAY '                                           M = opposed blade'
@ 13,0 SAY '                                           N = proportioning louver'
@ 14,0 SAY '                                           P = angle'
@ 15,0 SAY '                                           X = other'
@ 17,0 SAY 'LOCATION  For a penetration:  A = inner     C = both'
@ 18,0 SAY '                              B = outer'
@ 19,0 SAY '          For a valve:        A = inside containment '
@ 20,0 SAY '                              B = outside containment'
@ 22,0 SAY 'MFG       Manufacturer of the valve or penetration that failed, indicated by'
@ 23,0 SAY '          the four-character identifier from Exhibit J of NUREG-0161.'
RETURN
```

```
* R3GLOS3.PRG 1-17-85 KRA
* SCREEN NUMBER 3
@ 1,0 SAY  'REACNAME                    FP1   5 J.A. Fitzpatrick  PT1,2 1 Point Beach 1,2
@ 2,0 SAY  '                            FV1   8 Fort St. Vrain    PV1   1 Palo Verde 1'
@ 3,0 SAY  'CODE                        GG1   7 Grand Gulf 1      QC1,2 5 Quad Cities 1,2
@ 4,0 SAY  '½     CIS CLASS             HB3   1 Humboldt Bay 3    RG1   1 R.E. Ginna'
@ 5,0 SAY  '½     ½ REACTOR NAME        HN1   1 Haddam Neck       RO2   1 H.B. Robinson 2
@ 6,0 SAY  '½     ½ ½                   IP2,3 1 Indian Point 2,3  RS1   1 Rancho Seco'
@ 7,0 SAY  'AR1,2 1 Ark Nuc. One 1,2    JF1,2 1 J.M. Farley 1,2   SA1,2 1 Salem 1,2'
@ 8,0 SAY  'BF1-3 5 Browns Ferry 1-3    KE1   3 Kewaunee          SE1,2 4 Sequoyah 1,2'
@ 9,0 SAY  'BP1   8 Big Rock Point      LB1   8 LaCrosse BWR      SL1,2 3 St. Lucie 1,2'
@ 10,0 SAY 'BR1,2 5 Brunswick 1,2       LS1,2 6 LaSalle 1,2       SM1   6 Shoreham'
@ 11,0 SAY 'BV1   2 Beaver Valley 1     MG1,2 4 McGuire 1,2       SO1   8 San Onofre 1'
@ 12,0 SAY 'CC1,2 1 Calvert Clf 1,2     MI1   5 Millstone 1       SO2,3 1 San Onofre 2,3'
@ 13,0 SAY 'CO1   5 Cooper Station      MI2   1 Millstone 2       SS1,2 6 Susquehanna 1,2
@ 14,0 SAY 'CR3   1 Crystal River 3     MO1   5 Monticello        SU1,2 2 Surry 1,2'
@ 15,0 SAY 'DA1   5 Duane Arnold       MY1   1 Maine Yankee      TI1,2 1 Three Mi. Is. 1
@ 16,0 SAY 'DB1   3 Davis-Besse        NA1,2 2 North Anna 1,2    TR1   1 Trojan'
@ 17,0 SAY 'DC1,2 4 D.C. Cook 1,2       NM1   5 Nine Mile Pt. 1   TU3,4 1 Turkey Point 3,
@ 18,0 SAY 'DO1,2 1 Diablo Canyon 1,2   OC1   5 Oyster Creek 1    VS1   1 V.C. Summer'
@ 19,0 SAY 'DR1   8 Dresden 1           OE1-3 1 Oconee 1-3        VY1   5 Vermont Yankee'
@ 20,0 SAY 'DR2,3 5 Dresden 2,3         PA1   1 Palisades         WF3   3 Waterford 3'
@ 21,0 SAY 'EF2   5 Enrico Fermi 2      PB2,3 5 Peach Bottom 2,3  WP2   6 WNP 2'
@ 22,0 SAY 'EN1,2 5 E.I. Hatch 1,2      PI1   5 Pilgrim 1         YR1   8 Yankee Rowe'
@ 23,0 SAY 'FC1   1 Fort Calhoun        PR1,2 3 Prairie Is. 1,2   ZI1,2 1 Zion 1,2'
SET COLOR TO &COL2
WAIT'1984 Current List, do you want list for newer plants? Y/N' TO GCV
SET COLOR TO &COL1
IF UPPER(GCV)='Y'

CLEAR
@ 1,0 SAY  'REACNAME'
@ 3,0 SAY  'CODE'
@ 4,0 SAY  '½     CIS CLASS'
@ 5,0 SAY  '½     ½ REACTOR NAME'
@ 6,0 SAY  'BL1,2   Bellefonte 1,2'
@ 7,0 SAY  'BW1,2   Braidwood 1,2'
@ 8,0 SAY  'BY1,2   Byron 1,2'
@ 9,0 SAY  'CW1,2   Callaway 1,2'
@ 10,0 SAY 'CA1,2   Catawba 1,2'
@ 11,0 SAY 'CT1,2   Carroll County 1,2'
@ 12,0 SAY 'CL1     Clinton 1'
@ 13,0 SAY 'CP1,2   Commanche Peak 1,2'
@ 14,0 SAY 'HC1     Hope Creek 1'
@ 15,0 SAY 'LM1,2   Limerick 1,2'
@ 16,0 SAY 'PY1,2   Perry 1,2'
@ 17,0 SAY 'RB1     River Bend 1'
@ 18,0 SAY 'SH1     Shearon Harris'
@ 19,0 SAY 'ST1,2   S. Texas Project 1,2'
@ 20,0 SAY 'VG1,2   Vogtle 1,2'
@ 21,0 SAY 'WB1,2   Watts Bar 1,2'
@ 22,0 SAY 'WC1     Wolf Creek'
@ 23,0 SAY 'ZM1     Zimmer 1'
STORE ' ' TO GCV
ELSE
STORE ' ' TO GCV
RETURN
ENDIF
```

```
* R3GLOS4.PRG 9-18-84 KRA
* SCREEN NUMBER 4A
@ 1,0 SAY  'REACTYPE  One of the following:  B = BWR'
@ 2,0 SAY  '                                 H = HTGR (Fort St. Vrain)'
@ 3,0 SAY  '                                 P = PWR'
@ 5,0 SAY  'REACNSSS                         A = Allis-Chalmers (La Crosse BWR)'
@ 6,0 SAY  '                                 B = Babcock & Wilcox'
@ 7,0 SAY  'NSSS Vendor.                     C = Combustion Engineering'
@ 8,0 SAY  '                                 G = General Electric'
@ 9,0 SAY  '                                 N = General Atomic (Fort St. Vrain)'
@ 10,0 SAY '                                 W = Westinghouse'
@ 12,0 SAY 'CISCLASS   Class of Containment Isolation System (CIS)'
@ 14,0 SAY 'Class 1. PWR - Large Dry Containment       Class 5. BWR - Mark I Containment'
@ 15,0 SAY 'Class 2. PWR - Subatmospheric Containment  Class 6. BWR - Mark II Containment'
@ 16,0 SAY 'Class 3. PWR - Dual (Double) Containment   Class 7. BWR - Mark III Containment'
@ 17,0 SAY 'Class 4. PWR - Ice Condenser Containment   Class 8. Other CIS'
STORE ' ' TO NNS
@ 19,0 SAY 'SYSPRIMA  Primary system involved in failure.'
@ 20,0 SAY "          Designations are different for PWR's and BWR's."
@ 21,0 SAY '          To see PWR list type P or to see BWR list type B.'GET NNS
SET BELL OFF
READ
CLEAR
IF UPPER(NNS)='P'

* SCREEN NUMBER 4B
@ 1,0 SAY  'SYSPRIMA Primary system involved in failure.  For a PWR:'
@ 3,0 SAY  '01 = reactor coolant                    22 = demineralized water'
@ 4,0 SAY  '02 = main steam                         23 = containment sump'
@ 5,0 SAY  '03 = high pressure injection/recirc.    24 = steam generator'
@ 6,0 SAY  '04 = low pressure injection/recirc.     25 = containment large - volume purge'
@ 7,0 SAY  '05 = instrument air                     26 = containment small - volume purge'
@ 8,0 SAY  '06 = service air                        27 = containment hydrogen purge'
@ 9,0 SAY  '07 = air (unspecified)                  28 = containment purge (unspecified)'
@ 10,0 SAY '08 = service water                      29 = nitrogen supply'
@ 11,0 SAY '09 = residual heat removal              30 = containment spray'
@ 12,0 SAY '10 = containment HVAC                   31 = chemical volume control'
@ 13,0 SAY '11 = containment pressure               32 = refueling canal'
@ 14,0 SAY '12 = integrated leak rate test          33 = containment instrumentation (elec.)'
@ 15,0 SAY '13 = fire protection                    99 = other'
@ 16,0 SAY '14 = containment atmosphere'
@ 17,0 SAY '15 = component cooling water'
@ 18,0 SAY '16 = radwaste'
@ 19,0 SAY '17 = containment waste gas'
@ 20,0 SAY '18 = main feedwater'
@ 21,0 SAY '19 = auxiliary feedwater'
@ 22,0 SAY '20 = pressurizer'
@ 23,0 SAY '21 = safety injection'
ELSE

* SCREEN NUMBER 4C
@ 1,0 SAY  'SYSPRIMA Primary system involved in failure.  For a BWR:'
@ 3,0 SAY  '01 = reactor coolant                    22 = reactor cleanup'
@ 4,0 SAY  '02 = main steam                         23 = drywell purge'
@ 5,0 SAY  '03 = high pressure injection/recirc.    24 = drywell vent'
```

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@ 6,0 SAY  '04 = low pressure injection/recirc.  25 = drywell equipment sump'
@ 7,0 SAY  '05 = instrument air                  26 = drywell floor sump'
@ 8,0 SAY  '06 = service air                     27 = drywell sump (unspecified)'
@ 9,0 SAY  '07 = air (unspecified)               28 = control rod drive'
@ 10,0 SAY '08 = service water                   29 = core spray'
@ 11,0 SAY '09 = residual heat removal           30 = vessel head spray'
@ 12,0 SAY '10 = containment HVAC                31 = containment cooling'
@ 13,0 SAY '11 = drywell pressure                32 = traversing incore probe'
@ 14,0 SAY '12 = integrated leak rate test       33 = torus (wetwell) vent'
@ 15,0 SAY '13 = fire protection                 34 = vacuum relief'
@ 16,0 SAY '14 = drywell atmosphere              35 = drywell instrumentation (elec.)'
