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ABSTRACT

This report describes an evaluation of an industry-wide sample of Licensee Event Reports (LERs) that was conducted to determine whether or not these LERs were prepared in accordance with the requirements set forth in 10 CFR 50.73. The study was performed at the Idaho National Engineering Laboratory (INEL), by EG&G, Inc. This evaluation (NUREG/CR-4178) indicated that although the overall quality of the LERs was good, many LERs failed to meet all of the requirements. This report presents the methodology that was used to evaluate the LERs, the conclusions reached concerning problem areas in the reports, and suggestions as to how the overall quality and completeness of reports can be improved.

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SUMMARY

Background

On January 1, 1984, a new Licensee Event Report rule (10 CFR 50.73)[1] became effective. In order to determine whether licensees were preparing LERs in accordance with the requirements of this new rule, an evaluation[2] of an industry-wide sample of 415 LERs was performed. EG&G Idaho, Inc. performed the evaluation for the Nuclear Regulatory Commission's Office for Analysis and Evaluation of Operational Data. The evaluation (NUREG/CR-4178) focused on determining if there were recurring problems or deficiencies in the quality and completeness of the LERs. As a result of this evaluation, problems and deficiencies were identified that prompted a number of recommendations to enable the licensees to prepare LERs in a more complete and consistent manner.

Methodology

The methodology used to conduct the evaluation of the 415 LERs consisted of defining a minimum set of criteria based on 10 CFR 50.73(b), the appropriate sections of NUREG-1022,[3] and Supplement 1 to NUREG-1022. The content of each LER was then evaluated against these criteria. Based on this evaluation, the analysts were able to identify the most frequent deficiencies involving the text, abstract, and coded fields.

Summary of Results

The results obtained from the process of evaluating the LER sample are presented, primarily in terms of the number and type of deficiencies identified during the evaluation of each LER. The most frequent deficiencies are presented in tabular form, and possible reasons for them are discussed. This list of deficiencies prompted the recommendations presented in this report.

Recommendations

Two categories of recommendations are presented: (a) those that may necessitate changes to the licensees' training and review procedures, and (b) those that should require no changes to licensee procedures.

The suggested training and review procedure changes would have to be evaluated by each licensee in order to determine whether a deficiency exists based on how the licensee's (or utility's) LERs compare with the list of most frequent LER problems. However, no matter how well a licensee perceives its present procedures and methods for preparing LERs, the data indicate that better training and review procedures are necessary for the long-term goal of better quality LERs.

The second set of recommendations consists of a list of preparation guidelines, a text outline, and an outline checklist. The merits of these tools should be easily recognized. These recommendations are in the form of working documents that can be reproduced and provided to each person responsible for preparing and reviewing LERs. Their use should help licensees to prepare LERs that (a) meet all the requirements of the new LER rule, and (b) are consistent with others being prepared throughout the industry.

AN EVALUATION OF SELECTED LICENSEE EVENT REPORTS PREPARED PURSUANT TO 10 CFR 50.73

1. INTRODUCTION

In an effort to evaluate and improve (as necessary) the quality and completeness of the Licensee Event Reports (LERs) being prepared under the new LER rule (10 CFR 50.73) that became effective January 1, 1984, an industry-wide sample of 415 LERs was selected and evaluated against the criteria contained in 10 CFR 50.73(b). This evaluation was performed at the Idaho National Engineering Laboratory by EG&G Idaho, Inc. for the Nuclear Regulatory Commission's Office for Analysis and Evaluation of Operational Data. The results (NUREG/CR-4178) of this evaluation prompted this report, which addresses only the quality and completeness of the information contained in the LER sample, and not the question of whether the licensees are reporting all events that are required to be reported. In addition, this report does not address the technical accuracy or completeness of the LERs in terms of what actually took place during the event. While most utilities are attempting to comply with the requirements of 50.73(b), NUREG-1022, and Supplement No. 1 to NUREG-1022, the number of errors and deficiencies noted during the evaluation indicate that additional guidance and recommendations could be of benefit to the industry.

The body of this report contains three major sections: (a) a description of the methodology used to evaluate the LER sample, (b) a discussion of the results, and (c) recommendations for improving the overall quality and completeness of LERs. The methodology section presents the details covering selection of the LER sample and the rationale and criteria used to evaluate each LER. The results section focuses on the major errors and deficiencies identified during the evaluation process. The recommendation section presents guidance concerning the licensee's training and review process and the merits of using a list of guidelines, a text outline, and an outline checklist.

The appendices provide: (a) a list of LERs used in the sample, (b) the list of preparation guidelines, (c) the text outline, (d) the text outline checklist, and (e) examples of well written LERs that have been submitted by licensees.

The objective of this report is to present the details of the LER evaluation in a manner that would enable licensees to learn by reviewing the mistakes that are most commonly made during LER preparation. Not only will licensees find it easier and faster to write a quality report, but the industry as a whole will benefit by gaining more of the information necessary to identify, evaluate, and correct industry-related problems.

2. METHOD OF EVALUATION

The objective of this evaluation was to assess the content of up to five LERs from each licensee in comparison to NRC requirements and determine improvements to the reporting process. In order to meet this goal, 415 LERs submitted to the NRC and subsequently transmitted to EG&G Idaho, Inc. were selected for review. The scope of the evaluation did not allow comparison of the LER to an independent account of the event. The evaluation was limited to reviewing the LER content against the requirements of the new rule. Further, no attempt was made in this evaluation to determine if events are going unreported.

2.1 Sample Selection

A set of five LERs, if available, for each operating nuclear power plant was selected using the following initial guidelines:

1. The event date should be, if possible, between April 1, 1984 and September 30, 1984.

2. Each set was to include, if possible, at least one LER involving:

   a. A reactor scram from above one percent power, and

   b. An actuation of an engineered safety feature.

3. Each set, if possible, should address a variety of events.

4. Voluntary Reports (e.g., informational reports) were not selected. Some Special Reports were selected, but only if these reports met another requirement for reporting.

At the time the initial selection was made, the EG&G files did not contain all LERs for the sample period; therefore, some plants did not have sufficient LERs available for a set of five LERs. LERs continued to be received during the time that the evaluation of the initial sample was being conducted. The analysts expected that enough new LERs would be received by the completion of the evaluation of the initial sample, so that each plant would have a full set of five. This was not the case, however, as some plants still had not submitted enough LERs to meet the initial goal. Only 15 additional LERs were available, so the initial set of guidelines were relaxed as follows:

1. LERs with an event date later than September 30, 1984 were selected.

2. If more LERs were needed, LERs with event dates as early as March 1, 1984 were selected.

3. If still more LERs were needed, LERs involving events similar to other events in the sample were selected.

This change in guidelines resulted in 20 additional LERs producing a total of 415 LERs.

Out of 88 operating nuclear power plants, 78 plants had a sample of five LERs per plant. One plant did not have any LERs on file and another had filed only one voluntary report. Appendix A contains a complete list of the final LER sample listed by licensee.

2.2 Basis for Evaluation

The evaluation process was broken into four categories. The first item evaluated on each LER was the narrative description (referred to in this report and on NRC Form 366A as Text), the second was the abstract, the third item was the title, and the last encompassed all other fields on the reporting form (NRC Form 366). The text requirements are outlined in Paragraphs 50.73(b)(2) through 50.73(b)(6) of the new rule while the abstract requirements are specified in Paragraph 50.73(b)(1). The rule itself does not specifically state the requirements for a title; however, guidance concerning the title is presented in NUREG-1022. All other fields were reviewed primarily to determine if they were filled in correctly; comments were made concerning errors in these fields.

The evaluation was not done according to a strict set of rules, but instead was based on subjective evaluations. Even though this report was based on a subjective evaluation, the analysts realized that an element of consistency was necessary. To obtain this goal, a set of guidelines was developed, so that consistency between analysts would be maintained. Following are the descriptions of the guidelines developed for evaluating the text and abstract.

2.2.1 Basis for Evaluation of Text

The new rule requires that the LER text be written in sufficient depth so that knowledgeable readers conversant with the design of commercial nuclear power plants, but not familiar with the details of a particular plant, can understand the complete event. Characteristics of a plant that are unique and that influenced the event, favorably or unfavorably, should be described. Licensees should describe how system, component, and operating personnel performance affected the course of the event. This description should be sufficiently detailed so that no unanswered questions are left in the reader's mind. The text should also describe the event from the perspective of the operator, for example, what the operator saw, did, perceived, understood, or misunderstood during the event. Specific information that should be included, as appropriate for the particular event, is described in paragraphs 50.73(b)(2)(ii) through 50.73(b)(6). An assessment of these paragraphs will be discussed in the following sections.

The text analysis was broken into three categories. The first was an overall subjective evaluation of the quality of the text content. The second was a subjective evaluation of how well 10 CFR 50.73 was met concerning cause and corrective actions, and the third was an evaluation of how well the report met the minimum requirements of 50.73. The remainder of this section details the basis for each of these categories.

2.2.1.1 Quality of Text Content. The text should describe the course of the event, so that an understandable sequence of occurrences evolves in the reader's mind. The LER should address all pertinent points that affected the course of the event. For each point addressed, enough detail should be provided to explain the significance of the point without raising additional unanswered questions. The analysts categorized the LER discussion as either: (a) thoroughly explained, (b) understandable, (c) vague, or (d) unclear. The analysts also looked for contradictions and/or conclusions that were not supported by sufficient facts.

2.2.1.2 Cause and Corrective Actions. The text is required to include cause(s) [Paragraph 50.73(b)(2)(ii)(D)] and corrective action(s) [Paragraph 50.73(b)(4)]. For this requirement, the staff is looking for more than general statements. Not only should the immediate cause(s) be given, but also the root cause(s) and intermediate cause(s), when appropriate. If a root cause can not be determined, the steps taken during the attempt to determine the root cause should be discussed. A discussion of the steps is useful for providing insights into the possible cause of the event. The text should include similar details in relation to corrective actions. In particular, a discussion of all corrective actions taken to prevent recurrence in the future should be included. If the licensee does not determine the root cause, the corrective actions taken may not prevent recurrence. Thus, causes and corrective actions are closely related as illustrated in the following example for an Emergency Core Cooling System (ECCS) which failed to provide water to the core:

- Immediate cause--valve in an ECCS failed to open
- Intermediate cause--binding of the valve stem
- Intermediate cause--corrosion of the valve stem
- Intermediate cause--no lubrication on the valve stem
- Root cause--valve not included in the lubrication procedure
- Immediate corrective action--realign valves to use a different ECCS
- Planned corrective action (repair)--repair and lubricate valve stem

- Planned corrective action (prevention)—change lubrication procedure to include the valve.

As this example shows, the root cause is the cause which, when corrected, minimizes the probability of recurrence of the problem. Without determining and correcting the root cause, the valve stem would probably corrode again. In the above example, corrective actions would be insufficient if the valve stem were only repaired and lubricated.

2.2.1.3 Minimum Requirements of the Rule. The rule requires that the narrative description include the specific information of Paragraph 50.73(b)(2)(ii)(A) through 50.73(b)(6) as appropriate for the particular event. The evaluation considered the physical presence and the relative importance of each requirement. Following are specific comments about each requirement of the rule.

- Paragraph 50.73(b)(2)(ii)(A)—Plant operating conditions before the event. In general, the plant power level is considered minimally sufficient to meet the requirement of this paragraph. A statement that the plant was producing power is inadequate if the specific power level was not mentioned. Reference to numerical operating modes is not considered acceptable without a brief explanation of the mode number (e.g., hot shutdown, refueling outage). Additional data such as pressure and temperature is desirable depending on the event.

- Paragraph 50.73(b)(2)(ii)(B)—Status of structures, components, or systems that were inoperable at the start of the event and that contributed to the event. Comparison of the LERs to an independent description of the event was beyond the scope of the LER evaluation. As a result, there was no way of knowing what data should have been included in the report; therefore, if inoperable equipment was not mentioned in the report, it was assumed that the requirement of this paragraph was not applicable to this event.

- Paragraph 50.73(b)(2)(ii)(C)—Dates and approximate times of occurrences. The licensee should provide more than just the date and initial time of an event. For events which occur over several days, additional dates are expected; however, a single date is acceptable for an event that occurred in a single day. Times should be given for various occurrences during an event; for example, the time of a reactor trip and the time the plant reached a safe and stable condition after the trip. In addition, the time when systems or components became inoperable and are subsequently returned to service are of particular importance. Sufficient times and dates should be included so that the reader can visualize a time history for the event.

- Paragraphs 50.73(b)(2)(ii)(D)--The cause of each component or system failure or personnel error, if known; 50.73(b)(2)(ii)(E)--The failure mode, mechanism, and effect of each failed component, if known. These two paragraphs are discussed together, because of the close relationship between cause, failure mode, mechanism, and effect. Confusion exists in defining these terms, especially the distinction between cause and mechanism. Depending on the source, "mechanism" may either be defined as the process or physics that led from an operational component to a failed component[4] or may be defined as the "immediate cause"[5] as shown in the valve failure example in Section 2.2.1.2. Since mechanism can be defined as "immediate cause," the definition of "cause" required in Paragraph 50.73(b)(2)(ii)(D) may be unclear. As the valve failure example (page 8) demonstrates, there can be many levels in a failure sequence which can be interpreted as "cause." For purposes of this evaluation, the "cause" required in Paragraph 50.73(b)(2)(ii)(D) means the "root cause" and "intermediate causes." Additionally, the "mechanism" required in Paragraph 50.73(b)(2)(ii)(E) means the "immediate cause."

  Failure mode and effect add additional confusion because of their close relationship to cause and mechanism. The "failure mode" can be defined as an undesirable state of a system or component, and the "effect" can be defined as the consequence or major concern resulting from the failure. In the example, a valve failing to open resulted in a "failure mode" for an ECCS; namely, its failure to deliver water to the core. The "effect" of the ECCS could be a potential core temperature transient if alternate means of cooling are not provided. The example would now look as follows:

- Effect--no core cooling from the affected ECCS

- Failure mode--no water delivered to the core from the ECCS

- Immediate cause--valve in the ECCS failed to open

- Intermediate cause--binding of the valve stem

- Intermediate cause--corrosion of the valve stem

- Intermediate cause--no lubrication on the valve stem

- Root cause--valve not included in the lubrication procedure.

The designation of failure mode, effect, and immediate cause thus depends on whether a discussion is focusing on a system, subsystem, or component. Further discussions of these terms are available in References 4 and 5.

Note that in describing a failure or an entire event, a logical progression would include a discussion of effect (no flow) to explain the immediate corrective actions. Likewise, the immediate cause, intermediate causes, and root cause should be presented to justify the choice of long term corrective actions.

- <u>Paragraph 50.73(b)(2)(ii)(F)--The Energy Industry Identification System component function identifier and system name of each component or system referred to in the LER</u>. The initial evaluation did not independently verify the Energy Industry Identification System (EIIS) codes but merely verified that codes were provided where necessary.

- <u>Paragraph 50.73(b)(2)(ii)(G)--For failures of components with multiple functions, include a list of systems or secondary functions that were also affected</u>. As stated earlier, comparison of the LERs to an independent description of the event was beyond the scope of the LER evaluation. For evaluation purposes, there was no method available for consistently determining what data should have been included in the report; therefore, if multiple functions were unconditional, it was assumed that the requirements of this paragraph were not applicable to the event.

- o <u>Paragraph 50.73(b)(2)(ii)(H)--For failure that rendered a train of a safety system inoperable, an estimate of the elapsed time from the discovery of the failure until the train was returned to service.</u> If the licensee did not directly address an elapsed time from the discovery of a train failure until the train was returned to service, but the dates and times were included for all occurrences discussed in the LER such that the duration of a train failure could be determined, this is sufficient to satisfy the requirements of this paragraph. Many times licensees did not state whether or not the failure of a specific system, component, or a personnel error rendered a train of a safety system inoperable; therefore, the analysts were not always able to ascertain whether a train was inoperable. This situation is considered a deficiency. Note, that the word "failure" as used in this paragraph means anything that would render a train of a safety system inoperable, including personnel error. For example, an improper valve lineup is considered a failure for this paragraph.

- o <u>Paragraph 50.73(b)(2)(ii)(I)--The method of discovery of each component or system failure or procedural error.</u> The LER should include a description of the systematic process which leads to the identification of the principal occurrences. Even though more details are desirable, key words and phrases such as the following are acceptable:

  - While we were <u>testing</u> . . .
  - During an <u>investigation</u> of . . .
  - While <u>troubleshooting</u> . . .
  - During a supervisory <u>tour</u> . . .
  - Was <u>observed</u> by personnel . . .

o Paragraph 50.73(b)(2)(ii)(J)(1)--Operator actions that affected the course of the event, including operator errors, procedural deficiencies, or both, that contributed to the event. This paragraph requires the identification of actions which affect the event positively as well as negatively. The discussions of negative actions are beneficial to aid others in avoiding the same mistake. Likewise, a discussion of proven positive actions may aid others if they experience a similar event. Positive actions should include any immediate corrective actions that were taken such as those that may have prevented a scram or an undesirable system actuation. Negative actions should include any operator errors, procedural deficiencies, or both that contributed to the event. A general statement that "all personnel performed as required" is not considered to have met the requirements of the paragraph. As a minimum, the LER should contain statements such as "the operator opened the bypass valve" or "the operator verified that the residual heat removal system was in operation."

o Paragraph 50.73(b)(2)(ii)(J)(2)--For each personnel error, the licensee shall discuss:

(i) Whether the error was a cognitive error (e.g., failure to recognize the actual plant condition, failure to realize which systems should be functioning, failure to recognize the true nature of the event) or a procedural error.

(ii) Whether the error was contrary to an approved procedure, was a direct result of an error in an approved procedure, or was associated with an activity or task that was not covered by an approved procedure;

(iii) Any unusual characteristics of the work location (e.g., heat, noise) that directly contributed to the error; and

(iv) The type of personnel involved (i.e., contractor personnel, utility-licensed operator, utility nonlicensed operator, other utility personnel.)

Although this requirement specifically requires information concerning personnel errors, it also addresses the need for information concerning procedural deficiencies. There is a range of definitions of cognitive error, procedural error, and procedural deficiencies, and how the terms are related. For this requirement the terms procedural error and procedural deficiency are used interchangeably. The requirements of this paragraph are assumed to apply if a personnel error or procedural error is either stated or implied in the LER.

Paragraph 50.73(b)(2)(ii)(J)(2)(i) requires a discussion as to whether the personnel error was cognitive or procedural. A cognitive error is a personnel action that is perceived to be correct prior to initiation (i.e., an unintentional human error). A procedural error is an error in an approved procedure that was not recognized while following the procedure. (Note: Following a procedure incorrectly is considered a personnel error and not a procedural error.)

Paragraph 50.73(b)(2)(ii)(J)(2)(ii) asks for details concerning the cognitive or procedural error. For personnel error the report should discuss whether the error was contrary to an approved procedure or not covered by an approved procedure. For a procedural error, a discussion should be provided detailing the deficiencies within the procedure that caused the error.

Paragraph 50.73(b)(2)(ii)(J)(2)(iii) asks for a description of additional conditions affecting personnel performance; however, comparison of the LERs to an independent description of the event was beyond the scope of the LER evaluation. If any unusual characteristics of the work location were not mentioned, it was assumed in this evaluation that the requirement of this paragraph was not applicable.

Paragraph 50.73(b)(2)(ii)(J)(2)(iv) requires a description of the type of personnel involved in the event (e.g., contractor personnel, utility licensed or nonlicensed operators or other utility personnel).

- Paragraph 50.73(b)(2)(ii)(K)--Automatically and manually initiated safety system responses. This paragraph means that a licensee must provide details concerning the responses of any automatic or manual safety system actuations that occur during an event. A general statement that all safety systems operated as planned is considered inadequate unless this statement is accompanied by a list of safety systems that actuated during the event. The details of why and when these systems were actuated should be included in the discussion.

- Paragraph 50.73(b)(2)(ii)(L)--The manufacturer and model number (or other identification) of each component that failed during the event. The LER should include the manufacturer and the model number of each component that failed during the event. If the licensee supplies any identification that uniquely identifies the component so that other licensees or utilities can determine whether or not they have the same component, this requirement is considered fulfilled.

- Paragraph 50.73(b)(3)--An assessment of the safety consequences and implications of the event. This assessment must include the availability of other systems or components that can perform the same function as the components and systems that failed during the event.

The LER should include specific details concerning any safety consequences or implications or specific reasons why there were none. For example, details such as the availability of a redundant system and/or component, or references to the plant safety analysis should be included to support such conclusions. General statements such as the "health and safety of the public were not affected" or "this event caused no safety consequences or implications" are not adequate to meet the requirements of this paragraph.

It is not adequate to state that "this event had no safety significance because the plant was shutdown." The safety assessment should include the implications of the event had it occurred during other plant conditions, especially power operations, that may have made the event more severe. As a minimum, the basis for deciding that a comparable event could not occur at power should be provided.

o Paragraph 50.73(b)(4)--A description of any corrective actions planned as a result of the event, including those to reduce the probability of similar events occurring in the future. Since this paragraph requires discussion of corrective actions "planned" as a result of the event, the discussion required by this paragraph should focus on planned corrective actions. Immediate corrective actions taken to terminate the event should have been discussed under manual and/or automatic safety system actuations or under operator actions. Planned corrective actions can be thought of in two parts: (a) actions necessary to repair the failed component, and (b) actions necessary to prevent recurrence of the failure or similar failures.

In the example discussed in Section 2.2.1.2, repairing and lubricating the valve stem would be a necessary corrective action for repair but would not prevent recurrence of the failure. The planned corrective action that would prevent recurrence is changing the lubrication procedure to include the failed valve. (Note: It may also be appropriate to determine whether other valves also need to be included in the lubrication procedure.) The planned corrective action to prevent recurrence can only be determined after determining the root cause of the occurrence.

o Paragraph 50.73(b)(5)--Reference to any previous similar events at the same plant that are known to the licensee. Comparison of the LERs to an independent description or a search of previous LERs to identify similar events was beyond the scope of this evaluation. While it may be difficult for the licensees to identify previous similar events, references to known previous similar events at the respective plant are required. For the purposes of this requirement, when no reference is made to previous similar events, this requirement is assumed to be inappropriate.

o Paragraph 50.73(b)(6)--The name and telephone number of a person within the licensee's organization who is knowledgeable about the event and can provide additional information concerning the event and the plant's characteristics. The guidance in NUREG-1022 indicates that the name and telephone number provided in Item (12) of the LER form is sufficient to meet this requirement.

2.2.2 Basis for Evaluation of Abstract

The basis for evaluation of the abstract is derived from the requirements in 10 CFR 50.73(b)(1) and NUREG-1022. The abstract discussion should be a brief, concise summary of the LER text, and should meet the following requirements:

1. Includes the cause of each major occurrence within the event.

2. Includes a brief description of major responses to the event such as plant, system/component, and personnel responses.

3. Includes a brief description of the root causes of the occurrences in the event.

4. Includes a brief description of the corrective actions taken during the event and planned as a result of the event.

5. Is written in a clear, logical, and understandable manner.

The use of EIIS codes in the abstract is not encouraged because of the size limitation imposed on the abstract.

A licensee is permitted to submit an LER with only an abstract, as long as the abstract contains all appropriate data required by 10 CFR 50.73(b)(2) through 10 CFR 50.73(b)(6) and does not exceed the 1400-character limit. Few events, however, are so simple that the event description would not exceed the 1400-character limit. The abstract was evaluated twice for LERs with only abstracts. First the abstract was evaluated as a text. The abstract was then evaluated a second time in light of the requirements mentioned above.

2.3 Use of Acronyms and Plant Specific Designations

Undefined acronyms in the text or abstract usually make the discussion more difficult to understand. Although an acronym does not need to be defined on each usage, an acronym should be defined on the first usage in both the abstract and text. Undefined acronyms should not be used in the title.

Use of plant specific designations such as CV-25 for a control valve or AF-P-2 for an auxiliary feedwater pump should be accompanied with a brief description of the component function on the first usage.

3. SUMMARY OF RESULTS

The results obtained from the process of evaluating the industry-wide sample of 415 LERs are presented below. These results are presented primarily in terms of the number and type of deficiencies (and possible reasons for same) identified during the evaluation of each LER.