@ 17,0 SAY '15 = component cooling water         36 = torus (wetwell) inst. (elec.)'
@ 18,0 SAY '16 = radwaste                        37 = nitrogen supply'
@ 19,0 SAY '17 = drywell waste gas               38 = torus (wetwell) purge'
@ 20,0 SAY '18 = main feedwater                  99 = other'
@ 21,0 SAY '19 = auxiliary feedwater'
@ 22,0 SAY '20 = reactor core isolation cooling'
@ 23,0 SAY '21 = standby liquid control'
ENDIF
RETURN
```

```
* R3GLOS5.PRG 9-18-84 KRA
* SCREEN NUMBER 5
@ 1,0 SAY  'SYSSECON  The secondary system identifiers are provided to permit additional
@ 2,0 SAY  'specification of the system.'
@ 4,0 SAY  '01 = sample           10 = pump             For example, a reactor coolant'
@ 5,0 SAY  '02 = sensor/monitor   11 = heat exchanger   pump seal supply line would have
@ 6,0 SAY  '03 = drain            12 = tank             the following system identifiers:
@ 7,0 SAY  '04 = emergency        13 = seal'
@ 8,0 SAY  '05 = makeup           14 = leakage control      Primary   = 01'
@ 9,0 SAY  '06 = auxiliary        15 = recirculation        Secondary = 10,13.'
@ 10,0 SAY '07 = test             16 = turbine'
@ 11,0 SAY '08 = blowdown         17 = main'
@ 12,0 SAY '09 = cooling'
@ 15,0 SAY 'SYSDES   A free field to allow additional system description as needed.'
@ 17,0 SAY 'NUMFAILS  Number of failures reported in the LER, 1 unless specified'
@ 18,0 SAY ''
RETURN

* R3GLOS6.PRG 1-17-85 KRA
* SCREEN NUMBER 6
@ 1,0 SAY  'DATE         Date of failure event in six-digit code, e.g.,'
@ 2,0 SAY  '             830812 = August 12, 1983.'
@ 4,0 SAY  'POWELEV      Percent of full power of reactor when failure occurred.'
@ 6,0 SAY  'MODE         One of the following failure modes:'
@ 8,0 SAY  '             A = leakage (fail to seal)'
@ 9,0 SAY  '             B = fail to close'
@ 10,0 SAY '             C = unplanned opening (fail to remain closed)'
@ 13,0 SAY 'Failure mode B refers to failures in which the component does not close'
@ 14,0 SAY 'within a reasonable time limit, thereby constituting a potential failure to'
@ 15,0 SAY 'isolate containment.'
@ 21,0 SAY ''
RETURN
```

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@ 21,0 SAY '     (electrical power interrupt)'
@ 22,0 SAY '17 = bearing/bushing fail/prob.'
@ 23,0 SAY '18 = weld failure'
RETURN

* R3GLOS8.PRG 9-18-84 KRA
* SCREEN NUMBER 8
@ 1,0 SAY  'CAUSESEC   Secondary cause of failure.'
@ 3,0 SAY  '           Use the same identifiers as for Primary.'
@ 5,0 SAY  'The following example may help to distinguish between the primary and'
@ 6,0 SAY  'secondary failure causes.  Consider a damaged air lock door seal resulting '
@ 7,0 SAY  'from personnel closing the door with excessive force.  The primary failure '
@ 8,0 SAY  'cause would be "seal/gasket fail/prob." (13); the secondary cause would'
@ 9,0 SAY  'be "personnel (operation)" (01).'
@ 11,0 SAY 'DURATION   The number of days/hours/minutes during which the failure'
@ 12,0 SAY '           existed.  Following the dash, an A indicates that the duration'
@ 13,0 SAY '           is known to be the actual duration.  An M indicates an'
@ 14,0 SAY '           estimate of the minimum duration.  An X indicates unspecified.'
@ 16,0 SAY 'ISOLATED   Despite the failure, did containment remain isolated?  Yes/No'
@ 18,0 SAY 'DISCOVER   When the failure was discovered.  M = during maintenance'
@ 19,0 SAY '                                             N = during normal operations'
@ 20,0 SAY '                                             R = during records review'
@ 21,0 SAY '                                             T = during testing'
@ 22,0 SAY '                                             U = unknown'
@ 23,0 SAY ''
RETURN

* R3GLOS9.PRG 9-18-84 KRA
* SCREEN NUMBER 9
@ 1,0 SAY  'CORRECTS   The action(s) taken to return the failed component'
@ 2,0 SAY  '           to service.  One or two of the following:'
@ 4,0 SAY  '           A = replace part(s)'
@ 5,0 SAY  '           B = repair part(s)'
@ 6,0 SAY  '           C = replace total component'
@ 7,0 SAY  '           D = repair total component'
@ 8,0 SAY  '           E = recalibrate/adjust'
@ 9,0 SAY  '           F = redesign/modify'
@ 10,0 SAY '           G = change of procedure'
@ 11,0 SAY '           H = retrain/reinstruct personnel'
@ 12,0 SAY '           J = corrective action pending'
@ 13,0 SAY '           K = clean/reassemble'
@ 14,0 SAY '           L = recycle (valve)'
@ 15,0 SAY '           X = other'
@ 16,0 SAY '           Z = no corrective action taken'
@ 18,0 SAY "RELLER     Other LER's designated as being related to the failure (do not "
@ 19,0 SAY '           include revisions of the LER being reviewed).'
@ 21,0 SAY 'COMMENTS   Summary and/or additional information.'
@ 22,0 SAY ''
RETURN
```

```
* R3GLOS7.PRG 9-18-84 KRA
* SCREEN NUMBER 7
@ 1,0 SAY  'CAUSEPRI Primary cause, one of the following:'
@ 3,0 SAY  '00 = unknown                                    19 = lack of lubrication'
@ 4,0 SAY  '01 = personnel (operation)                      20 = electric motor operator fail/prob.'
@ 5,0 SAY  '02 = personnel (maintenance)                    21 = electric solenoid fail/prob.'
@ 6,0 SAY  '03 = personnel (testing)                        22 = leaking/ruptured diaphragm '
@ 7,0 SAY  '04 = design error                               23 = torque switch fail/prob.'
@ 8,0 SAY  '05 = fabrication/construction/QC                24 = failure of component supply system'
@ 9,0 SAY  '06 = procedural discrepancy                          (air supply interrupt)'
@ 10,0 SAY '07 = normal wear                                25 = seat/disc fail/prob.'
@ 11,0 SAY '08 = excessive wear                             26 = limit switch fail/prob.'
@ 12,0 SAY '09 = corrosion                                  27 = pilot valve fail/prob.'
@ 13,0 SAY '10 = foreign material contamination             28 = air solenoid fail/prob.'
@ 14,0 SAY '11 = excessive vibration                        29 = solenoid (unspecified) fail/prob.'
@ 15,0 SAY '12 = mechanical control/parts;                  30 = operator (unspecified) fail/prob.'
@ 16,0 SAY '     failed or out of adjustment                31 = penetration sealant fail/prob.'
@ 17,0 SAY '13 = seal/gasket fail/prob.                     32 = personnel (construction)'
@ 18,0 SAY '14 = packing fail/prob.                         33 = rupture'
@ 19,0 SAY '15 = bellows/boot fail/prob.                    34 = equalizing valve (air lock) fail/prob.
@ 20,0 SAY '16 = electrical input fail/prob.                35 = hydraulic operator fail/prob'
@ 21,0 SAY '     (electrical power interrupt)'
@ 22,0 SAY '17 = bearing/bushing fail/prob.'
@ 23,0 SAY '18 = weld failure'
RETURN
```

```
* DELAY.PRG
STORE 1 TO N
DO WHILE N<100
STORE N+1 TO N
ENDDO
ENDIF
```

TECHNICAL ASSISTANCE

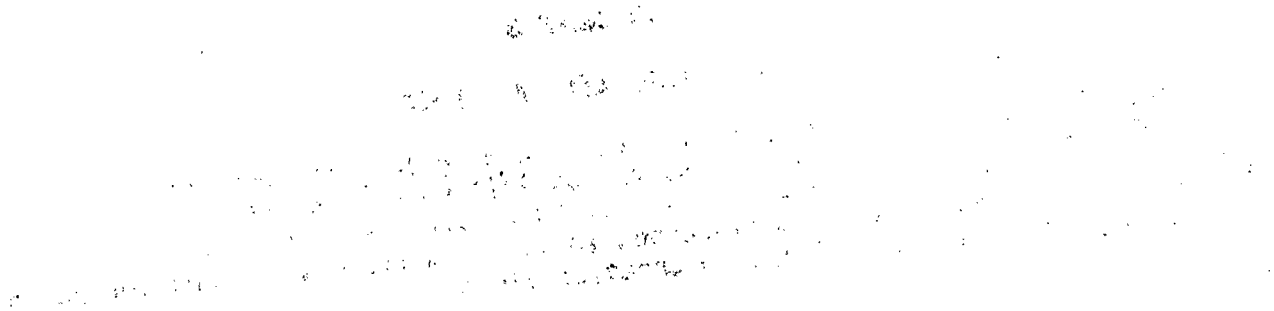
This program and user manual was written by Ken Ames at Battelle Pacific Northwest Laboratories. For technical help write to him at:

Battelle Northwest
Box 999
Richland, WA 99352

or phone 509 375 3930 (remember, this is Pacific time zone)

APPENDIX B

STRUCTURE OF LER DATA BASE



APPENDIX B

STRUCTURE OF LER DATA BASE

This appendix contains an example of the LER coding form and corresponding instructions used to review the LERs; the definition of the information fields used in the computer data base; and a listing of plant classes and plants included in the data base. As discussed in the main report, information was not always available for many of the information fields.

LER CODING FORM

Identification Information

Data Base # _____ LER # _____ Revision # ___

Accession # _____ Failure # ___

Component Information

Type: Main ___ Sub-1 ___ Sub-2 ___

Location ___ Manufacturer _____

Reactor: Name _____ Type ___ NSSS Vendor ___

System: Primary ___ Secondary _____

Failure Information

Date ___/___/___ Power Level _____% Failure Mode ___

Cause: Primary ___ Secondary ___

Duration ___/___/___ Containment Isolated? ___

Discovery ___ Corrective Actions _____

Related LERs _____

Comments

INSTRUCTIONS FOR COMPLETING LER CODING FORM

The following is a list of instructions for completing each entry in the LER Coding Form. Where no information is available, leave an entry blank.