As was explained in the methodology section, in order to determine the most frequent deficiencies it was necessary to evaluate each of the LERs against the requirements presented in 10 CFR 50.73(b).

3.1 Text Deficiencies

Table 1 presents the most frequent text deficiencies encountered based on the evaluation of the 415 LERs. This table presents: (a) a brief narrative description of each text deficiency noted by the analyst, (b) a reference to the specific paragraph of 10 CFR 50.73 which describes the text requirement, and (c) the number of deficiencies. While it is not possible to ascertain the precise reasons for these deficiencies by simply evaluating the LERs, one reason for some of them may be that some of the licensees interpreted the text requirements in a different manner than the analysts. Other possible reasons will be noted in the discussion of the various deficiencies, where appropriate.

The 162 deficiencies involving a failure to include dates and times of occurrences are divided into three distinct categories. Most licensees provided a date and time that coincided with the start of the event; however, many licensees failed to provide times (and in some instances dates) for major "occurrences" discussed within the event. It is appropriate to provide a date and time for the discovery (or start) of the event (e.g., on March 31, 1984 at 1920, Valve F-012 failed to open during an ECCS actuation), but it is also necessary to provide the times for other major occurrences such as the time (a) auxiliary systems were initiated, (b) the reactor was stabilized in a safe condition, and (c) the time that inoperable systems were returned to service. By providing these times and dates, the reader can properly follow the sequence of occurrences.

TABLE 1
Most Frequent Text Deficiencies

Description of Deficiencies	Number of Deficiencies[a] Subtotals	Totals
50.73(b)(2)(ii)(F)--The Energy Industry Identification System component function identifier and/or system identifier for each component or system was not included		259
50.73(b)(2)(ii)(C)--Failure to include dates and/or times		162
a. Dates were included but times were not	92	
b. Dates and times were not included	52	
c. Times were included but dates were not	18	
50.73(b)(3)--An assessment of the safety consequences and implications of the event was not included or was lacking detail		145
50.73(b)(4)--A description of corrective actions planned as a result of the event including those to reduce the probability of similar events occurring in the future was not included or was lacking details		117
50.73(b)(2)(ii)(L)--The manufacturer and/or model number of each failed component was not included		109
50.73(b)(2)(ii)(J)(2)--For each personnel error the licensee:		94
a. 50.73(b)(2)(ii)(J)(ii)--Failed to include enough information to determine if the personnel error was contrary to an approved procedure, or was an activity or task that was not covered by an approved procedure	38	
b. 50.73(b)(2)(ii)(J)(2)(iv)--Failed to indicate the type of personnel involved	35	
c. 50.73(b)(2)(ii)(J)(2)(i)--Failed to include enough information to determine whether the error was cognitive or procedural	21	
50.73(b)(2)(ii)(A)--Plant operating conditions before the event were not included		62

TABLE 1 (Continued)

Description of Deficiencies	Number of Deficiencies[a] Subtotals	Totals
<u>50.73(b)(2)(ii)(E)</u>--Failure to include failure mode and/or mechanism and/or effect of the failed component		59
a. Mechanism was not included	48	
b. Effect was not included	10	
c. Failure mode was not included	1	
<u>50.73(b)(2)(ii)(I)</u>--The method of discovery of component failure, system failure, or procedural error was not included		55
<u>50.73(b)(2)(ii)(D)</u>--The cause of each component failure, system failure, or personnel error was not included		48
<u>50.73(b)(2)(ii)(H)</u>--For a failure that rendered a train of a safety system inoperable, the estimate of elapsed time from the discovery of the failure until the train was returned to service was not included		46
<u>50.73(b)(2)(ii)(J)(1)</u>--Operator actions that affected the event including operator errors and/or procedural deficiencies were not included		36
<u>50.73(b)(2)(ii)(K)</u>--Automatic and/or manual safety system responses were not included		34

[a] Note that percentages cannot be calculated by simply divi[illegible]g the number of deficiencies by the total number of LERs (4[illegible] [illegible]cause not all the requirements were appropriate for each LER [illegible] was reviewed.

Another frequent text deficiency was the failure (in 145 LERs) to include an adequate assessment of the safety consequences and implications of the event discussed in the LER. Some of the licensees simply failed to include any words of assessment that could be construed as safety consequences or implications. Others did include phrases or sentences that could be interpreted as relating to safety; however, such references clearly do not qualify as an assessment of safety consequences and implications. Still others made specific statements such as, "There were no safety consequences as a result of this event," but failed to indicate how they had reached this conclusion.

A discussion of the safety consequences and implications is required in at least a few sentences or a paragraph that is clearly identifiable as a safety assessment. This discussion should indicate: (a) all of the safety consequences of the event including an assessment of the consequences had it been possible for the event to occur under a more severe set of initial conditions, or (b) if there were no safety consequences or implications, it should explicitly state why there were none. While some of the LERs contained a detailed assessment of the safety consequences, many of the others failed to provide adequate information concerning this very important aspect of the event.

The next most frequent deficiency (117) involves another important aspect of every event; namely, planned corrective action. What makes this requirement important is the fact that only by taking adequate corrective action can a licensee be reasonably certain that the event will not recur. Another way of looking at this is to recognize that if the planned corrective action that was taken does not prevent a recurrence of the event, the root cause of the original event may not have been adequately determined. This link between root cause and planned corrective action must be recognized if the licensee is to adequately plan appropriate corrective actions. A subtle example of not planning adequate corrective action is a report that states, "the corrective action was to discuss the specifics of the event with those personnel involved." This is adequate action only if the "involved personnel" are the only ones who will ever in the future perform similar evolutions that resulted in the event. A better solution may have been to counsel those involved and; depending on the event, include a warning in a procedural step, and include a discussion of the event in the training program. Only by taking such specific and positive steps can a licensee be reasonably certain that the root cause of the event has been addressed, and thus, the corrective actions will be effective. Licensees should also ask themselves questions as they plan their corrective actions; questions such as (a) "Do I need to look for similar deficiencies in other plant procedures?" or (b) "Do we use this component in other safety related systems in the plant?"

The next most frequent text deficiency (109) is the failure to include the manufacturer and model number (or other identification) of each component that failed during the event. The licensees may feel that this information is redundant to that required to be entered into Item 13 on Page 1 of the LER form. Whatever the reasons for this deficiency, it must be recognized that a manufacturer name without specific information such as model, size, or other unique identification, does little to allow other licensees to determine if they have the same component at their plant. Such information is needed to determine whether there are generic problems.

The next most frequent text deficiency (94) is actually a combination of three deficiencies involving personnel error: (a) failure to state whether the error was cognitive or procedural; (b) failure to state whether the error was contrary to an approved procedure, the result of an error in an approved procedure, or the result of not having an approved procedure; and (c) failure to indicate the type of personnel involved.

Many of the LERs involving personnel error failed to explicitly state that a personnel error had actually occurred. These LERs contained statements such as, "the valve was inadvertently opened," or "an inadvertent signal during instrument testing caused an Engineered Safety Features (ESF) actuation," but failed to explicitly state that there was a "personnel error." If one will not explicitly state that a personnel error has occurred it follows that a discussion of the details asked for will not be provided. In some LERs, it is not difficult for the reader to determine that personnel error has occurred. What is difficult for the reader is to assess the reason for the error when the details surrounding it are omitted. The LERs must contain enough detail to assure that everyone understands what happened and that others can learn from such events.

Sixty-one of the LERs were considered to be deficient in providing adequate information concerning plant operating conditions prior to the event. Some of these LERs failed to mention plant operating conditions at all while others provided information considered inadequate such as a mode number without a brief description of the mode (mode numbers vary considerably from plant to plant). The reader would in most cases prefer specific information such as power level, temperatures and pressures (where appropriate), or statements such as "refueling was in progress" rather than the operating mode designation.

Another deficiency which is closely related to operating conditions is the failure to include a discussion of the automatic and manually initiated safety system responses. The discussion of these responses should include the cause and results of the initiation. These causes and results can usually be described in terms of operating conditions or transients. The link between operating conditions and safety system responses is very important to the reader concerned about potential accident precursors.

It is inadequate to simply state, "Plant safety systems performed as required after the reactor trip." The reader does not expect a description of each relay actuation but does expect some details, such as: (a) Auxiliary Feedwater Pump started, (b) Automatic Depressurization System valve opened, and (c) High Pressure Coolant Injection pump started. Some licensees provide a good discussion of safety system responses up until the time the reactor scrams, but fail to provide any details after that point even though it was obvious that the transient continued. To ensure compliance with this requirement [i.e., 50.73(b)(2)(ii)(K)], it would be appropriate to discuss all automatic and manually initiated safety system responses required to place the plant in a safe and stable condition. Note that a reactor scram does not always place the plant in a safe or stable condition.

Two other deficiencies are closely related and can be discussed together. These are: (a) the failure to provide a cause for each component or system failure or personnel error (46 deficiencies) and (b) the failure to provide the failure mode, mechanism, and effect of each failed component (59 deficiencies). An element of confusion between these two requirements involves the words "cause" and "mechanism." The word "cause" in 50.73(b)(2)(ii)(J) means the root cause (and if appropriate those intermediate causes between the root and immediate cause). Likewise the word "mechanism" in 50.73(b)(2)(ii)(E) means immediate cause. The following example is typical of the kinds of statements made in many of the LERs and should illustrate how confusion can result when explicit statements concerning cause are not included:

> Valve F005 did not open due to a sheared stem, and therefore no water was injected into the core. It is believed that the stem sheared as a result of the improper adjustment of a limit switch during the last maintenance period. The procedure used to set the limit switch was revised.

In this example the root cause of the component failure could be considered to be a procedural deficiency. Note that the root cause (e.g., a procedure deficiency) was not explicitly stated but could be inferred from the corrective action. This is often the only way the root cause could be identified from reading the LERs. The immediate cause of the component failure is considered to be the stem shearing. However, there is another inference concerning root cause that could be made from this example because the details involving why the procedure was revised are not discussed. Without knowing precisely what was changed in the procedure, it is not clear that the improper adjustment resulted from a procedural inadequacy. The root cause may actually have been the improper execution (or interpretation) of the procedure.

Another of the categories of text deficiencies, the failure to provide the method of discovery for each component or system failure or procedural error (55 deficiencies), could have been avoided had the writers of these LERs added just a few details to certain sentences. It is not that much more difficult to add phrases such as "during the shift change meeting," "while taking the eight-hour readings," during the semi-annual procedures review," or "while conducting the monthly surveillance on the pump." Such phrases added to the appropriate sentence provide the reader with additional information concerning how each failure or error was discovered.

A method of discovery should also be provided for personnel errors. One of the LERs reviewed for this report highlights this need. In this LER, a contract health physics person was found asleep while responsible for monitoring several individuals working in a high radiation area. The method of discovery stated in the LER was "discovered by the plant health physics technician during his roving patrol." This level of detail is important because it can key other licensees, who may not have seen the need for a roving patrol during contract maintenance periods, to include this as a requirement in their health physics program.

The last two text deficiencies to be discussed are: (a) failure to estimate the duration of a safety system train failure (46 deficiencies) and (b) failure to discuss operator actions that affected the course of the event (36 deficiencies). These could have been avoided had the writer adequately addressed other text requirements. For example, if times and dates were included for all major occurrences discussed in the LER, the duration of a train failure could be determined by comparing the appropriate times. This will not entirely solve all problems related to this deficiency, however, as most of the licensees also did not explicitly state that the failure of a specific component rendered a train of a system inoperable. It would also be helpful to include in such statements an indication of the number of trains (or channels) of the system available (e.g., "the pump failure resulted in one of the three redundant trains being declared inoperable"). In addition, there may be some variation in the definition of the word "failure" in this requirement [i.e., 50.73(b)(2)(ii)(H)]. The word "failure" means anything that renders a train of a safety system inoperable, including personnel errors (e.g., improper valve line-up).

In regards to Paragraph 50.73(b)(2)(ii)(J)(1), providing a few more details in the area of operator actions, both positive and negative, would have significantly reduced the number of deficiencies. If during an event an operator takes an action that lessens the consequence of the event or prevents an undesirable automatic actuation, the details concerning such actions (e.g., what prompted him to take the action) should be presented, so that others might consider taking the same action if they ever experience a similar event. Conversely, operator actions (or procedural deficiencies) that are detrimental to the course of the event should be discussed so that others might avoid the same problems during a similar event.

Other general observations involving the text of some of the evaluated LERs are listed below:

1. Acronyms were frequently not defined (112 LER deficiencies).

2. The reason for "other" reporting requirements (Item 11 on LER form) was not discussed in the text.

3. No mention was made that and why a supplemental report would be submitted.

4. The order of the event discussions varied greatly between LERs.

5. The LER text was (incorrectly) not a stand alone document.

6. Diagrams or figures were not included although they would have been beneficial in many LERs.

7. Explicit statements were not always provided. Often details (e.g., cause) could only be inferred from other statements in the text (e.g., corrective actions).

Most of these general observations do not require additional discussion; however, additional comments are appropriate concerning one of them.

Although many of the undefined acronyms are widely known to most readers having a general knowledge of the industry, it is a good practice to define acronyms the first time they appear in the text. Also, the text should be considered separate from the abstract; therefore, acronyms must be defined in each. Plant-specific acronyms must always be defined, as well as plant-specific designations for systems or components.

In addition, a very minor concern is that certain licensees have chosen to prepare their LERs in all capital letters. This practice makes it difficult to interpret longer sentences, especially when there is little or no punctuation within these sentences.

Most Frequent Abstract Deficiencies

Table 2 presents the most frequent abstract deficiencies encountered during the evaluation. The failure to include adequate details concerning corrective actions planned or taken (70 LERs) was followed closely by the failure to include the cause (i.e., root cause) of the event (59 LERs). In many of these deficient abstracts there was simply no mention of cause or corrective actions.

Table 2
Most Frequent Abstract Deficiencies

Description of Deficiencies	Number of Deficiencies
Corrective actions taken or planned as a result of the event were not included	70
Root cause of event was not included	59
The abstract contains information not included in the text. The abstract is intended to be a summary of the text, therefore, the text should discuss all information summarized in the abstract	24

It appears that many licensees deleted information concerning cause and corrective actions due to a concern for space; that is, the 1400-character limit. However, space would not have been a problem in most cases had all the major requirements of the text been summarized properly. In many cases the abstracts and the text read nearly word for word until space became a consideration and then the remaining information was either deleted or a generic statement such as "corrective actions were taken" was used.

The last abstract deficiency in Table 2 (the abstract contains information not provided in the text) is considered to be a preparation problem. It appears that abstracts may have been written prior to the text. This practice can lead to information being omitted from the text. Twenty-four of the abstracts evaluated contained information that was either not contained in the text or was discussed in more detail in the abstract than in the text. The text should contain all the information concerning the event and present the information in detail. The abstract should summarize this information and provide the level of detail that can be contained in the required space. Abstracts should never contain new information. If during the course of writing an abstract it becomes apparent that new information is necessary, the writer should go back to the text and insert such information where appropriate. This information can then be left in the abstract, as space permits.

Many of the abstracts reviewed were extremely short and, therefore, lacked much of the detail necessary to adequately describe the major aspects of the event. Licensees should consider using more of the space available, thereby aiding those who are able to use only the LER abstracts (and not the text) as their data source. Most computerized LER data bases contain only the abstract. The text can only be retrieved by a labor intensive review of hard-copy or microfiche files.

Acronyms were again a problem; 59 LER abstracts contained undefined acronyms.

As was pointed out in the discussion of general text deficiencies, there is a requirement to provide the specific reporting requirement applicable to the event if the "other" box is checked under Item 11 of the LER form. This information is required to be stated in both the text and the abstract; however, this was seldom done.

A few of the abstracts referenced the text for additional information that is required to be contained in the abstract. For example, corrective actions taken or planned to prevent recurrence are required to be included in every abstract. As with the text, abstracts should stand alone with respect to required content.

General observations concerning titles are very similar to those concerning abstracts; titles are generally too short and do not adequately reflect the event as described in the LER text. The writers need to review their text thoroughly prior to formulating a title.

The basic problem with many of the titles was that they focused too much on the result of the sequence of occurrences (i.e., the event) rather than presenting a description of the event as a whole. For example, a title such as "Reactor Trip" does not represent an accurate description of an event. A reactor trip is the result (or at least one of the results) of a sequence of occurrences. It is recognized that the result, which is normally the reason the event was required to be reported, is an important aspect of the event; however, at least two other elements are necessary to formulate a meaningful title. These elements are cause, and a principal link between the cause and the result. Just as a title "Reactor Trip" was considered inadequate, the title "Personnel Error Causes Reactor Trip" is considered lacking in that there could be innumerable ways in which a person could cause a reactor trip. The principal link in this example would be the details necessary to explain how the error caused the trip, (e.g., "Technician Inadvertently Injected Signal Resulting in a Reactor Trip"). The above title presents the reader with a better interpretation of the event; however, if a procedural error caused the technician to take the wrong action, a more appropriate title might be "Error in Procedure Leads to a Reactor Trip." In this example the procedural inadequacy is the root cause rather than personnel error.

To summarize, a title should contain three elements that describe the event: (a) a root cause, (b) a result, and (c) a link between the root cause and the result.

3.3 Other Field Deficiencies

Table 3 presents the most frequent deficiencies encountered during the review of the "other fields" (i.e., other than text, abstract, and title) that are required to be filled in on the LER form. Most of the information provided in Table 3 needs little or no discussion; however, a few of the items do require some additional explanation, primarily to clarify some areas that apparently cause confusion while completing the LER form.

The component failure field (i.e., Item 13 on the first page of the LER form) contained the highest number of deficiencies (110). Fifty-five of these were really not deficiencies, but were cases of completing the field when it was not required. One line in this field is required to be completed for each component (or set of identical components) that fails. The field is not required to be completed (i.e. should be left blank) in the event of "component faults,"

Table 3
Most Frequent Other Fields Deficiencies

Item Number	Description of Deficiencies	Number of Deficiencies: Subtotals	Number of Deficiencies: Totals
13	Component Failures		110
	a. Event does not contain component failures; fields should have been left blank	55	
	b. One or more component failures occurred, but all field blank	23	
	c. Cause, system, and component fields were coded inappropriately for the event	23	
	d. At least one sub-field (e.g., system) was left blank	9	
7	Report Date		49
	a. Not within 30 days of event date	42	
	b. Field was left blank	7	
9	Operating Mode		40
	a. Field was left blank	38	
	b. Mode in field differs from description in text and abstract	2	
14	Supplemental Report		40
	a. Neither Yes/No block was checked	19	
	b. A supplemental report appears to be appropriate but the "Yes" block was not checked	21	
11	Reporting Requirements		29
	a. The event could also have been reported under the requirements of other 10 CFR paragraphs	26	
	b. Apparently the wrong 10 CFR reporting requirement paragraph was used	3	
1	Facility Name		16
	a. Unit number was not included	11	

Table 3 (continued)

Item Number	Description of Deficiencies	Number of Deficiencies Subtotals	Totals
	b. Name was incorrect	3	
	c. Additional unit numbers were included but not required	2	
8	Other Facilities Involved		13
	a. The text indicates that other units were involved, but they were not listed in the field	7	
	b. Unit numbers were given without reason provided in the text or abstract	4	
	c. Unit number listed in the title was also listed in this field	2	
6	LER Number		6
	a. LER sequence number on pages of report differs from page number one	4	
	b. Field was left blank	2	
5	Event Date		5
	a. Discovery date was supplied in place of event date even though event date was given in text	5	
3	Page Number		4
	a. Field was left blank or was incorrect	4	
10	Power Level		4
	a. Field was left blank	3	
	b. Power listed in field differs from power level description in text and abstract	1	
2	Docket Number		2
	a. Field was left blank	2	

examples of which are: (a) a valve that is found closed when it is required to be open because it had been inadvertently positioned wrong, or (b) a relief valve that lifts prematurely because it was set to the wrong lift pressure. In example (a), if the valve was found closed because it had a disc-stem separation, this would be a component failure and must be reported in Item 33. Similarly, in example (b) the valve would be considered failed if the pressure setpoint had "drifted" to a higher setpoint.

Other deficiencies related to the component failure field were: (a) not completing the field for each failure (23 times) and (b) using what appeared to be inappropriate codes (23 times).

One of the LER requirements is that an LER be submitted to the NRC within 30 days of the date the event was discovered. In 49 of the LERs reviewed for this report, the Report Date (Item 7) was more than 30 days beyond the Event Date (Item 5) without apparent justification. It is permissible for there to be greater than 30 days between these two dates if the text indicates that the event was not discovered until a later date. However, this discussion was not provided for the 49 deficiencies noted. Without such information, the analysts had to assume that the event and discovery dates were the same.

Many of the 49 report date deficiencies involved exceeding the 30-day reporting requirement by only one day. The fact that many late LERs were received in 31 days reflected the policy that when a due date falls on a Saturday, Sunday, or holiday, the LER is not due until the next working day. In addition, in some cases this appeared to be due to a failure to consider that the month in which the event was discovered contained 31 days rather than 30 days.

The Supplemental Report Required field (Item 14) accounted for 40 deficiencies, 19 of which were simply omissions (i.e., the field was left blank) that may have been avoided had the form been adequately reviewed prior to submitting it to the NRC. Twenty-one of the deficiencies are not as easily explained. In these 21 LERs, the text indicated that some problems encountered during the event had not been totally resolved at the time the LER was written. Without resolving certain problems, such as root cause determination, the long term corrective actions cannot be planned; therefore, these LERs were incomplete because they did not meet all the requirements of the rule. Submitting incomplete LERs is permissible so long as a follow-up (supplemental) report is submitted at a later [illegible] addresses the requirements completely. It appears that for the 21 LERs in question the licensee should have planned to submit a supplemental report and should have indicated the same by checking the "yes" block in Item 14.

The last deficiency on Table 3 that requires additional discussion is the "Other Facilities Involved" field (Item 8) on the LER form. It was apparent based on the review of the LERs that a few of the licensees did not understand when this field should be used. NUREG-1022, Page 24, states that a licensee should enter into Item 8 the facility name and docket number of any other facility at their site that was directly affected by the event being reported. There are two problems relative to this requirement. The first is that the phrase "directly affected by" is subject to different definitions. One basis is to use commonality for items such as components, rooms, and environments as the major link between facilities. Shared procedures are not considered a basis for including another facility in Item 8, unless both facilities experienced reportable events during the time frame discussed in the LER because of the use of a common procedure. Stating that "procedural changes were going to be made that would extend to another facility" is not justification for including information in Item 8.

The second problem concerning this requirement again involves the phrase "directly affected by." In this case the key word is "affected." An LER should be written such that if an event occurs at Unit 2 which subsequently affects Unit 1, Unit 1 (the "affected" facility) shall be named in Item 8. This conflicts with NUREG-1022, Page 22, concerning "facility name" which states that if more than one facility is involved, list the lowest numbered facility under Item 1. The intent of the requirement is to name the facility in which the primary event occurred, whether or not that facility is the lowest numbered of the facilities involved. The automatic use of the lowest number should only apply to cases where both units are affected approximately equally.

It appears that many of the deficiencies involving completion of the "other fields" on the LER form could have been avoided if the NUREG-1022 sections concerning these fields had been periodically reviewed by those responsible for writing the LERs. Additionally, some of the deficiencies could have been avoided simply by having either the preparer or those responsible for approving the LER do a more thorough review of the LER prior to its submittal.

4. CONCLUSIONS AND RECOMMENDATIONS

Based on the 415 LERs that were evaluated, it is evident that the licensees are attempting to comply with the requirements for preparing LERs as set forth in 10 CFR 50.73. Unfortunately, for a number of reasons, some of these requirements are not being addressed in a manner that meets the new rule. In this section recommendations are provided concerning: (a) training, (b) preparation guidelines, (c) a text outline, (d) an outline checklist, and (e) review techniques. The implementation of those recommendations by the licensees should result in LERs that consistently meet the requirements of the new rule.

4.1 Training

Adequate training is probably the most important recommendation in terms of long term improvements in LER quality and completeness.

Each person responsible for preparing or reviewing LERs should receive periodic (e.g., annual) training on the preparation of LERs. This training could take any form deemed appropriate, ranging from a group workshop to a formal classroom presentation conducted by plant training personnel. Whatever form this training takes, the obvious benefit will be that those involved will share a common understanding of the fundamental aspects of their task.