Identification Information

Data Base #. Number (1-3100) listed for the NSIC data base entry.

LER #. Five-digit number assigned to the LER.

Revision #. Number of revision to original LER (assign a zero to the original LER).

Accession #. The six digits following 00Z0 of the accession number (last six digits of the accession number).

Failure #. The number of the failure described by the LER. This entry enables one to provide a unique identifier to each failure described by an individual LER since some LERs address multiple failures. Always assign a 1 as the failure number for an LER describing only one failure.

Component Information

Type: Main. Either a P (penetration) or V (valve).

Type: Sub-1. For a penetration:

A = personnel access
B = fuel handling
C = equipment access
D = electrical
E = instrument line
F = process piping
G = access (unspecified)
X = other

For a valve:

A = electric-motor-operated (AC)
B = electric-motor-operated (DC)
C = hydraulic-operated
D = pneumatic/diaphragm/cylinder-operated
E = solenoid-operated (AC)
F = solenoid-operated (DC)
G = float-operated
H = explosive-operated, squib
J = mechanical-operated
K = electric-motor-operated (unspecified)
L = solenoid-operated (unspecified)
M = manual-operated
N = remote-operated
P = damper
Q = vacuum breaker
R = relief/safety
S = check
X = other

Type: Sub-2. For a penetration: no identifiers currently anticipated.

For a valve:

A = ball
B = butterfly
C = check
D = diaphragm
E = gate
F = globe
G = needle
H = plug
J = nozzle
K = single blade
L = parallel blade
M = opposed blade
N = proportioning louver
P = angle
X = other

/For a valve designated in an LER solely as a diaphragm or a check valve, use the subtype-1 identifier and omit the subtype-2 identifier./

Location. For a penetration (currently presumed applicable only to accesses with double doors):

A = inner
B = outer
C = both (inner and outer doors)

For a valve:

A = inside containment
B = outside containment

Maufacturer: The four-character identifier from Exhibit J of NUREG-0161.

Reactor: Name. The three-character code from Table B-1 of NUREG/CR-1730. A supplement to this table is provided at the end of these instructions which updates the table to include all reactors operating or scheduled to be operating by the end of 1984. Also note the following updates in Table B-1:

- o Arkansas Nuclear One 2 commenced operation on 3/26/80
- o North Anna 1 commenced operation on 6/6/78
- o Edwin I. Hatch 2 commenced operation on 9/5/79.

Reactor: Type. One of the following:

B = BWR
H = HTGR (Fort St. Vrain)
P = PWR

Reactor: NSSS Vendor. One of the following:

A = Allis-Chalmers (La Crosse BWR)
B = Babcock & Wilcox
C = Combustion Engineering
G = General Electric
N = General Atomic (Fort St. Vrain)
W = Westinghouse

System:
Primary.

For a PWR:

01 = reactor coolant
02 = main steam
03 = high pressure injection/recirculation
04 = low pressure injection/recirculation
05 = instrument air
06 = service air
07 = air (unspecified)
08 = service water
09 = residual heat removal
10 = containment heating/ventilation/air conditioning
11 = containment pressure
12 = integrated leak rate test
13 = fire protection
14 = containment atmosphere
15 = component cooling water
16 = radwaste
17 = containment waste gas
18 = main feedwater
19 = auxiliary feedwater
20 = pressurizer
21 = safety injection
22 = demineralized water
23 = containment sump
24 = steam generator
25 = containment large-volume purge
26 = containment small-volume purge
27 = containment hydrogen purge
28 = containment purge (unspecified)
29 = nitrogen supply
30 = containment spray
31 = chemical volume control
32 = refueling canal
33 = containment instrumentation (electrical)
99 = other

For a BWR:

01 = reactor coolant
02 = main steam
03 = high pressure injection/recirculation
04 = low pressure injection/recirculation
05 = instrument air
06 = service air
07 = air (unspecified)
08 = service water
09 = residual heat removal
10 = containment heating/ventilation/air conditioning
11 = drywell pressure
12 = integrated leak rate test
13 = fire protection
14 = drywell atmosphere
15 = component cooling water
16 = radwaste
17 = drywell waste gas
18 = main feedwater
19 = auxiliary feedwater
20 = reactor core isolation cooling
21 = standby liquid control
22 = reactor cleanup
23 = drywell purge
24 = drywell vent
25 = drywell equipment sump
26 = drywell floor sump
27 = drywell sump (unspecified)
28 = control rod drive
29 = core spray
30 = vessel head spray
31 = containment cooling
32 = traversing incore probe
33 = torus (wetwell) vent
34 = vacuum relief
35 = drywell instrumentation (electrical)
36 = torus (wetwell) instrumentation (electrical)
37 = nitrogen supply
38 = torus (wetwell) purge
99 = other

System:
Secondary. One or two of the following:

01 = sample
02 = sensor/monitor
03 = drain
04 = emergency
05 = makeup
06 = auxiliary
07 = test
08 = blowdown
09 = cooling
10 = pump
11 = heat exchanger
12 = tank
13 = seal
14 = leakage control
15 = recirculation
16 = turbine
17 = main
18 = air

/The secondary system identifiers are provided to permit additional specification of the system. For example, a reactor coolant pump seal supply line would have the following system identifiers:

Primary = 01
Secondary = 10,13.

The line below the system identifier entries is provided for additional system description as needed./

Failure Information

Date. Date of failure event in six-digit code, e.g., 08/12/83 = August 12, 1983.

Power Level. Percent of full power of reactor when failure occurred.

Failure Mode. One of the following:

A = leakage (fail to seal)
B = fail to close
C = unplanned opening (fail to remain closed)

/Failure mode B refers to failures in which the component does not close within a reasonable time limit, thereby constituting a potential failure to isolate containment./

Cause:
Primary. One of the following:

00 = unknown
01 = personnel (operation)
02 = personnel (maintenance)
03 = personnel (testing)
04 = design error
05 = fabrication/construction/quality control
06 = procedural discrepancy
07 = normal wear
08 = excessive wear
09 = corrosion
10 = foreign material contamination
11 = excessive vibration
12 = mechanical control/parts; failed or out of adjustment
13 = seal/gasket failure/problem
14 = packing failure/problem
15 = bellows/boot failure/problem
16 = electrical input failure/problem (electrical power interrupt)
17 = bearing/bushing failure/problem
18 = weld failure
19 = lack of lubrication
20 = electric motor operator failure/problem
21 = electric solenoid failure/problem
22 = leaking/ruptured diaphragm
23 = torque switch failure/problem
24 = failure of component supply system (air supply interrupt)
25 = seat/disc failure/problem
26 = limit switch failure/problem
27 = pilot valve failure/problem
28 = air solenoid failure/problem
29 = solenoid (unspecified) failure/problem
30 = operator (unspecified) failure/problem
31 = penetration sealant failure/problem
32 = personnel (construction)
33 = rupture
34 = equalizing valve (on air lock) failure/problem
35 = hydraulic operator failure/problem

Cause:
Secondary. Use the same identifiers as for Primary.

/The following example may help to distinguish between the primary and secondary failure causes. Consider a damaged air lock door seal resulting from personnel closing the door with excessive force. The primary failure cause would be "seal/gasket failure/problem" (13); the secondary cause would be "personnel (operation)" (01)..

Duration. The number of days/hours/minutes during which the failure existed. Following the dash, enter an A if the duration is known to be the actual duration. Enter an M if it is an estimate of the minimum duration. If unsure, enter an X.

Containment Isolated? Despite the failure, did containment remain isolated - Y = yes, N = no?

Discovery. When was the failure discovered? One of the following.

M = during maintenance
N = during normal operations
R = during records review
T = during testing
U = unknown

Corrective Actions. The action(s) taken to return the failed component to service. One or two of the following:

A = replace part(s)
B = repair part(s)
C = replace total component
D = repair total component
E = recalibrate/adjust
F = redesign/modify
G = change of procedure
H = retrain/reinstruct personnel
J = corrective action pending
K = clean/reassemble
L = recycle (valve)
X = other
Z = no corrective action taken

Related LERs. Other LERs designated as being related to the failure (do not include revisions of the LER being reviewed).

Comments

Include additional information as well as expanding on previously coded information in this section. Typical information might be an expanded description of the component (e.g., valve size) or the failure (e.g., brand name of defective penetration sealant). Leakage rates reported should be included here. Any unique aspects of the LER should be mentioned.

INSTRUCTIONS FOR TRANSFERRAL OF LER CODING FORMS INTO COMPUTER DATA BASE

The computer data base (CDB) contains 29 information fields corresponding to the 27 information fields listed on each LER Coding Form, plus two additional information fields. Twenty-eight of the 29 fields in the CDB have labels beginning with the letters I, C, or F followed by a colon. These letters indicate the type of information contained in the field and correspond to the fields on the LER Coding Form as follows:

I = Identification Information
C = Component Information
F = Failure Information

Following the colon in each CDB label is a name which more specifically characterizes the field. These names also correspond to the field names on the LER Coding Form. There are two exceptions, which are discussed later when each field is examined individually. The last field in the CDB is "Comments" and corresponds to the "Comments" field on the LER Coding Form. Three of the 29 CDB field labels have ":F" following the name. This indicates that the field contains information in a free-style format, i.e., uncoded.

Each of the 29 fields in the CDB is examined individually as follows.

CDB FIELD #	CDB FIELD NAME	LER CODING FORM FIELD NAME	REMARKS
01	I:DATABNUM	Data Base #	Enter 4 digits (use preceding zeros where needed to completely fill field, e.g., enter Data Base # 38 as 0038)
02	I:LERNUM	LER #	Enter 5 digits with dash (-) between first 2 and last 3 (e.g., 83-005)
03	I:REVISNUM	Revision #	Enter 2 digits (use preceding zero where needed to completely fill field, e.g., enter Revision # 2 as 02)
04	I:ACCESNUM	Accession #	Enter 6 digits (use preceding zeros where needed to completely fill field, e.g., enter Accession # 98707 as 098707)

CDB FIELD #	NAME	LER CODING FORM FIELD NAME	REMARKS
05	I:ENTRYNUM	Failure #	Enter 2 digits (use preceding zero where needed to completely fill field, e.g., enter Failure # 1 as 01). NOTE: The LER Coding Form field labeled "Failure #" does NOT indicate the number of failures, i.e., it does NOT correspond to CDB field #18 labeled "F:NUMFAILS."