Suggestions as to what might be included in such a training program are presented below:

1. An explanation of why LERs are necessary and how they are used that goes beyond saying, "It is a requirement." As discussed previously, LERs benefit the entire industry in a variety of ways ranging from providing real world examples of problems and how they were solved to providing a data base for the study of everything from component failure rates to human factors. Only by understanding how the information is being used can the writer realize what information he must provide.

2. A discussion of precisely what constitutes an "event." It was discovered during the evaluation of the 415 LERs that the terms event

and occurrences are not being treated consistently. A general definition of event is: "All occurrences between the time a problem is discovered and the time the condition is corrected." The failures, problems, errors, transients, or responses that occur during (and are relative to) the event are occurrences.

For events involving an Engineered Safety Features actuation or a reactor trip, where the actuation or trip results in a transient condition, the discussion of the event should include details concerning when and how the plant was eventually placed in a safe and stable condition.

3. A detailed review of the requirements of 10 CFR 50.73 and NUREG-1022 and its supplement(s) is the backbone of any training effort. This review must focus on providing an interpretation of each of the 10 CFR 50.73 requirements that can be understood and agreed upon by those concerned. This report may aid in this effort by providing additional insight concerning the proper interpretation of the requirements.

4.2 Guidelines, Outline, and Outline Checklist

While training is considered the long term key to LER preparation, it is recognized that training programs take time to develop and implement. The next most important recommendation that can be implemented immediately is simply providing copies of the (a) Preparation Guidelines, (b) Text Outline, and (c) Text Outline Checklist provided in Appendices B, C, and D, respectively, to those personnel who prepare or review LERs. This material provides the basic framework necessary to consistently prepare quality reports.

The Preparation Guidelines contain suggestions based on the kinds of deficiencies encountered during the review of the 415 LERs. Individual preparers may choose to add to this list based on management response to the LERs submitted for review.

The Text Outline and Text Outline Checklist are the keys to an immediate improvement in LER quality throughout the industry. If all licensees were to prepare the text of their LERs using this outline and checklist, the quality and completeness of nearly all LERs would improve. This is not to say that all LERs are now of poor quality; many of the LERs reviewed for this report contained all of the required information and more. However, there was no consistency between licensees concerning report format. The use of the Text Outline will aid in structuring the text discussion into the basic elements that are required to be included in every LER. To provide a convenient method of ensuring that every text requirement is addressed (as appropriate), the Text Outline Checklist was developed. This checklist illustrates specifically what should be discussed under each of the five sections of the outline. For example, under the Description of Event, the checklist lists eight requirements as specified in 10 CFR 50.73 which must be included (if appropriate) within the discussion of every event. After writing an LER, its text should be reviewed against this checklist to ensure that each of the appropriate requirements is addressed.

The checklist was developed by taking all of the requirements in 10 CFR 50.73(b)(2)(ii) and listing them under one of the five sections of the outline. The examples presented in the checklist are intended to illustrate the kinds of statements that a discussion might contain.

It is realized that every event is different and, therefore, in some cases some of the requirements need not be addressed. For example if there are no component failures involved in an event, the requirement to discuss failure modes, mechanisms (i.e., immediate causes), and effect [10 CFR 50.73(b)(2)(ii)(E)] is inappropriate and need not be addressed.

The checklist provides the writer and the reviewer with a simple tool that will help identify any deficiencies in the content of the LER text.

4.3 Review Techniques

Another potential improvement is for each licensee to develop an LER review process that extends beyond the organization directly responsible for LER preparation. For example, if Plant Operations is responsible for preparing and submitting LERs to the NRC, a final review of all LERs could be performed by an organization that does not report to the operations manager. Such an independent review is beneficial for a number of reasons, the most important of which is that the quality of the reports can be enhanced, thus improving the usefulness of the reports to the industry.

Obviously the personnel conducting this independent review will not have all of the information that was available to those who originated the LER. This is not a major disadvantage, however, as it adds an element of objectivity to the overall review. The writer, and often the initial reviewers, tend to be too involved with the details of events and not as concerned with other aspects of the report such as ensuring that: (a) the text reads well, (b) there are no unanswered questions, (c) there are no errors or inconsistancies, (d) the conclusions reached are consistent with the information presented, and (e) information required by 50.73(b) is provided. The final report resulting from such a two-stage review process should be superior to any report which is originated, reviewed, and submitted by a single organization within a licensee's organizational structure.

5. REFERENCES

1. U.S. Nuclear Regulatory Commission, Code of Federal Regulations, Energy. Washington D.C.: Office of the Federal Register, September 30, 1983, Part 50.73.

2. B.S. Anderson, C.F. Miller, and B.M. Valentine, An Evaluation of Selected Licensee Event Reports Prepared Pursuant to 10 CFR 50.73 (DRAFT), NUREG/CR 4178, March 1985.

3. Office for Analysis and Evaluation of Operational Data, Licensee Event Report System, NUREG-1022, U.S. Nuclear Regulatory Commission, September 1983.

4. IEEE Std 500-1984, IEEE Guide to the Collection and Presentation of Electrical, Electronic Sensing Component and Mechanical Equipment Reliability Data for Nuclear-Power Generating Stations, New York: Wiley-Interscience, December 1983, Pg. 22-24.

5. N. H. Roberts and W. E. Vesely, Fault Tree Handbook, NUREG-0492, U.S. Nuclear Regulatory Commission, January 1981, pg. V-3-5.

APPENDIX A

LIST OF LERs USED IN SAMPLE

Plant	Docket Number	LER Sequence Numbers[a]	NUREG-0020[b]
Arkansas Nuclear 1	313	2[S], 3, 4[S], 5[S], 6	Yes
Arkansas Nuclear 2	368	11[S], 13[S], 16, 18, 25	Yes
Arnold	331	16, 20[E], 25, 27[S], 31	Yes
Beaver Valley 1	334	4[S], 5, 6-1[c], 7, 9	Yes
Beaver Valley 2[d]	412	—	No
Big Rock Point	155	5[E], 7, 9[S], 11, 13	Yes
Browns Ferry 1	259	23-1[c][E], 24[S], 25, 28, 33	Yes
Browns Ferry 2	260	5[E], 6[S], 7	Yes
Browns Ferry 3	296	5, 6-1[c], 7-1[E], 8[E], 11	Yes
Brunswick 1	325	5, 6, 9, 11[E], 14[E]	Yes
Brunswick 2	324	6[E], 7, 8[E], 9[E], 11	Yes
Callaway 1	483	8-1[c], 18[E], 21, 27, 28[E]	No

Plant Name	Docket Number	LER Sequence Numbers[a]	NUREG-0820[b]
Calvert Cliffs 1	317	3-1[c], 6, 7 [E], 8, 12	Yes
Calvert Cliffs 2	318	3 [S], 4, 5, 6, 7	Yes
Catawba 1	413	1, 3, 4, 5, 7	No
Connecticut Yankee (Haddam Neck)	213	4, 5, 9, 10 [E], 12	Yes
Cook 1	315	6, 8 [S], 12 [E], 14, 17 [E]	Yes
Cook 2	316	8-1[c], 12 [E], 15, 18, 20 [S]	Yes
Cooper Station	298	4, 5, 8, 9, 10 [S]	Yes
Crystal River 3	302	8 [E], 10-1[c] [S], 11, 13, 15 [E]	Yes
Davis-Besse 1	346	6-1[c], 7, 9-1[c], 10 [S], 11	Yes
Diablo Canyon 1	275	13, 14 [S], 22 [E], 23, 24	Yes
Dresden 2	237	5, 8-1[c], 9 [S], 11, 16	Yes
Dresden 3	249	3, 6-1[c], 7 [S], 8, 9	Yes

Plant	Docket Number	LER Sequence Numbers[a]	NUREG-0020[b]
Farley 1	348	11, 12[E], 13, 14, 17	Yes
Farley 2	364	5[S], 7, 8, 11, 13	Yes
FitzPatrick	333	12, 13[S], 14, 15, 16	Yes
Ft. Calhoun 1	285	5[E], 8-1[c], 12, 13[S], 15	Yes
Fort St. Vrain[e]	267	—	Yes
Ginna	244	4, 5, 6[E], 7[E], 8	Yes
Grand Gulf 1	416	27[E], 28, 30[S], 34 38	No
Hatch 1	321	4, 6[S], 7[S], 8, 13[E]	Yes
Hatch 2	366	5, 9[E], 11, 15, 16[E]	Yes
Indian Point 2	247	4, 5, 7, 8[E], 9	Yes
Indian Point 3	286	7, 8[S], 10, 11[S], 12	Yes
Kewaunee	305	3, 4[S], 9-1[c][S], 12, 14[S]	Yes

Plant	Docket Number	LER Sequence Numbers[a]	NUREG-0020[b]
LaSalle 1	373	22 (S), 26, 39 (S), 44, 47	Yes
LaSalle 2	374	15, 24, 30, 36 (S), 44 (E)	Yes
LaCrosse	409	6 (S), 8, 9, 11 (E), 13	Yes
Maine Yankee	309	5 (E), 6 (E), 7 (E), 8 (S), 9 (E)	Yes
McGuire 1	369	15 (E), 17 (E), 19, 20 (S), 23	Yes
McGuire 2	370	11, 12 (S), 14, 15 (E), 16 (S)	Yes
Millstone 1	245	6, 9-1[c], 12, 17, 18	Yes
Millstone 2	336	7, 8, 9, 10	Yes
Monticello	263	16, 17, 20, 23 (E), 28	Yes
Nine Mile Point 1	220	7, 9, 12 (E), 14-1[c], 15	Yes
North Anna 1	338	6, 14 (S), 16, 17, 18	Yes
North Anna 2	339	2 (S), 3 (S), 8, 9, 11	Yes

Plant	Docket Number	LER Sequence Numbers[a]	NUREG-0020[b]
Oconee 1	269	1, 2[S], 3, 4	Yes
Oconee 2	270	1	Yes
Oconee 3	287	3[S], 4[S], 5[S], 6	Yes
Oyster Creek	219	4, 12, 14, 17, 18	Yes
Palisades	255	4[E], 7, 12, 14, 15[S]	Yes
Peach Bottom 2	277	7, 9[E], 11-1[c], 13, 15	Yes
Peach Bottom 3	278	6, 7, 8, 9, 11	Yes
Pilgrim 1	293	5-1[c], 6, 7, 9, 11[E]	Yes
Point Beach 1	266	3, 4[E], 6	Yes
Point Beach 2	301	3[E], 4[E], 5[E], 6[E], 7[E]	Yes
Prairie Island 1	282	2, 3, 4[E], 5[S], 6[S]	Yes
Prairie Island 2	306	1, 2	Yes

Plant	Docket Number	LER Sequence Numbers[a]	NUREG-0020[b]
Quad Cities 1	254	5-1[c], 6, 7-1[c], 13, 14	Yes
Quad Cities 2	265	5, 6, 7-1[c] (S), 8, 9	Yes
Rancho Seco	312	13, 14, 16, 18-1[c] (S), 22	Yes
Robinson 2	261	3, 4, 5, 6 (E), 9	Yes
Salem 1	272	10, 12, 14 (E), 17, 18	Yes
Salem 2	311	8 (S), 14, 16, 18 (S), 20	Yes
San Onofre 1	206	5, 6, 7, 8, 13	Yes
San Onofre 2	361	23 (E), 26 (E), 43 (S), 50, 51	Yes
San Onofre 3	362	22 (S), 25, 32 (S), 35-1[c], 36	Yes
Sequoyah 1	327	23, 35 (S), 41, 44 (E), 52	Yes
Sequoyah 2	328	6, 8 (S), 9 (E), 10, 12	Yes
St. Lucie 1	335	2, 3, 4-7[c], 5 (S), 6	Yes

Plant	Docket Number	LER Sequence Numbers[a]	NUREG-0020[b]
St. Lucie 2	389	6, 7, 8, 9	Yes
Summer 1	395	23 (E), 26 (E), 31, 32 (S), 35	Yes
Surry 1	280	12, 13, 15 (S), 16, 17	Yes
Surry 2	281	9, 10 (S), 11-1[c], 12, 13	Yes
Susquehanna 1	387	19 (E), 27, 28 (S), 31, 37	Yes
Susquehanna 2	388	3 (E), 7, 8 (S), 12, 15	Yes
Three Mile Island 1	289	1-1[c], 2, 3 (E), 4, 5	Yes
Three Mile Island 2	320	7, 9, 10, 11, 13	No
Trojan	344	6-1[c] (S), 7 (E), 10-1[c], 11 (E), 12	Yes
Turkey Point 3	250	13 (E), 14 (S), 17, 19, 22	Yes
Turkey Point 4	251	8 (S), 11 (E), 12, 15, 20	Yes
Vermont Yankee	271	4 (S), 8, 12-1[c], 19, 20	Yes

Plant	Docket Number	LER Sequence Numbers[a]	NUREG-0020[b]
Washington Nuclear Power 2	397	47, 57, 71, 89 (S), 90 (E)	Yes
Yankee Rowe	29	4, 8 (E), 10, 12 (S), 14	Yes
Zion 1	295	11 (E), 12 (S), 18, 22, 24	Yes
Zion 2	304	14, 18, 19 (S), 20, 23	Yes

a. E = Engineered safety features actuation; S = Scram >1% power.

b. Yes = in NUREG-0020, Vol. 8, No. 8, August 1984, Licensed Operating Reactors (Grey Book).
No = not in NUREG-0020.

c. LER number with dash is followed by revision number (i.e., 7-1).

d. No reports on file with EG&G Idaho, Inc.

e. Only one voluntary report on file with EG&G Idaho, Inc.

APPENDIX B

PREPARATION GUIDELINES

APPENDIX B

PREPARATION GUIDELINES

1. Remember your audience is large and may not necessarily know the details concerning your plant.

2. Preferable order of LER preparation is text, abstract, and then title ("other fields" should be last).

3. Acronyms should be defined and all component designators (e.g., Valve F015) should be explained on their first usage.

4. Acronyms should be defined in both text and abstract.

5. Make explicit statements rather than relying on inference (e.g., say "personnel error" when it occurred).

6. The title should include root cause and result (why event was required to be reported) and the link between them.

7. Use enough times and dates in your discussion to allow the reader to see the time history of the event.

8. Do not use boiler-plate statements without explaining why the statement is true (i.e., how you reached your conclusion).

9. The abstract should contain all major occurrences of the event, including component and system failures, operator errors, procedural violations; the root cause(s) of the major occurrence(s); and the corrective action planned for each root cause.

10. Discuss both the discovery date and the event date if they differ.

11. When more than one failure or error occurs be sure that the requirements are met for each [e.g., if two different components failed during the event,

the failure mode, mechanism (immediate cause) and effect, in addition to a root cause and corrective action, must be discussed for both].

12. If applicable, mention the supplemental report in the text and state the reason why it will be submitted.

13. If applicable, discuss why the "other" requirement box is checked in Item 11 of the form.

14. Use a "vertical bar" in the margin to denote all new material in supplemental reports (revisions).

15. Consider using a diagram or a figure if necessary to aid the readers' understanding of the event (put it directly on a Form 366A).

APPENDIX C

TEXT OUTLINE

APPENDIX C

TEXT OUTLINE

I. Description of Event

II. Cause of Event

III. Analysis of Event

IV. Corrective Actions

V. Additional Information

    A. Failed Component Identification[a]

    B. Previous Similar Events[b]

---

[a]If applicable.

[b]A negative statement should be provided if there have been no previous similar events.

APPENDIX D

TEXT OUTLINE CHECKLIST

APPENDIX D

TEXT OUTLINE CHECKLIST

I. Description of Event should include:

- o Plant operating conditions prior to the event, (e.g., power level; or if not at power, mode, temperature and pressure).
- o The name and status of all structures, components, or systems that contributed to the event because they were inoperable at the start of the event (if none, so state).
- o The dates and approximate time for all major occurrences discussed in the LER (e.g., discoveries, immediate corrective actions, systems/components declared inoperable/operable, reactor trip, stable conditions achieved). Include an estimate of the time and date of failure of components, trains, and systems if different than the time and date of discovery.
- o The failure mode, mechanism (immediate cause), and effect of each failed component (e.g., valve failed to open because the stem broke resulting in no flow to the reactor).
- o A list of other systems or secondary functions that were also affected by each component failure or fault, if the component had multiple functions.
- o The method of discovery of each component failure, system failure, personnel error or procedural deficiency (e.g., while reviewing surveillance procedures or results . . ., during a pre-startup valve lineup check . . ., while performing quarterly maintenance on . . ., during a plant walkdown . . .).

- All major operator action that affected the course of the event (including immediate corrective actions, operator errors, etc.) and any procedural deficiencies that contributed to the event.

- All automatic and manually initiated safety system responses that occurred including those necessary to place the plant in a safe and stable condition ("All systems responded as designed" is not sufficient).

II. Cause of Event should include:

- The root cause (and all intermediate causes, if applicable) that led to each component or system failure (or fault), or personnel error, if known. For example, the causes for the valve stem breaking in the above example could have been because a limit switch had been improperly adjusted during maintenance. In this case, the root cause would be personnel error and the intermediate cause would be limit switch adjustment. It should be realized (and explained if applicable) that some personnel errors could have a root cause, for example, deficient procedures or inadequate personnel training.

- If the event involves personnel error, the cause discussion must also include:

  - Information as to whether the personnel error was the result of a cognitive error or the result of a procedural error. Also, information as to whether the personnel error was a result of not adequately following an approved procedure, was a direct result of an error in an approved procedure, or was a result of the activity or task not being covered by an approved procedure.

  - Any unusual characteristics of the work location (e.g., heat, noise, smoke, poor lighting) that directly contributed to the personnel error.

- The type of personnel involved in the event (e.g., contractor maintenance personnel, utility-licensed operator, utility-nonlicensed operator, utility maintenance personnel).

o If the cause of a failure cannot be readily determined and the investigation is to continue, state in the text: (a) the steps planned to continue the investigation, and (b) that a supplemental report will be submitted that discusses the results of the investigation and includes the cause and all planned corrective actions.

III. Analysis of Event should include:

o The reason the event was considered reportable, including the specific reporting requirement, if the "OTHER" box is checked in Item 11 of the LER form.

o An assessment of the safety consequences and implications of the event. This assessment must include the availability of other systems or components that could have performed the same function as the systems or components that failed (or otherwise became inoperable) during the event. The assessment should also include the safety consequences and implications had it been possible for the event to have occurred under a more severe set of initial conditions (e.g., at power rather than shutdown, at 100% power rather than 20%). If it is concluded that no safety consequences resulted from the event, state how this conclusion was reached.

o An estimate of the elapsed time from the discovery of an inoperable safety system train or component until the train or component was returned to service. In addition, an estimate of the length of time the train or component was inoperable prior to discovery should be included in the discussion. Explicitly state whenever a train is inoperable and provide redundancy information or, for instrument systems, the logic (e.g., one out of three).

IV. Corrective Actions should include:

- o A description of any corrective action planned or taken as a result of the event. This should include a discussion of repair or replacement actions as well as those actions that will reduce the probability of a similar event occurring in the future (e.g., "the valve was replaced and the personnel involved in the event were counseled," "the pump was repaired and a discussion of the event was included in the training lectures," "no modification to the instrument was deemed necessary but a Caution Notice was inserted into its calibration procedure just prior to the step that initiated the event").

V. Additional Information should include:

- o The manufacturer and model number (or other identification) of each component that failed or was found failed during the course of the event. An example of other identification could be (for a pipe rupture) size, schedule, or material composition (if no components failed, state "none.")

- o The LER number(s) of previous similar events (if no previous similar events, state "none").

APPENDIX E

EXAMPLES OF WELL WRITTEN LERs

LICENSEE EVENT REPORT (LER)

Beaver Valley Power Station, Unit 1

Docket Number: 0 5 0 0 0 3 3 4 | Page: 1 OF 0 2

Title: Failure of Containment (CNMT) Recirculation Cooling Coils Chilled Water System Outlet Isolation Valve

Event Date Month	Day	Year	LER Year	Sequential Number	Revision Number	Report Date Month	Day	Year	Other Facilities Involved: Facility Names	Docket Numbers
0 7	0 4	8 4	8 4	0 0 7	0 0	0 8	0 1	8 4	N/A	0 5 0 0 0
									N/A	0 5 0 0 0

Operating Mode: 1 | Power Level: 1 0 0

This report is submitted pursuant to the requirements of 10 CFR: X 50.73(a)(2)(i)

Licensee Contact for this LER: Robert J. Druga, Chief Engineer | Telephone Number: 412 643-1264

Complete one line for each component failure described in this report:

Cause	System	Component	Manufacturer	Reportable to NPRDS
	K M	I S V X	M 1 2 0	N

Supplemental Report Expected: X NO

On 7/4/84, at 2138 hours, during normal operations, the Containment Recirculation Cooling Coils Chilled Water System Outlet Isolation Valve failed shut. This caused a loss of cooling water flow to the CNMT Air Recirculation Cooling Coils and to the CNMT Instrument Air Compressors. The loss of cooling water to the Air Recirculation Cooling Coils resulted in increasing CNMT temperatures. Subsequent attempts to restore cooling water were unsuccessful and at 2238 hours, CNMT temperature reached 105.08 degrees. Technical Specification 3.6.1.5 requires the CNMT temperature to be less than 105 degrees. Station Management then elected to reduce power to effect valve repairs and to reduce CNMT temperature. At 2315 hours, the Instrument Air to CNMT Instrument Air Isolation Valve was opened to supply CNMT with Instrument Air. This was done due to the loss of cooling to the CNMT Instrument Air Compressors. At 2318 hours, CNMT temperature reached 106.38 degrees. A manual shutdown to Hot Standby was commenced. The cause for the Chilled Water System Isolation Valve failing shut was due to a failed pneumatic valve diaphragm. This diaphragm was replaced. There were no safety implications to the public because the reactor was placed in a safe, controlled shutdown condition and the River Water System was operable at all times as an additional source of cooling if necessary.

IE22 1/1

On 7/4/84, at 2138 hours, during normal operations at 100% reactor power, the itainment Recirculation Cooling Coils Chilled Water System Outlet Isolation Valve /-CC-110D] failed shut. This caused a loss of cooling water flow to the Contain- it Air Recirculation Cooling Coils and the Containment Air Compressors. The loss of oling water to the Containment Air Recirculation Cooling Coils resulted in increasing itainment temperatures. Subsequent attempts to open the isolation valve [TV-CC-110D] re unsuccessful and at 2238 hours, Containment temperature reached 105.08 degrees. chnical Specification 3.6.1.5 requires the Containment temperature to be less than 105 grees. Station management then elected to reduce power to effect valve repairs and attempt to reduce Containment heat load. At 2311 hours, a Containment entry was de to investigate the failure of [TV-CC-110D]. At 2315 hours, the Instrument Air Containment Instrument Air Isolation Valve [IA-90] was opened to supply Containment th Instrument Air. This was done due to the loss of cooling water to the Containment r Compressors. At 2318 hours, Containment temperature reached 106.38 degrees. A ntrolled manual shutdown to Hot Standby was commenced due to the increasing Contain- nt temperatures. On 7/5/84, two additional Containment entries were made to investi- te the failure of [TV- CC-110D]. It was determined that [TV-CC-110D] failed shut due a failed pneumatic valve diaphragm. An additional Containment entry was made on 5/84 to erect scaffolding to affect repairs on [TV-CC-110D]. On 7/7/84 at 2000 hours, e valve operating diaphragm and air regulator on [TV-CC-110D] were replaced. No other rrective actions are planned.

There were no safety implications to the public because the reactor was placed in safe shutdown condition and the River Water System was operable at all times as an ditional source of cooling if necessary.

The Containment Recirculation Cooling Coils Chilled Water System Outlet Isolation lve [TV-CC-110D] is a Masoneilian Trip Valve, Model No. 38-20761. This is the first ported failure of this valve.