06	C:TYPEMAIN	Type: Main	Enter 1 letter
07	C:TYPESUB1	Type: Sub-1	Enter 1 letter
08	C:TYPESUB2	Type: Sub-2	Enter 1 letter
09	C:LOCATION	Location	Enter 1 letter
10	C:MANUFACT	Manufacturer	Enter 4 characters (1 letter followed by 3 digits)
11	C:REACNAME	Reactor: Name	Enter 3 characters (2 letters followed by 1 digit)
12	C:REACTYPE	Reactor: Type	Enter 1 letter
13	C:REACNSSS	Reactor: NSSS Vendor	Enter 1 letter
14	C:CISCLASS	—	Refer to the "List of Plant Classes" (attached) and enter the digit signifying the class of the reactor specified in CDB field #11 (C:REACNAME); e.g., enter a 5 in C:CISCLASS for a C:REACNAME entry "BF1." NOTE: The LER Coding Form does NOT have a field corresponding to the CDB field "C:CISCLASS."
15	C:SYSPRIMA	System: Primary	Enter 2 digits (use preceding zero where needed to completely fill field, e.g., enter System:Primary #7 as 07)

CDB FIELD #	CDB FIELD NAME	LER CODING FORM FIELD NAME	REMARKS
16	C:SYSSECON	System: Secondary	Enter 1 or 2 pairs of digits, separated by a comma if 2 pairs are entered (no comma for just 1 pair). NOTE: Within each pair, use preceding zero where needed to completely fill that pair's field, e.g., enter System:Secondary #8 as 08; System:Secondary #12,7 as 12,07).
17	C:SYSDES:F	System (free-field description)	Enter ≤ 36 characters from free-field description (underlined on LER Coding Form immediately below System fields), using appropriate abbreviations where needed (See list of abbreviations following this table)
18	F:NUMFAILS	--	Enter 2 digits (use preceding zero where needed to completely fill field, e.g., enter 3 failures as 03). NOTE: The LER Coding Form does NOT have a field corresponding to the CDB field "F:NUMFAILS." Normally, 01 should be entered in this field (representing 1 failure). However, some LER Coding Forms indicate multiple failures, usually as a circled item toward the upper right, e.g., "6 valves" circled in the upper right. For such an item, enter the circled number in CDB field "F:NUMFAILS," e.g., 06.

#	COB FIELD NAME	LER CODING FORM FIELD NAME	REMARKS
19	F:DATE	Date	Enter 8 characters (3 pairs of digits separated by slashes [/]). NOTE: Within each pair, use preceding zero where needed to completely fill that pair's field, e.g., enter Date 1/6/83 as 01/06/83.
20	F:POWERLEV	Power Level (%)	Enter 3 digits (use preceding zero where needed to completely fill field, e.g., enter Power Level 95% as 095). NOTE: The % symbol should NOT be entered.
21	F:MODE	Failure Mode	Enter 1 digit
22	F:CAUSEPRI	Cause: Primary	Enter 2 digits (use preceding zero where needed to completely fill field, e.g., enter Cause:Primary #5 as 05)
23	F:CAUSESEC	Cause: Secondary	Enter 2 digits (use preceding zero where needed to completely fill field, e.g., enter Cause:Secondary #3 as 03)
24	F:DURATION	Duration	Enter 10 characters (3 pairs of digits, separated by slashes [/], followed by a dash [-] and a letter). NOTE: Within each pair of digits, use preceding zero where needed to completely fill that pair's field, e.g., enter Duration 0/5/13-M as 00/05/13-M.
25	F:ISOLATED	Containment Isolated?	Enter 1 letter
26	F:DISCOVER	Discovery	Enter 1 letter
27	F:CORRECTS	Corrective Actions	Enter 1 or 2 letters, separated by a comma if 2 letters are entered (no comma for just 1 letter).

#	CDB FIELD NAME	LER CODING FORM FIELD NAME	REMARKS
28	F:RELLER:F	Related LERs (free-field)	Enter ≤ 28 characters from free field
29	COMMENTS:F	Comments (free-field)	Enter ≤ 240 characters from free field, using appropriate abbreviations where needed (See list of abbreviations following this table)

LIST OF ABBREVIATIONS

V = valve
IV = isolation valve
AL = air lock
PAL = personnel air lock
fl = fail/failure
lk = leak/leakage
& = and

***NOTE: Use other common abbreviations as appropriate.

LIST OF PLANT CLASSES

Class 1. PWR - Large Dry Containment

Class 2. PWR - Subatmospheric Containment

Class 3. PWR - Dual (Double) Containment

Class 4. PWR - Ice Condenser Containment

Class 5. BWR - Mark I Containment

Class 6. BWR - Mark II Containment

Class 7. BWR - Mark III Containment

Class 8. Other

PLANT	CODE	CLASS
Arkansas Nuclear One 1	AR1	1
Arkansas Nuclear One 2	AR2	1
Browns Ferry 1	BF1	5
Browns Ferry 2	BF2	5
Browns Ferry 3	BF3	5
Big Rock Point	BP1	8
Brunswick 1	BR1	5
Brunswick 2	BR2	5
Beaver Valley 1	BV1	2
Calvert Cliffs 1	CC1	1
Calvert Cliffs 2	CC2	1
Cooper Station	CO1	5
Crystal River 3	CR3	1
Duane Arnold	DA1	5
Davis-Besse 1	DB1	3

PLANT	CODE	CLASS
D. C. Cook 1	DC1	4
D. C. Cook 2	DC2	4
Diablo Canyon 1	DO1	1
Diablo Canyon 2	DO2	1
Dresden 1	DR1	8
Dresden 2	DR2	5
Dresden 3	DR3	5
Enrico Fermi 2	EF2	5
E. I. Hatch 1	EN1	5
E. I. Hatch 2	EN2	5
Fort Calhoun	FC1	1
J. A. Fitzpatrick	FP1	5
Fort St. Vrain	FV1	8
Grand Gulf 1	GG1	7
Humboldt Bay 3	HB3	5
Haddam Neck (CT Yankee)	HN1	1
Indian Point 2	IP2	1
Indian Point 3	IP3	1
J. M. Farley 1	JF1	1
J. M. Farley 2	JF2	1
Kewaunee	KE1	3
LaCrosse BWR	LB1	8
LaSalle 1	LS1	6
LaSalle 2	LS2	6
McGuire 1	MG1	4
McGuire 2	MG2	4

PLANT	CODE	CLASS
Millstone 1	MI1	5
Millstone 2	MI2	1
Monticello	MO1	5
Maine Yankee	MY1	1
North Anna 1	NA1	2
North Anna 2	NA2	2
Nine Mile Point 1	NM1	5
Oyster Creek 1	OC1	5
Oconee 1	OE1	1
Oconee 2	OE2	1
Oconee 3	OE3	1
Palisades	PA1	1
Peach Bottom 2	PB2	5
Peach Bottom 3	PB3	5
Pilgrim 1	PI1	5
Prairie Island 1	PR1	3
Prairie Island 2	PR2	3
Point Beach 1	PT1	1
Point Beach 2	PT2	1
Palo Verde 1	PV1	1
Quad Cities 1	QC1	5
Quad Cities 2	QC2	5
R. E. Ginna	RG1	1
H. B. Robinson 2	RO2	1
Rancho Seco	RS1	1
Salem 1	SA1	1

PLANT	CODE	CLASS
Salem 2	SA2	1
Sequoyah 1	SE1	4
Sequoyah 2	SE2	4
St. Lucie 1	SL1	3
St. Lucie 2	SL2	3
Shoreham	SM1	6
San Onofre 1	SO1	8
San Onofre 2	SO2	1
San Onofre 3	SO3	1
Susquehanna 1	SS1	6
Susquehanna 2	SS2	6
Surry 1	SU1	2
Surry 2	SU2	2
Three Mile Island 1	TI1	1
Three Mile Island 2	TI2	1
Trojan	TR1	1
Turkey Point 3	TU3	1
Turkey Point 4	TU4	1
V. C. Summer 1	VS1	1
Vermont Yankee	VY1	5
Waterford 3	WF3	3
WNP 2	WP2	6
Yankee Rowe	YR1	8
Zion 1	ZI1	1
Zion 2	ZI2	1

APPENDIX C

LISTING OF PENETRATIONS AND VALVES

APPENDIX C

LISTING OF PENETRATIONS AND VALVES

This appendix provides a listing of containment penetrations and valves for Peach Bottom 2 and St. Lucie 2. This listing supports the example analysis in Section 7.0.

Standard Listing of Peach Bottom 2 Penetrations for RACISP

RTR	SYSTEM	ID	TYPE	SIZE	STAT	FREQ
PB2	MAIN STEAM	N-007	F	26	OCC	C
PB2	MAIN STEAM DRAIN	N-008	F	3	OCC	C
PB2	FEEDWATER	N-009A	F	24	OCO	C
PB2	FEEDWATER	N-009B	F	24	OCO	C
PB2	STEAM TO RCIC TURBIN	N-010	F	3	OCO	C
PB2	STEAM TO HPCI TURBIN	N-011	F	10	OCO	C
PB2	RHR SHTDWN CLNG SUCT	N-012	F	20	COC	C
PB2	RHR SHTDN COOLNG RET	N-013A	F	24	COC	C
PB2	LPCI INJECTION	N-013B	F	24	COC	N
PB2	RWCU PUMP SUCTION	N-014	F	6	OOC	C
PB2	CORE SPRAY PUMP DISC	N-016A,B	F	12	CCO	C
PB2	RHR HEAD SPRAY	N-017	F	6	COC	C
PB2	DRYWEL FL DR PMP DSC	N-018	F	3	OCC	C
PB2	DRYWEL EQ DR PMP DSC	N-019	F	3	OCC	C
PB2	SERVICE AIR SUPPLY	N-021	E	1	CCC	C
PB2	PBCW TO RECIRC PUMPS	N-023	F	4	OOC	N
PB2	PBCW FR RECIRC PUMPS	N-024	F	4	OOC	N
PB2	DRYWELL & TORUS PURG	N-025	F	18	COC	C
PB2	DRYWELL PURGE EXHAUS	N-026	F	18	OOO	C
PB2	TIP DRIVES	N-035A TO E	E	3/8	OCC	A
PB2	TIP PURGE	N-035F	E	1	OCC	A
PB2	CRD RETURN	N-036	F	4	CCC	C
PB2	CRD INSERT	N-037A TO D	E	1	CCC	N
PB2	CRD WITHDRAWAL	N-038A TO D	E	1	CCV	N
PB2	RHR CONT SPRAY	N-039A,B	F	14	CCO	C
PB2	RECIRC LOOP SAMPLE	N-041	E	3/4	CCC	C
PB2	STANDBY LIQ CONTROL	N-042	E	1.5	CCC	C
PB2	RECIRC SUCT PRESSURE	N-050A	E	1		
PB2	RCIC STEAM PRESSURE	N-050B,C	E	1		A
PB2	RWCU PUMP SUCT PRES	N-050D,E	E	1		A
PB2	CACS SAMPLE	N-051C	E	1	OOC	C
PB2	CACS SAMPLE	N-051C	E	1	OOC	C
PB2	CACS SAMPLE RETURN	N-051D	E	1	OOC	C
PB2	INST GAS SUPPLY	N-052F	E	1	OOC	C
PB2	H2O FR D'WL COOLERSA	N-053	F	8	OOC	N
PB2	H2O FR D'WL COOLERSB	N-054	F	8	OOC	N
PB2	H2O TO D'WL COOLERSB	N-055	F	8	OOC	N
PB2	H2O TO D'WL COOLERSA	N-056	F	8	OOC	N
PB2	MN STM LINE D SAMPLE	N-057	E	3/4	CCC	C
PB2	DRYWELL PRESSURE	N-102	E	1		A
PB2	DRYWELL PRESSURE	N-102B	E	1		
PB2	TORUS VACUUM BREAKER	N-205A	F	20	CCC	C
PB2	D'WL & TORUS PRG SUP	N-205B	F	20	CCC	C
PB2	RHR TST & PL COOL RT	N-210A,B	F	18	CCC	C
PB2	RHR TORUS SPRAY	N-211A,B	F	6	CCC	C
PB2	RCIC TURBINE EXHAUST	N-212	F	12	OOO	N
PB2	TORUS DRAIN	N-213A	E	1	OOO	A
PB2	HPCI	N-214	F	24	OOO	N
PB2	TORUS LEVEL	N-215	F	2	OOO	A
PB2	TORUS LEVEL	N-215	V	1	OOO	A

Standard Listing of Peach Bottom 2 Penetrations for RACISP

RTR	SYSTEM	ID	TYPE	SIZE	STAT	FREQ
PB2	HPCI MIN FLOW	N-216	F	4	CCC	N
PB2	HPCI & RCIC VAC REL	N-217B	F	2	OOC	C
PB2	INST GAS SUPPLY	N-218	E	1	OOC	C
PB2	INST GAS SUPPLY	N-218A	E	1	OOC	C
PB2	CACS SAMPLE LINE	N-218B	E	1	OOC	C
PB2	ILRT CONNECTION	N-218C	F	3/4	CCC	C
PB2	TORUS PURGE EXHAUST	N-219	F	18	COC	C
PB2	RCIC VAC PUMP DISCH	N-221	F	2	OOO	N
PB2	HPCI TURBINE DRAIN	N-223	F	2	OOO	N
PB2	RCIC & TORUS H2O SUC	N-225	F	6	CCO	C
PB2	RHR PUMP SUCTION	N-226A TO D	F	24	OOO	N
PB2	HPCI PUMP SUCTION	N-227	F	16	CCO	C
PB2	CORE SPRAY PUMP SUCT	N-228A TO D	F	16	OOO	N
PB2	COR SP PUMP MIN FLOW	N-229	F	4	OOO	N
PB2	RCIC PUMP MIN FLOW	N-230	F	2	CCC	N
PB2	HPCI TEST LINE	N-233	F	4	CCC	C
PB2	CORE SPRAY TEST LINE	N-234	F	10	CCC	N
PB2	CORE SPRAY TEST LINE	N-234	F	10	CCC	N

Standard Listing of Peach Bottom 2 Valves for RACISP

RTR	SYSTEM	ID	TYPE	OP	SIZE	STAT	FREQ	STANDARD
PB2	MAIN STEAM	AO-2-80 A-D	F	DX	26	OCC	C	
PB2	MAIN STEAM	AO-2-86 A-D	F	DX	26	OCC	C	
PB2	MAIN STEAM DRAIN	MO-2-74	E	A	3	COC	C	
PB2	MAIN STEAM DRAIN	MO-2-77	E	A	3	COC	C	
PB2	FEEDWATER	2-28A	C	S	24	OCO	C	
PB2	FEEDWATER	2-96A	C	S	24	OCC	C	
PB2	F'WATER STARTUP REC	MO-2-38A	E	A	24	CCC	C	
PB2	FEEDWATER HPCI	MO-23-19	E	B	24	CCO	C	
PB2	FEEDWATER	MO-2149 A-C	E	A	24	OOC	C	
PB2	FEEDWATER INST	INST	F	M	1	OOO	C	
PB2	F'WATER STARTUP BYP	CHECK	C	S	24	CCC	C	
PB2	FEEDWATER	2-28B	C	S	24	OCO	C	
PB2	FEEDWATER	2-96B	C	S	24	OCC	C	
PB2	FEEDWATER RCIC	MO-13-21	E	B	24	CCO	C	
PB2	FEEDWATER RWCU	MO-12-68	F	A	24	OOC	C	
PB2	FW STARTUP RECIRC	MO-2-38B	E	A	24	CCC	C	
PB2	STEAM TO RCIC TURBIN	MO-13-15	E		3	OCO	C	
PB2	STEAM TO RCIC TURBIN	MO-13-16	F	B	3	OCO	C	
PB2	STEAM TO HPIC TURBIN	MO-23-15	E	A	10	OCO	C	
PB2	STEAM TO HPIC TURBIN	MO-23-16	E	B	10	OCO	C	
PB2	STEAM TO HPIC TURBIN	AO-4807	E	D	10	OCO	C	
PB2	RHR SHTDWN CLNG SUCT	MO-10-17	E	A	20	COC	C	
PB2	RHR SHTDWN CLNG SUCT	MO-10-18	E	B	20	COC	C	
PB2	RHR SHTDN COOLNG RET	MO-10-25 A,B	E	A	24	COC	C	
PB2	LPCI INJECTION	AO-10-46 A,B	C	S	24	COC	N	
PB2	LPCI INJECTION	AO-10-163A,B	D		24	CCC	N	
PB2	RWCU PUMP SUCTION	MO-12-15	F	A	6	OOC	C	
PB2	RWCU PUMP SUCTION	MO-12-18	F	B	6	OOC	C	
PB2	CORE SPRAY PUMP DISC	MO-14-12A,B	E	A	12	CCO	C	
PB2	CORE SPRAY PUMP DISC	AO-14-13A,B	C	S	12	CCO	C	
PB2	CORE SPRAY PUMP DISC	AO-14-15A,B	D	D	12	CCC	C	
PB2	RHR HEAD SPRAY	MO-10-32	E	A	6	COC	C	
PB2	RHR HEAD SPRAY	MO-10-33	E	B	6	COC	C	
PB2	DRYWEL FL DR PMP DSC	AO-20-82	D	D	3	OCC	C	
PB2	DRYWEL FL DR PMP DSC	AO-20-83	D	D	3	OCC	C	
PB2	DRYWEL EQ DR PMP DSC	AO-20-94	D	D	3	OCC	C	
PB2	DRYWEL EQ DR PMP DSC	AO-20-95	D	D	3	OCC	C	
PB2	SERVICE AIR SUPPLY		F	M	1	CCC	C	
PB2	SERVICE AIR SUPPLY		F	M	1	CCC	C	
PB2	INST GAS SUPPLY		C	S	1	OOC	C	
PB2	INST GAS SUPPLY	AO-2969A	D	D	1	OOC	C	
PB2	PBCW TO RECIRC PUMPS	MO-2373	E	A	4	OOC	N	
PB2	PBCW FR RECIRC PUMPS	MO-2374	E	A	4	OOC	N	
PB2	DRYWELL & TORUS PURG	AO-2505	B	D	18	COC	C	
PB2	DRYWELL & TORUS PURG	AO-2519	B	D	20	CCC	C	
PB2	DRYWELL & TORUS PURG	AO-2520	B	D	20	COC	C	
PB2	DRYWELL & TORUS PURG	AO-2521A	B	D	20	COC	C	
PB2	DRYWELL & TORUS PURG	AO-2521B	B	D	20	COC	C	
PB2	D'WEL & TORUS N2 SUP	AO-2523	D	D	20	CCC	C	
PB2	D'WEL & TORUS N2 SUP		D	D	20	CCC	C	

Standard Listing of Peach Bottom 2 Valves for RACISP

RTR	SYSTEM	ID	TYPE	OP	SIZE	STAT	FREQ	STANDARD
PB2	D'WEL & TORUS VAC RL	AO-2502A	B	D	20	CCC	C	
PB2	D'WEL & TORUS VAC RL	9-26A	X	S	20	CCC	C	
PB2	D'WEL & TORUS PRESS	INST	F	M	20	OOO	C	
PB2	D'WEL & TORUS N2 SUP		C	S	20	CCC	C	
PB2	D'WEL PURGE EXH CAD	AO-2509	D	D	18	OOO	C	
PB2	D'WEL PURGE EXH CAD	AO-2510	D	D	18	CCO	C	
PB2	D'WEL EXHAUST PURGE	AO-2506	B	D	18	COC	C	