LICENSEE EVENT REPORT (LER)

Facility Name	Docket Number	Page
Salem Generating Station - Unit 1	0 5 0 0 0 2 7 2	1 OF 0 5

Title: Charging/Safety Injection Throttling Valves - Disks Becoming Detached From Stems

Event Date (Month)	Day	Year	LER Year	Sequential Number	Revision Number	Report Date (Month)	Day	Year	Other Facilities Involved: Facility Names	Docket Number(s)
0 5	2 7	8 4	8 4	0 1 2	0 0	0 6	2 6	8 4	Salem - Unit 2	0 5 0 0 0 3 1 1
										0 5 0 0 0

Operating Mode: 6

Power Level: 0 0 0

This report is submitted pursuant to the requirements of 10 CFR: [X] 50.73(a)(2)(i) [X] 50.73(a)(2)(v) [X] OTHER: Generic Implications

Licensee Contact for this LER: J. L. Rupp — Telephone Number: 609 339-4309

Cause	System	Component	Manufacturer	Reportable to NPRDS	Cause	System	Component	Manufacturer	Reportable to NPRDS
B	BQ	FCV	R344	Y					

Supplemental Report Expected: [X] NO

Abstract:

Stem/disk separation problems with RTD Loop Bypass Valves (see Unit 1 LER 84-010-00 and Unit 2 LER 84-001-00) prompted a review of all systems containing valves of this particular design. Of the valves identified, twelve valves (in each Unit) used as Safety Injection System flow throttling valves were deemed to have some safety concerns, should similar failures occur. On May 27, 1984, during a refueling outage of Unit 1, radiography results revealed that the disk was becoming detached from the stem of 11SJ16 (Charging/Safety Injection to Cold Leg Throttle Valve). On May 30, 1984, similar findings were discovered with 21SJ16 and 22SJ16 (Unit 2 valves). Unit 2 was operating at the time of discovery, and the findings immediately prompted a controlled shutdown of the Unit. The valve disks were found to be partially unthreaded from the disk nut, due to missing weld material which secures the disk to the nut. Unit 2 valves (21SJ16 and 22SJ16) were replaced in kind. A Design Change Request will replace 11 through 14SJ16 (Unit 1 valves) with valves of a different design during the present refueling outage. Plans are to eventually replace all twelve throttle valves in each Unit. This report is being submitted due to the generic implications involved, and in accordance with 10CFR 50.73(a)(2)(i)(A), and 50.73(a)(2)(v).

8407030225 840626
PDR ADOCK 05000272
S PDR

IE22

PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

IDENTIFICATION OF OCCURRENCE:

11SJ16 (Unit 1 valve), 21SJ16 and 22SJ16 (Unit 2 valves) - Disks Becoming Detached From Stems

Discovery Dates: 05/27/84 - (Unit 1)

05/30/84 - (Unit 2)

Report Date: 06/26/84

This report was initiated by Incident Reports 84-081 and 84-082

CONDITIONS PRIOR TO OCCURRENCE:

Unit 1 - Mode 6 - Rx Power 000 % - Unit Load 0000 MWe

Unit 2 - Mode 1 - Rx Power 100 % - Unit Load 1150 MWe

DESCRIPTION OF OCCURRENCE:

As the result of occurrences whereby the RTD Loop Bypass Valves [AB] were found to have experienced stem to disk separation (these events are documented in Unit 1 LER 84-010-00 and Unit 2 LER 84-001-00), a review of all systems was made to determine where valves of this particular design were installed, and what function these valves served. The majority of the valves reviewed were found to be used in applications such as vents and drains, which do not present any safety concerns. However, several valves were used as Safety Injection System [BQ] flow throttling valves; and, these were deemed to have some safety concerns, should similar type failures occur.

On May 27, 1984, during a refueling outage of Unit 1, 11 through 14SJ16 (Charging/Safety Injection to Cold Leg Throttle Valves), 11 through 14SJ138 (Safety Injection to Hot Leg Throttle Valves) and 11 through 14SJ143 (Safety Injection to Cold Leg Throttle Valves) were radiographed. The results revealed that the disk was becoming detached from the stem of 11SJ16. All other Unit 1 valves were satisfactory.

On May 30, 1984, radiography results of these same valves in Unit 2 revealed that the disks were also becoming detached in 21SJ16 and 22SJ16. Since Unit 2 was operating at the time, the Station Operations Review Committee immediately held a special meeting to discuss the safety significance of the finding.

DESCRIPTION OF OCCURRENCE: (cont'd)

Although a review of the last Charging/Safety Injection Pump full flow test indicated satisfactory results, with indication that the disks were becoming detached, there was no guarantee that flow would be within the limits specified by Technical Specification Surveillance Requirement 4.5.2.h.2. Based on the results of that meeting, a controlled shutdown of Unit 2 was commenced at 1106 hours, May 30, 1984. In accordance with the requirements of The Code of Federal Regulations, 10CFR 50.72, the Commission was notified of the commencement of the shutdown.

APPARENT CAUSE OF OCCURRENCE:

The valve's stem/disk design consists of a stem with a disk nut, which is free to rotate about the stem. The disk is screwed onto the disk nut. To prevent the disk from separating from the disk nut, a hole on the side of the disk serves to allow for the deposit of weld metal to attach the disk to the disk nut. An inspection of the affected valves revealed that the weld material was missing from the disk hole. This allowed the disk to unthread itself from the disk nut. In the case of the Unit 1 valve (11SJ16), the disk was approximately fifty percent (50%) unthreaded from the disk nut. With the Unit 2 valves (21SJ16 and 22SJ16), the disks were slightly unthreaded from the nuts. In addition, the stellite insert (which is located between the valve stem and the valve disk) was shifted out of position on 11SJ16 and 22SJ16.

ANALYSIS OF OCCURRENCE:

Technical Specification Surveillance Requirement 4.5.2.g requires that the correct position of the SJ16 valves, the SJ138 valves and the SJ143 valves be verified within four (4) hours following completion of each valve stroking operation or maintenance on the valve when the ECCS subsystems are required to be operable; and, also at least once per eighteen (18) months.

Technical Specification Surveillance Requirement 4.5.2.h.2 requires that each ECCS subsystem shall be demonstrated operable by performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying that:

> For centrifugal charging pump lines, with a single pump running, that the sum of the injection line flow rates, excluding the line with the high flow rate, is greater than or equal to 346 GPM, and that the total pump flow rate is less than or equal to 550 GPM.

ANALYSIS OF OCCURRENCE: (cont'd)

The Surveillance Requirements for throttle valve position, as well as the flow balance testing, provide assurance that proper ECCS flows will be maintained in the event of a Loss of Coolant Accident (LOCA). Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses.

As previously stated, the partially unthreaded disk on 11SJ16 (Unit 1) was discovered while the Unit was in a refueling outage, and consequently posed no immediate problem. However, Unit 2 valves (21SJ16 and 22SJ16) were discovered during Unit operation. These valves, only slightly unthreaded, were still operable and would have provided flow in the event of an ECCS actuation. However, due to the inability to perform a confirmatory full flow test during power operation (which would have guaranteed the required Technical Specification flow), and because of possible further degradation, a controlled shutdown was initiated.

This report is submitted in accordance with the requirements of the Code of Federal Regulations 10CFR 50.73(a)(2)(i)(A), 10CFR 50.73(a)(2)(v) and because of the generic problems associated with these valves.

CORRECTIVE ACTION:

Unit 2 valves (21SJ16 and 22SJ16) were replaced in kind utilizing 13SJ16 and 14SJ16 (from Unit 1). A full flow test was satisfactorily performed on June 3, 1984, with flow being adjusted to the proper specification. A Design Change Request is presently being formulated to replace 11 through 14SJ16 (Unit 1 valves) with valves of a different design during the present refueling outage.

Present plans are to eventually replace all twelve throttle valves (in each Unit) with valves of a different design. Until all of the valves are replaced, to ensure valve integrity, the valves in question will be radiographed following any safety injection or manual operation.

FAILURE DATA:

Rockwell-International
Globe Valve
1 1/2", Stainless Steel
Type 3624 #316
Mark No. PA-125

General Manager-
Salem Operations

JLR:tns

SORC Mtg 84-075

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): Salem Generating Station - Unit 2

DOCKET NUMBER (2): 0 5 0 0 0 3 1 1

TITLE (4): Containment Ventilation Isolation - Inoperable

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR
0 5	2 8	8 4	8 4	0 1 4	0 0	0 6	2 7	8 4

OTHER FACILITIES INVOLVED (8) — DOCKET NUMBER(S): 0 5 0 0 0 ; 0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL (10): 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: X

LICENSEE CONTACT FOR THIS LER (12)

NAME: J. L. Rupp

TELEPHONE NUMBER: 6 0 9 3 3 9 - 4 3 0 5

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) — X NO

EXPECTED SUBMISSION DATE (15): MONTH DAY YEAR

ABSTRACT (16)

The Technical Specifications allow the use of a plant vent radioactivity monitor in place of a containment monitor for monitoring, purge and pressure relief operations, provided the plant vent monitor setpoints are reduced to the value of the containment monitor. On May 28, 1984, a containment pressure relief was performed utilizing the plant vent Gaseous Activity Monitor (2R41C) in lieu of the containment Gaseous Activity Monitor (2R12A). The containment atmosphere was sampled prior to the release, plant vent samples were obtained and the plant vent monitors were continuously monitored during the release to verify activity levels remained below the allowable discharge limits. However, 2R41C setpoint was not reduced as required, resulting in a Containment Ventilation Isolation System setpoint which was not consistent with the assumptions used in the FSAR. This occurrence was attributed to the failure to follow the operating procedure as written. The procedure provides for the inoperability of a containment activity monitor; however, a temporary "On-The-Spot" change to the procedure inadvertently omitted the step which required the 2R41C setpoint to be reduced. The individual involved was counseled. In addition, a review of the Administrative Procedure will be conducted for the proper application of "On-The-Spot" changes.

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NRC Form 366

PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

IDENTIFICATION OF OCCURRENCE:

Engineered Safety Feature Actuation System Instrumentation - Containment Ventilation Isolation - Inoperable

Event Date: 05/28/84

Report Date: 06/27/84

This report was initiated by Incident Report No. 84-083

CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 - Rx Power 100 % - Unit Load 1150 MWe

DESCRIPTION OF OCCURRENCE:

On May 28, 1984, during normal power operation, Containment Gaseous Activity Monitor [IL] 2R12A was in an alarm condition, which resulted in a Containment Ventilation Isolation signal [JM]. During this time, a containment pressure relief was necessary, due to containment pressure being very close to the Technical Specification limit. It was necessary to block the Containment Ventilation Isolation signal from 2R12A in order to open the containment purge/pressure-vacuum relief isolation valves and perform the required pressure relief. In the event of inoperability of 2R12A, Technical Specification 3.3.2 allows the plant vent Gaseous Activity Monitor (2R41C) to be used to provide the Containment Ventilation Isolation function, provided its setpoint is lowered prior to opening the containment purge/pressure-vacuum relief isolation valves. The containment atmosphere was sampled and the Containment Ventilation Isolation signal from 2R12A was blocked in preparation for the pressure relief operation. The pressure relief commenced at 1915 hours and ended at 2015 hours. Although 2R41C was monitored during the containment pressure relief, its setpoint was not reduced as required by the Technical Specifications. This resulted in the inoperability of the Containment Ventilation Isolation System.

APPARENT CAUSE OF OCCURRENCE:

The Containment Pressure - Vacuum Relief Operating Procedure (OP-II-16.3.1), step 5.6.1.b states: "RMS Channels 2R11A, 2R12A and 2R12B are in operation. All alarms are cleared and reset." The Senior Shift Supervisor believed that a change to the procedure was required because step 5.6.1.b stated that 2R12A was in operation.

APPARENT CAUSE OF OCCURRENCE: (cont'd)

A temporary "On-The-Spot" change was initiated. This temporary change provided for obtaining plant vent samples and directed that the plant vent Gross Activity Monitor (2R16) and Gaseous Activity Monitor (2R41C) be monitored during the pressure relief operation. It also directed that calculations be performed using the 2R16 to ensure that the release rate was not exceeded. Consequently, the change as written deleted Step 5.5.1.b.1 of the procedure, which states: "If any of the 2R11A, 2R12A, or 2R12B Monitors is inoperable, the appropriate 2R41 Monitor may be used as a substitute. I&C must reduce the setpoint prior to the pressure relief."

OP-II-16.3.1 makes provisions for the inoperability of a Radiation Monitor. This occurrence was attributed to the failure to follow the operating procedure as written, and to unnecessarily initiating an "On-The-Spot" change. Due to oversight, this temporary change inadvertently omitted a step in the procedure, which resulted in the inoperability of the Containment Ventilation Isolation System.