PB2	D'WEL EXHAUST PURGE	COC2507	B	D	18	OOO	C	
PB2	D'WEL EXH INST GAS	AO-4235	D	D	18	OOC	C	
PB2	D'WEL EXH INST GAS	SV-8100	X	E	18	OOC	C	
PB2	D'WEL EXH CACS SAMPL	SV-2671	X	E	18	OOC	C	
PB2	D'WEL EXH CACS SAMPL	SV-2978	X	F	18	CCO	C	
PB2	D'WEL EXH CAD SAMPLE	SV-4960B	X	E	18	CCC	C	
PB2	D'WEL EXH CAD SAMPLE	SV-4961B	X	E	18	CCO	C	
PB2	DW EXH RAD GAS SAMPL	SV-4966B	X	E	18	CCO	C	
PB2	DW EXH RAD GAS SAMPL	SV-8101	X	E	18	CCO	C	
PB2	DW EXH PURG PRESSURE	INST	F	M	18	OOO	C	
PB2	TIP DRIVES		A	E	3/8	OCC	A	
PB2	TIP DRIVES		X	H	3/8	OOC	A	
PB2	TIP PURGE		C	S	1	OCC	A	
PB2	TIP PURGE	7-113	X	E	1	CCC	A	
PB2	CRD RETURN	3-113	C	S	4	CCC	C	
PB2	CRD RETURN	3-110	C	S	4	CCC	C	
PB2	CRD INSERT		C	S	1	CCC	N	
PB2	CRD WITHDRAWAL		X	ED	1	CCC	N	
PB2	CRD WITHDRAWAL		E	ED	1	CCC	N	
PB2	CRD WITHDRAWAL	CV3-32 A,B	F	D	1	OOC	C	
PB2	CRD WITHDRAWAL	CV3-33	F	D	1	OOC	C	
PB2	CRD WITHDRAWAL	CV3-35 A,B	F	D	1	OOC	C	
PB2	CRD WITHDRAWAL	CV3-36	F	D	1	OOC	C	
PB2	RHR CONT SPRAY RHR	MO-10-31 A,B	E	A	14	CCO	C	
PB2	RHR CONT SPRAY RHR	MO-10-26 A,B	E	A	14	CCO	C	
PB2	RHR CONT SPRAY CAD	SV-4948 A,B	X	E	14	CCO	C	
PB2	RHR CONT SPRAY CAD	SV-4949 A,B	X	E	14	CCO	C	
PB2	RHR CONT SPRAY CAD		C	S	14	CCO	C	
PB2	RECIRC LOOP SAMPLE	AO-2-39	D	D	3/4	CCC	C	
PB2	RECIRC LOOP SAMPLE	AO-2-40	D	D	3/4	CCC	C	
PB2	STANDBY LIQ CONTROL	11-16	C	S	1.5	CCC	C	
PB2	STANDBY LIQ CONTROL	11-17	C	S	1.5	CCC	C	
PB2	DRYWELL PRESSURE	10-53 A,C	F	M	1		A	
PB2	DRYWELL PRESSURE	10-60 A,C	F	M	1		A	
PB2	RECIRDC SUCT PRESSUR	305A	F	M	1		A	
PB2	RCIC STEAM PRESSURE		F	M	1		A	
PB2	RCIC STEAM PRESSURE	54 A,B	F	M	1		A	
PB2	RWCU PUMP SUCT PRES	125 A,B	X		1		A	
PB2	RWCU PUMP SUCT PRES	6 A,B	X		1		A	
PB2	CACS SAMPLE	SV-2671 E,D	X	E	1	OOC	C	
PB2	CACS SAMPLE	SV-2978 E,D	X	F	1	OOC	C	
PB2	CACS SAMPLE	SV-2671C	S	E	1	OOC	C	
PB2	CACS SAMPLE	SV-2678C	S	E	1	COC	C	

Standard Listing of Peach Bottom 2 Valves for RACISP

RTR	SYSTEM	ID	TYPE	OP	SIZE	STAT	FREQ	STANDARD
PB2	CACS SAMPLE CAD	SV-4960C	X	E	1	CCO	C	
PB2	CACS SAMPLE CAD	SV-4961C	X	E	1	CCO	C	
PB2	CACS SAMPLE RAD GAS	SV-4966C	X	E	1	CCC	C	
PB2	CACS SAMPLE RAD GAS	SV-8101	X	E	1	CCC	C	
PB2	CACS SAMPLE RETURN		C	S	1	OOC	C	
PB2	CACS SAMPLE RETURN	SV-2980	X	F	1	OOC	C	
PB2	RCIRC SUCT PRESSURE	305B	X	F	1		C	
PB2	INST GAS SUPPLY	33	C	S	1		C	
PB2	H2O FR D'WL COOLERSB	MO-2200B	E	A	8	OOC	N	
PB2	H2O FR D'WL COOLERSA	MO-2201B	E	A	8	OOC	N	
PB2	H2O TO D'WL COOLERSB	MO-2200A	E	A	8	OOC	N	
PB2	H2O TO D'WL COOLERSA	MO-2201A	E	A	8	OOC	N	
PB2	MN STM LINE D SAMPLE	AO-2-316	D	D	3/4	CCC	C	
PB2	MN STM LINE D SAMPLE	AO-2-317	D	D	3/4	CCC	C	
PB2	DRYWELL PRESSURE	53 B,D	F		1		A	
PB2	DRYWELL PRESSURE	60 B,D	F		1			
PB2	TORUS VACUUM BREAKER	AO-2502B	D	D	20	CCC	C	
PB2	TORUS VACUUM BREAKER	9-26B	X	S	20	CCC	C	
PB2	TORUS LEVEL		F	M	20	OOO	A	
PB2	RHR TST & PL COOL RT	MO-10-34 A,B	F	A	18	CCC	C	
PB2	RHR TST & PL COOL RT	10-19 A-D	C	S	18	COO	N	
PB2	RHR TORUS SPRAY	MO-10-34 A,B	F	A	6	CCC	C	
PB2	RHR TORUS SPRAY	MO-10-39 A,B	E	A	6	CCC	C	
PB2	RHR TORUS SPRAY	MO-10-34 A,B	E	A	6	CCC	C	
PB2	RHR TORUS SPRAY-CAD	SV-4950 A,B	X	E	6	CCO	C	
PB2	RHR TORUS SPRAY-CAD	SV-4951 A,B	X	E	6	CCO	C	
PB2	RCIC TURBINE EXHAUST	13-9	C	S	12	OOO	N	
PB2	RCIC TURBINE EXHAUST	13-50	C	S	12	OOO	N	
PB2	RCIC TURBINE EXHAUST	AO-4240	D	D	12	OOO	N	
PB2	RCIC TURBINE EXHAUST	AO-4241	D	D	12	OOO	N	
PB2	RCIC TURBINE EXHAUST	23-12	C	S	24	OOO	N	
PB2	RCIC TURBINE EXHAUST	23-65	C	S	24	OOO	N	
PB2	RCIC TURBINE EXHAUST	AO-4247	D	D	24	OOO	N	
PB2	RCIC TURBINE EXHAUST	AO-4248	D	D	24	OOO	N	
PB2	RCIC TURBINE EXHAUST	AO-4248	D	A	24	OOO	N	
PB2	RCIC TURBINE EXHAUST	MO-4244	E	B	24	OOC	N	
PB2	RCIC TURBINE EXHAUST	MO-4244A	E	B	24	OOC	N	
PB2	HPCI MIN FLOW	23-62	C	S	4	CCC	N	
PB2	INST GAS SUPPLY	AO-2968	D	D	1	OOC	C	
PB2	CACS SAMPLE LINE	SV-2671A	X	F	1	OOC	C	
PB2	CACS SAMPLE LINE	SV-2978A	X	F	1	OOC	C	
PB2	RCIC VAC PUMP DISCH	13-10	C	S	2	OOO	N	
PB2	RCIC VAC PUMP DISCH	13-38	C	S	2	CCO	C	
PB2	HPCI TURBINE DRAIN	23-13	C	S	2	OOO	N	
PB2	HPCI TURBINE DRAIN	23-56	C	S	2	CCO	C	
PB2	CORE SPRAY TEST LINE	MO-14-26A	F	A	10	CCC	N	
PB2	CORE SPRAY TEST LINE	14-66 A,C	C	S	10	CCC	N	
PB2	RCIC & TORUS H2O SUC	MO-13-41	E	B	6	CCO	C	
PB2	RCIC & TORUS H2O SUC	MO-14-70	E	A	6	CCC	C	
PB2	RCIC & TORUS H2O SUC	MO-14-71	E	B	6	CCC	C	

Standard Listing of Peach Bottom 2 Valves for RACISP

RTR	SYSTEM	ID	TYPE	OP	SIZE	STAT	FREQ	STANDARD
PB2	RHR PUMP SUCTION	MO-10-13 A-D	E	A	24	OOO	N	
PB2	RHR PUMP SUCTION	RV-10-72 A-D	X	S	24	CCC	N	
PB2	HPCI PUMP SUCTION	MO-23-58	E	B	16	CCO	C	
PB2	CORE SPRAY PUMP SUCT	MO-14-7 A-D	E	A	16	OOO	N	
PB2	COR SP PUMP MIN FLOW	14-66 B,D	C	S	4	OOO	N	
PB2	RCIC PUMP MIN FLOW	13-29	C	S	2	CCC	N	
PB2	HPCI TEST LINE	MO-23-31	E	B	4	CCC	C	
PB2	CORE SPRAY TEST LINE	MO-14-26B	F	A	10	CCC	C	
PB2	IN LI CORE PLATE PRE	25,27	X		1	XXX		
PB2	IN LINE RPV LEVEL PR	17A,19A,11,1	X		1	AXX		
PB2	IN LINE RPV HEAD PRE	23	X		1	XXX		
PB2	IN LINE PRV LEVEL PR	17B,19B,13B,	X		1	XXX		
PB2	IN LINE MAIN STM PRE	73 A,C,E,G	X		1	XXX		
PB2	IN LINE REC LOOP B F	64 C,D	X		1	XXX		
PB2	IN LINE REC PUMPSEAL	7 A,B	X		1	XXX	X	
PB2	IN LINE REC PUMPSEAL	8 A,B	X		1	XXX		
PB2	IN LINE REC LOOP B F	63 A,B	X		1	XXX		
PB2	IN LINE REC LOOP B F	63 A,B	X		1	XXX		
PB2	IN LINE CS INJ PRESS	30 A,B	X		1	XXX		
PB2	IN LINE REC PUMP PRE	62 A,B,C,D	X		1	XXX		
PB2	IN LINE REC PUMP PRE	62 A,B,C,D	X		1	XXX		
PB2	IN LINE MAIN STM PRE	73 B,D,F,H	X		1	XXX		
PB2	IN LINE HPCI STM PRE	37 A,B	X		1	XXX		

Standard Listing of St. Lucie 2 Penetrations for RACISP

RTR	SYSTEM	ID	TYPE	SIZE	STAT	FREQ	STANDARD
SL2	MAIN STEAM	I34 MS23	F	34	OCC	B	GDC57
SL2	MAIN STEAM	I34 MS29	F	34	OCC	B	GDC57
SL2	FEEDWATER	I20 BF14	F	20	OCC	B	GDC57
SL2	FEEDWATER	I20 BF19	F	20	OCC	B	GDC57
SL2	BLOWDOWN	I2 B2	F	2	OCC	B	GDC57
SL2	BLOWDOWN	I2 B1	F	2	OCC	B	GDC57
SL2	PRIM H2O SUPPLY	I2 PMW7	F	2	CCC	C	GDC56
SL2	STATION AIR SUPPLY	I2 SA12	X	2	CCV	C	GDC56
SL2	INSTRU AIR SUPPLY	I2IA14	X	2	OCC	C	GDC56
SL2	H&V CONT PURGE		X	48	CCC	C	GDC56
SL2	N2 SUPPLY	I1WM226	F	1	OOC	C	GDC56
SL2	N2 SUPPLY	I1WM851	F	1	OOC		GDC56
SL2	CCW RTN FAN COOLER	I8CC43	F	8	OOO		GDC57
SL2	CCW SUPPLY COOLER	I8CC39	F	8			
SL2	CCW RETURN COOLER	I8CC44	F	8			
SL2	CCW SUPPLY COOLER	I8CC40	F	8			
SL2	CCW RETURN COOLER	I8CC41	F	8			
SL2	CCW SUPPLY COOLER	I8CC37	F	8			
SL2	CCW RETURN COOLER	I8CC42	F	8			
SL2	CCW SUPPLY COOLER	I8CC38	F	8			
SL2	H2O SUPPLY RCP	I8CC138	F	8	OCC	C	GDC56
SL2	H2O RETURN RCP	I8CC168	F	8	OCC	C	GDC56
SL2	FUEL TRANS TUBE	I8CC168	B	36		B	
SL2	LETDOWN LINE	I2CH103	F	2	OCC	C	GDC55
SL2	CHARGING LINE	I2CH109	F	2	OOO		GDC55
SL2	SAMPLING HOT LEG	I3/8SS635	X	3/8	OCC	C	GDC55
SL2	SAMPLING PRESS STM	I3/8SS633	X	3/8	OCC	C	GDC55
SL2	BLOWDOWN	I1/2B81	F	1/2		B	GDC57
SL2	CONT VENT HEADER	I1WM223	X	2	OOC	C	GDC56
SL2	CONT SUMP SUCTION	I24 CS4	F	24	CCO		GDC56
SL2	CONT SUMP SUCTION	I24 CS5	F	24	CCO		GDC56
SL2	CONT SPRAY	I10 CS12	F	10	CCO		GDC56
SL2	CONT SPRAY	I10 CS13	F	10	CCO		GDC56
SL2	CONT SPRAY	I12 CS18	F	12	CCO		GDC56
SL2	CONT SPRAY	I12 CS19	F	12	CCO		GDC56
SL2	SI LOOP 2A2	I6SI113	F	6	COO		GDC55
SL2	SI LOOP 2A1	I6SI113	F	6	COO		GDC55
SL2	SI LOOP 2B1	I6SI111	F	6	COO		GDC55
SL2	SI LOOP 2B2	I6SI110	F	6	COO		GDC55
SL2	SHTDWN COOLING	I10SI362	F	10	COC		GDC55
SL2	SI TANK TEST	I2SI479	X	2	CCC	C	GDC55
SL2	CONT SUMP PUMP DISCH	I3CS63	F	3	CCC		GDC56
SL2	REAC DRAIN PUMP SUCT	I3WM108	F	3	OCV		GDC56
SL2	RCP CONTRL BLEED OFF	I3/4CH129	F	3/4	OCV		GDC55
SL2	REFUEL CAV PURIF IN	I3CS52	B	3	CCC	C	GDC56
SL2	REFUEL CAV PURIF OUT	I3CS56	B	3	CCC	C	GDC56
SL2	H2 SAMPLING	I3/8MS12	X	3/8	CVC	C	GDC56
SL2	BLOWDOWN	I1/2 B82	F	1/2		B	
SL2	SPARE		X				
SL2	H2 SAMPLING	I3/8MS14	X	3/8	VCV	C	GDC56

Standard Listing of St. Lucie 2 Penetrations for RACISP

RTR	SYSTEM	ID	TYPE	SIZE	STAT	FREQ	STANDARD
SL2	CONT/ANNUL PRESS DIF		X			A	RG-11
SL2	INTEG LEAK RATE TEST		X		CCC	C	GDC56
SL2	CONT/ANNUL DIFF PRES		X			A	RG-1.11
SL2	INTEG LEAK RATE TEST	I8IT21	X	3	CCC	C	GDC56
SL2	SPARE		X				
SL2	H&V PURGE INLET	I8CV3	X	8	OCC		GDC56
SL2	H&V PURGE OUTLET	I8CV8	X	8	OCC		GDC56
SL2	SPARE		X				
SL2	H&V CONT PURGE		X	48	CVC		GDC56
SL2	SHUTDOWN COOLING	I10SI363	F	10	COC		GDC55
SL2	H&V VACUUM RELIEF		X	24	CCV		GDC56
SL2	HOT LEG 2A INJECTION	I3SI179	F	3	CCC		GDC55
SL2	HOT LEG 2B INJECTION	I3SI181	F	3	CCC		GDC55
SL2	SPARE		X				
SL2	SPARE		X				
SL2	ELECTRICAL		D		CCC	B	
SL2	CONSTRUCTION HATCH		C	28FT	CCC	B	
SL2	INTERIOR PERS ACCESS		A	51	CVC	B	
SL2	ELECTRICAL		D		CCC	B	
SL2	EXTERIOR PERS ACCESS		A	51	CVC	B	
SL2	EMERGENCY AIR ACCESS		X		CVC	B	
SL2	LOCK TEST		X		CCC	B	
SL2	ELECTRICAL		D		CCC	B	
SL2	ESCAPE LOCK (INT)		A	69	CVC	B	
SL2	ELECTRICAL		D		CCC	B	
SL2	ESCAPE LOCK (EXT)		A		CVC	B	
SL2	ELECTRICAL		D		CCC	B	
SL2	TEST PENETRATIONS		X		CCC	B	
SL2	EMERG AIR FLANGE		X		CVC	B	
SL2	MAINTNEANCE HATCH		G		CVC	B	

Standard Listing of St. Lucie 2 Valves for RACISP

RTR	SYSTEM	ID	TYPE	OP	SIZE	STAT	FREQ	STANDARD
SL2	MSIV	IHCV081A	F	D	34	OCC	C	GDC57
SL2	MSIV	IMV081A	E	AM	3	CCC	C	GDC57
SL2	MSIV	IMV081B	E	AM	3	CCC	C	GDC57
SL2	MSIV	IHCV081B	F	D	34	OCC	C	GDC57
SL2	AUX FEEDWATER	IMV099	F	AM	4	OCO	C	GDC57
SL2	AUX FEEDWATER	IMV0812	E	BM	4	COO	C	GDC57
SL2	STM GEN BLOWDOWN	IFCV233	E	DM	2	OCC	C	GDC57
SL2	PRIM MAKEUP WATER	IHCV151	F	DM	2	CCC	C	GDC56
SL2	PRIM MAKEUP WATER	IV151347	C	S	2		C	GDC56
SL2	STATION AIR	IV18947	F		2	CCV	C	GDC56
SL2	STATION AIR	IV18947P	F		2		C	GDC56
SL2	INSTRUMENT AIR	IHCV181	F	D	2	OCC	C	GDC56
SL2	INSTRUMENT AIR	IV18957	C		2		C	GDC56
SL2	CONT PURGE EXHAUST	IFCV256	B	DM	48	CCC	C	GDC56
SL2	CONT PURGE EXHAUST	IFCV255	B	DM	48	CCC	C	GDC56
SL2	CONT PURGE EXHAUST	IFCV254	B	DM	48	CCC	C	GDC56
SL2	CONT PURGE SUPPLY	IFCV251	B	DM	48	CCC	C	GDC56
SL2	CONT PURGE SUPPLY	IFCV252	B	DM	48	CCC	C	GDC56
SL2	CONT PURGE SUPPLY	IFCV253	B	DM	48	CCC	C	GDC56
SL2	N2 SUPPLY TO SI TANK	V6741	F	DM	1	OOC	C	GDC56
SL2	N2 SUPPLY TO SI TANK	V6792	C	S	1		C	GDC56
SL2	FAN COOL H20 RETURN	IMV1410	B	AM	8	OOO		GDC57
SL2	FAN COOL H20 SUPPLY	IMV149	B	AM	8	OOO		GDC57
SL2	RCP COOL H20 SUPPLY	IHCV147	B	DM	8	OCC	C	GDC56
SL2	RCP COOL H20 SUPPLY	IHCV141	B	DM	8	OCC	C	GDC56
SL2	RCP COOL H20 RETURN	IHCV146	B	DM	8	OCC	C	GDC56
SL2	RCP COOL H20 RETURN	IHCV142	B	DM	8	OCC	C	GDC56
SL2	CVCS(LETDOWN)	IV2516	F	DM	2	OCC	C	GDC55
SL2	CVCS(LETDOWN)	IV2522	F	DM	2	OCC	C	GDC55
SL2	CVCS(CHARGING)	IV2462	C	S	2			GDC55
SL2	CVCS(CHARGING)	IV2523	F	D	2	OOO		GDC55
SL2	SI TANK SAMPLE	ISE051A	F	DM	3/8	CCC	C	GDC55
SL2	SI TANK SAMPLE	ISE051E	F	DM	3/8	CCC	C	GDC55
SL2	RCS HOT LEG SAMPLE	IV5200	F	DM	3/8	OCC	C	GDC55
SL2	RCS HOT LEG SAMPLE	IV5203	F	DM	3/8	OCC	C	GDC55
SL2	PRESS SURGE SAMPLE	IV5204	F	DM	3/8	CCC	C	GDC55
SL2	PRESS SURGE SYSTEM	IV5201	F	DM	3/8	CCC	C	GDC55
SL2	PRESS STM SAMPLE	IV5205	F	DM	3/8	OCC	C	GDC55
SL2	PRESS STM SAMPLE	IV5202	F	DM	3/8	OCC	C	GDC55
SL2	STM GEN BLDN SAMPLE	IFCV237	F	DM	1/2	OCC	C	GDC57
SL2	CONT VENT HEADER	IV6718	D	DM	1	OOC	C	GDC56
SL2	CONT VENT HEADER	IV6750	D	DM	1	OOC	C	GDC56
SL2	CONT SUMP SUCTION	IMV072A	B	AM	24	CCO		GDC56
SL2	CONT SPRAY	IFCV071A	B	DM	10	CCO	C	GDC56
SL2	CONT SPRAY	IV071553	C	S	10			GDC56
SL2	SAFETY INJECTION	IHCV3615	F		6	COO		GDC55
SL2	SAFETY INJECTION	IHCV3625	F		6	COO		GDC55
SL2	SAFETY INJECTION	IHCV3635	F		6	COO		GDC55
SL2	SAFETY INJECTION	IHCV3645	F		6	COO		GDC55
SL2	SAFETY INJECTION	IHCV3616	F		6	COO		GDC55

Standard Listing of St. Lucie 2 Valves for RACISP

RTR	SYSTEM	ID	TYPE	OP	SIZE	STAT	FREQ	STANDARD
SL2	SAFETY INJECTION	IHCV3626	F		6	COO		GDC55
SL2	SAFETY INJECTION	IHCV3636	F		6	COO		GDC55
SL2	SAFETY INJECTION	IHCV3646	F		6	COO		GDC55
SL2	SAFETY INJECTION	IHCV3617	F		6	COO		GDC55
SL2	SAFETY INJECTION	IHCV3627	F		6	COO		GDC55
SL2	SAFETY INJECTION	IHCV3637	F		6	COO		GDC55
SL2	SAFETY INJECTION	IHCV3647	F		6	COO		GDC55
SL2	SAFETY INJECTION	IV3258	C		6			GDC55
SL2	SAFETY INJECTION	IV3259	C		6			GDC55
SL2	SAFETY INJECTION	IV3260	C		6			GDC55
SL2	SAFETY INJECTION	IV3261	C		6			GDC55
SL2	SHUTDOWN COOLING	IV3665	E		10	COC		GDC55
SL2	SHUTDOWN COOLING	IV3651	E		10	COC		GDC55
SL2	SIT TEST LINE	ISE032A	F	FM	2	CCC	C	GDC55
SL2	SIT TEST LINE	IV3463	E		2	CCC	C	GDC55
SL2	RCAVITY SUMP DISCHAR	ILCV0711A	F	DM	3	CCC	C	GDC56
SL2	RCAVITY SUMP DISCHAR	ILCV0711B	F	DM	3	CCC	C	GDC56
SL2	RCDT PUMP SUCTION	IV6341	D	DM	3	OCV	C	GDC56
SL2	RCDT PUMP SUCTION	IV6342	D	DM	3	OCV	C	GDC56
SL2	RCP CTRL BLEEDOFF	IV2524	F	DM	3/4	OCV	C	GDC55
SL2	RCP CTRL BLEEDOFF	IV2505	F	DM	3/4	OCV	C	GDC55
SL2	FLUID INST LINE	EXCES FLOW	C	S	3/8			RG-11
SL2	FUEL POOL CLEANUP-I	IV07(1609)	E	M	3	CCC	C	GDC56
SL2	FUEL POOL CLEANUP-I	IV07(1609)	E	M	3	CCC	C	GDC56
SL2	FUEL POOL CLEANUP-O	IV07(1609)	E	M	3	CCC	C	GDC56
SL2	FUEL POOL CLEANUP-O	IV07(1609)	E	M	3	CCC	C	GDC56
SL2	H2 SAMPLE LINES OUT	IFSE278	F	EM	3/8	CVC	C	GDC56
SL2	H2 SAMPLE LINES OUT	IFSE2715	E	EM	3/8	CVC	C	GDC56
SL2	FLUID INST LINE	EXCES FLOW	C	S	3/8	OOV		RG-11
SL2	H2 SAMPLE LINES-I	IV27(1342)	C		3/8	VCV	C	GDC56
SL2	H2 SAMPLE LINES-I	IFSE2716	E	EM	3/8	CCC	C	GDC56
SL2	CONT PRESSURE	ISE075E	F	DM	3/8	OOO		RG-11
SL2	CONT RAD MONITORING	IFCV261	F	DM	1	OCC	C	GDC56
SL2	CONT RAD MONITORING	IFCV262	F	DM	1	OCC	C	GDC56
SL2	CONT RAD MONITORING	IFCV263	F	DM	1	OCC	C	GDC56
SL2	CONT RAD MONITORING	IFCV264	F	DM	1	OCC	C	GDC56
SL2	CONT RAD MONITORING	IFCV265	F	DM	1	OCC	C	GDC56
SL2	CONT RAD MONITORING	IFCV266	F	DM	1	OCC	C	GDC56
SL2	ILRT	IV00(1325)	F	M	1	CCC	C	GDC56
SL2	ILRT	IV00(1325)	F	M	1	CCC	C	GDC56
SL2	ILRT	IV00(1322)	F	M	3/8	CCC	C	GDC56
SL2	ILRT	IV00(1322)	F	M	3/8	CCC	C	GDC56
SL2	ILRT	IV00612	E	M	3	CCC	C	GDC56
SL2	CONT PRESS INST	ISE075A	F	FM	3/8	OOO		RG-1.11
SL2	H2 PURGE MAKEUP-I	IFCV2526	B	DM	8	OCC	C	GDC56
SL2	H2 PURGE MAKEUP-I	IV2525	C	S	8	OCC	C	GDC56
SL2	H2 PURGE MAKEUP-EX	IFCV2520	B	DM	8	OCC	C	GDC56
SL2	H2 PURGE MAKEUP-EX	IFCV2521	B	DM	8	OCC	C	GDC56
SL2	CONT PRESS INST	ISE075C	F	FM	3/8	OOO		RG-1.11
SL2	CONT VAC RELIEF	IV2520	C	S	24	CCC	C	GDC56

Standard Listing of St. Lucie 2 Valves for RACISP

RTR	SYSTEM	ID	TYPE	OP	SIZE	STAT	FREQ	STANDARD
SL2	CONT VAC RELIEF	IFCV257	B	DM	24	CCC	C	GDC56
SL2	HOT LEG INJECTION	IV3540	F	KM	3	CCC		GDC55
SL2	HOT LEG INJECTION	IV3524	C	S	3			GDC55
SL2	HOT LEG INJECTION	IV3523	F	KM	3	CCC		GDC55
SL2	HOT LEG INJECTION	IV3526	C	S	3			GDC55
SL2	CONT PRESS INST	ISE075D	F	FM	3/8	OOO		RG-1.11
SL2	FEEDWATER	IHCV091A	E	DM	20	OCC	C	GDC57
SL2	FEEDWATER	IHCV091B	E	DM	20	OCC	C	GDC57
SL2	FEEDWATER	IHCV092A	E	DM	20	OCC	C	GDC57
SL2	FEEDWATER	IHCV092B	E	DM	20	OCC	C	GDC57
SL2	AUX FEEDWATER	IMV0910	F	AM	4	OCO	C	GDC57
SL2	AUX FEEDWATER	IMV0911	F	AM	4	OCO	C	GDC57
SL2	AUX FEEDWATER	IMV0912	F	AM	4	OCO	C	GDC57
SL2	AUX FEEDWATER	IMV0813	E	BM	4	COO	C	GDC57
SL2	STM GEN BLOWDOWN	IFCV235	E	DM	2	OCC	C	GDC57
SL2	FAN COOL H2O RETURN	IMV1412	B	AM	8	OOO		GDC57
SL2	FAN COOL H2O RETURN	IMV1414	B	AM	8	OOO		GDC57
SL2	FAN COOL H2O RETURN	IMV1416	B	AM	8	OOO		GDC57
SL2	FAN COOL H2O RETURN	IMV1411	B	AM	8	OOO		GDC57
SL2	FAN COOL H2O RETURN	IMV1413	B	AM	8	OOO		GDC57
SL2	FAN COOL H2O RETURN	IMV1415	B	AM	8	OOO		GDC57
SL2	SI TANK SAMPLE	ISE051B	F	DM	3/8	CCC	C	GDC55
SL2	SI TANK SAMPLE	ISE051C	F	DM	3/8	CCC	C	GDC55
SL2	SI TANK SAMPLE	ISE051D	F	DM	3/8	CCC	C	GDC55
SL2	STM GEN BLDN SAMPLE	IFCV239	F	DM	1/2	OCC		GDC57
SL2	CONT SUMP SUCTION	IMV072B	B	AM	24	CCO		GDC56
SL2	CONT SPRAY	IFCV071B	B	DM	10	CCO	C	GDC56
SL2	SHUTDOWN COOLING	IV3664	E		10	COC	C	GDC55
SL2	SHUTDOWN COOLING	IV3481	E		10	COC	C	GDC55
SL2	SIT TEST LINE	ISE032B	F	FM	2	CCC	C	GDC55
SL2	H2 SAMPLE LINES OUT	IFSE279	F	EM	3/8	CVC	C	GDC56
SL2	H2 SAMPLE LINES OUT	IFSE2710	F	EM	3/8	CVC	C	GDC56
SL2	H2 SAMPLE LINES OUT	IFSE2711	F	EM	3/8	CVC	C	GDC56
SL2	H2 SAMPLE LINES OUT	IFSE2712	F	EM	3/8	CVC	C	GDC56
SL2	H2 SAMPLE LINES OUT	IFSE2713	F	EM	3/8	CVC	C	GDC56
SL2	H2 SAMPLE LINES OUT	IFSE2714	F	EM	3/8	CVC	C	GDC56
SL2	H2 SAMPLE LINES OUT	IFSE2718	E	EM	3/8	CVC	C	GDC56
SL2	H2 SAMPLE LINES IN	IFSE2717	E	EM	3/8	CCC	C	GDC56
SL2	CONT PRESSURE	ISE075F	F	DM	3/8	OOO		RG-11
SL2	CONT VAC RELIEF	IV2521	C	S	24	CCC	C	GDC56
SL2	CONT VAC RELIEF	IFCV258	B	DM	24	CCC	C	GDC56
SL2	CONT PRESS INST	ISE075B	F	FM	3/8	OOO		RG-1.11

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This report summarizes the results of the Reliability Analysis of Containment Isolation System Project. Work was performed in five basic areas: design review, operating experience review, related research review, generic analysis and plant specific analysis. Licensee Event Reports (LERs) and Integrated Leak Rate (ILRT) Test reports provided the major sources of containment performance information used in this study. Data extracted from the LERs were assembled into a computer data base. Qualitative and quantitative information developed for containment performance under normal operating conditions and design basis accidents indicate that there is room for improvement. A crude estimate for overall containment unavailability for relatively small leaks which violate plant technical specifications is 0.3. An estimate of containment unavailability due to large leakage events is in the range of 0.001 to 0.01. These estimates are dependent on several assumptions (particularly on event duration times) which are documented in the report.

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