ANALYSIS OF OCCURRENCE:

2R12A and 2R41C are provided to measure gaseous radioactivity in the containment, and to ensure that the release rate through the plant vent during purging is maintained below specified limits. High radioactivity level initiates closure of the containment purge supply and exhaust duct valves, the containment pressure relief line valves and the Waste Gas discharge valve. Technical Specification 3.3.2 requires operation of the Containment Gaseous Activity Monitor (2R12A) with a Containment Ventilation Isolation setpoint signal of less than or equal to 4.5×10^{-4} curies/second, and a response time of less than or equal to five (5) seconds. The Containment Ventilation Isolation System provides the means of isolating the containment atmosphere to prevent the release of radioactivity to the environment in the event of a loss-of-coolant accident. In addition, the required closure time of the valves ensures that no significant release of radioactivity to the environment can occur during such an event. Although the containment isolation signal from 2R12A was blocked, the monitoring function from this channel was still operable. 2R41C, and 2R16 were monitored during the pressure release to ensure that the release rates were within specification. Although 2R41C would have isolated the Containment Ventilation System, the setpoint at which this would have occurred is not consistent with the Technical Specification requirement, or with the assumptions used in the FSAR. Because this operation was prohibited by the Technical Specifications, this report is submitted in accordance with the requirements of the Code of Federal Regulations, 10CFR 50.73(a)(2)(i)(B).

CORRECTIVE ACTION:

The Senior Shift Supervisor involved with this incident was counseled and apprised of his shortcomings. The proper use of "On-The-Spot" changes will be discussed by department management with the responsible department supervision. In addition, as the result of previous occurrences involving the questionable use of "On-The-Spot" changes, an audit will be performed by the Quality Assurance Department on the application of Administrative Procedure (AP-3) for "On-The-Spot" changes (Sorc Open Item No. 84-075-02).

General Manager-
Salem Operations

JLR:tns

SORC Mtg 84-078B

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): Kewaunee Nuclear Power Plant

DOCKET NUMBER (2): 0 5 0 0 0 3 0 5

TITLE (4): Rod Cluster Control Assembly Cladding Wear

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 4	0 1	8 4	8 4	0 0 1	0 1	1 0	3 1	8 4	N/A	0 5 0 0 0

OPERATING MODE (9): N

POWER LEVEL (10): 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: [X] OTHER (Specify in Abstract below and in Text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

NAME: John G. Thorgersen - Nuclear Engineer

TELEPHONE NUMBER: 4 1 4 4 3 3 - 1 3 0 3

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	AA	R O D	W 1 2 0	Yes					

SUPPLEMENTAL REPORT EXPECTED (14): [X] YES (If yes, complete EXPECTED SUBMISSION DATE) [ ] NO

EXPECTED SUBMISSION DATE (15): 0 7 | 0 1 | 8 6

ABSTRACT (16)

During the Cycle IX-X refueling shutdown, an underwater visual inspection of three rod cluster control assemblies (RCCA's) revealed apparent wear marks on the cladding of the RCCA absorber rodlets. The wear marks were found to occur at a position which correlates to the location of the guide cards, which are used to position the rodlets in the guide housing, when the RCCA's are parked in their normally full out position. The cladding wear is attributable to the design of the guide cards and is a result of vibratory interaction between the rodlets and the guide cards during long periods of steady state power operation.

Westinghouse has evaluated the wear marks on these rodlets and determined that they do not exceed Westinghouse's criteria for RCCA wear depth. They have also concluded that at a minimum, the RCCA's currently in use during Cycle X can be safely used through the end of Cycle XI without performing a detailed visual inspection during the Cycle X-XI refueling shutdown.

WPSC has revised the normally fully withdrawn position of the RCCA's from 228 steps to 226 steps in order to minimize fretting in the existing areas and to extend the lifetime of the RCCA's.

Although this event does not meet the reporting criteria of 10 CFR 50.73(a), it is being reported as an LER which may be of generic interest.

Safe, functional operation of the RCCA's is ensured, and there is no impact on public health and safety.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Facility Name	Docket Number	LER Number: Year	Sequential Number	Revision Number	Page
Kewaunee Nuclear Power Plant	0 5 0 0 0 3 0 5	8 4	— 0 0 3	— 0 1	0 2 of 0 2

During the Cycle IX-X refueling shutdown, Kewaunee Plant personnel visually inspected three of twenty-nine rod cluster control assemblies [RCCA's] (ROD) for evidence of cladding wear. This inspection was prompted by a recent inspection of RCCA's at another nuclear facility which revealed cladding wear greater than expected. The RCCA's inspected were R-05, R-14, and R-20. These assemblies are of the spider mounted design which contain 16 rodlets per RCCA. The assemblies are compatible with the 14 x 14 fuel design used at the Kewaunee Plant and contain silver, indium and cadmium as an absorber material.

The inspection was performed during the last week in March, 1984, using an underwater TV camera coupled with videotape recording equipment. The results were recorded on five videotapes and revealed apparent wear marks on the surfaces of the RCCA absorber rodlets. The wear marks are about one inch in length and are located at an elevation which corresponds to the guide cards, which are used to position the rodlets in the guide housing, when the RCCA's are fully withdrawn (at 228 steps) from the core. The wear is postulated to occur as a result of the vibratory interaction (fretting) between the rodlets and the guide cards during long periods of steady state power operation. This fretting is characteristic of the design of the guide cards.

Based on a detailed review of these videotapes, Westinghouse has concluded that none of the inspected RCCA's exhibit wear in excess of Westinghouse's wear criteria. They have also concluded that at a minimum, the RCCA's currently in use during Cycle X can be safely used through the end of Cycle XI without performing a detailed visual inspection during the Cycle X-XI refueling shutdown.

Westinghouse has also suggested that by changing the normally parked position of all the RCCA's by 2-3 steps, fretting in existing areas can be minimized and the lifetime of the RCCA's could be extended. WPSC has revised the normally fully withdrawn position of the RCCA's from 228 steps to 226 steps.

Although this event does not meet the reporting criteria of 10 CFR 50.73(a), it is being reported as an LER which may be of generic interest.

The safe, functional operation of the RCCA's is ensured, and there is no impact on public health and safety.

LICENSEE EVENT REPORT (LER)

Facility Name (1): McGuire Nuclear Station, Unit 1

Docket Number (2): 0|5|0|0|0|3|6|9

Page (3): 1 OF 0|3

Title (4): Failure to install T-Drains in Limitorque SMB Electrical motor operators

Event Date (5) Month	Day	Year	LER Number (6) Year	Sequential Number	Revision Number	Report Date (7) Month	Day	Year	Other Facilities Involved (8) Facility Names	Docket Number(s)
0|6	0|6	8|4	8|4	— 0|1|9 —	0|0	0|7	0|6	8|4	McGuire Unit 2	0|5|0|0|0|3|7|0
										0|5|0|0|0

Operating Mode (9): 1

Power Level (10): 1\|0\|0

This report is submitted pursuant to the requirements of 10 CFR §: (Check one or more of the following) (11): X [illegible]

Licensee Contact for this LER (12)

Name: Phillip B. Nardoci, Licensing Engineer

Telephone Number: 7\|0\|4 3\|7\|3 — 7\|4\|3\|2

Complete one line for each component failure described in this report (13)

Cause	System	Component	Manufac-turer	Reportable to NPRDS	Cause	System	Component	Manufac-turer	Reportable to NPRDS

Supplemental Report Expected (14): YES (If yes, complete EXPECTED SUBMISSION DATE) — X NO

Expected Submission Date (15): Month | Day | Year

Abstract

Limitorque SMB electric motor actuators are qualified for active inside containment service per Limitorque Qualification Type Test Report 600456. The actuators were qualified with T-drain plugs installed in the bottom of the actuator motor housing to prevent accumulation of condensation during a LOCA or MSLB. Duke Power utilizes actuators qualified to Report 600456 for active valves in both the Containment and Doghouses. The T-drain plugs are packaged inside the actuator switch compartment and tagged with field installation instructions. An inspection conducted (6/6-10/84) at McGuire as a result of deficiencies identified on the Catawba Nuclear Station revealed several active valves with Limitorque SMB actuators were installed in the Containment and Doghouses without the T-drains in place. Both units were in Mode 1 at 100% power at the time of discovery.

Investigation was unable to determine a cause for the failure to install the T-drains. Evaluation indicated there is a very high degree of confidence that the valves would have functioned without T-drain plugs in place. The valve actuators were fitted with T-drain plugs as soon as they became accessible. Limitorque installation and instruction manuals will be revised to include T-drain plug installation requirements.

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Limitorque Corporation SMB "Containment Chamber" electric motor valve actuators (EIIS:XCV) are qualified for active inside containment service per limitorque qualification type test report 600456. Limitorque operators are not designed to be completely sealed from the DBE (LOCA or Main Steam Line Break) environment. The actuator configuration qualified in the Limitorque LOCA Chamber Test had T-drain plugs installed in the bottom of the actuator motor (EIIS:MO) housing to prevent accumulation of condensation due to the harsh environment created during a LOCA or MSLB. In the event of steam entrapment in the motor compartment, the T-drains would allow drainage of condensate, thus preventing possible saturation of the motor insulation and short circuiting of the motor leading to operator failure. Failure of the motor to operate would prevent the actuator from performing its intended safety function; therefore, T-drains are required to maintain the nuclear qualification of the operators. Duke Power utilizes actuators qualified to report 600456 for active valves in both the containment and doghouses.

On May 16, 1984 a deficiency was identified on the Catawba Nuclear Station in which the T-drain plugs had not been field installed, as required by the vendor, on certain Limitorque electric motor valve operators (Ref. Significant Deficiency Report SD 413-414/84-15). Subsequent inspection of McGuire revealed (June 6-10, 1984) that several active valves (EIIS:V) with Limitorque SMB actuators were installed in the containment vessel and doghouses without the T-drains in place. Both units were in Mode 1 at 100% power at the time of the discovery. The following is a list of all the McGuire valves with Limitorque actuators without T-drains for which T-drains are required (note that various other active valves have T-drains missing or don't have provisions for T-drains but don't require them for their application):

UNIT 1

Inside Containment:

Containment Air Return\Exchange & Hydrogen Skimmer System (VX) (EIIS:VD) valves 1VX-1A and 1VX-2B

Safety Injection System (NI) (EIIS:BP) valves 1NI-430A and 1NI-431B

Doghouse:

Auxiliary Feedwater System (CA) (EIIS:BA) valves 1CA-38B, 1CA-50B, 1CA-54A, & 1CA-66A

UNIT 2

Inside containment:

Containment Air Return Exchange & Hydrogen Skimmer System (VX) valves 2VX-1A and 2VX-2B

Reactor Coolant System (NC) (EIIS:AB) valves 2NC-54A and 2NC-196A

Safety Injection System (NI) valves 2NI-430A and 2NI-431B

Component Cooling System (KC) (EIIS:CC) valve 2KC-424B

(Note that the unit 1 valves corresponding to 2NI-430A, 2NI-431B, and 2KC-424B do not have Limitroque operators)

Doghouse:

Auxiliary Feedwater System (CA) valves 2CA-38B, 2CA-50B, 2CA-54A, and 2CA-66A.

The T-drains should be field installed (according to actuator orientation) in place of the two lowest (existing) solid pipe plugs in the motor end bells. The T-drain plugs are shipped packaged inside the actuator switch compartment and tagged with field installation instructions. Limitorque Nuclear Qualification Report B-0058 also briefly states T-drain installation requirements. Investigation was unable to determine a cause for the failure to install the T-drains.

Of the valves listed, only the Auxiliary Feedwater System (CA) valves and Unit 2 Containment Isolation valves 2KC-424B and 2NC-54A must function in the event of a LOCA or MSLB. All others are active but are not required to function to mitigate a LOCA or MSLB. 2KC-424B and 2NC-54A receive an automatic containment isolation signal, initiated by high containment pressure, and will reach their safety position within 40 seconds and 10 seconds, respectively, after receipt of signal. The valves are not required to operate thereafter. Condensation is not expected to form in the motor housing before the valves reach their safety position.

Auxiliary Feedwater System (CA) valves receive a manual signal from the control room operator. Several minutes could pass before the CA valves receive their signal so some condensation may form in the motor housing due to worst case 5 psig Doghouse environment. Even if condensation actually formed and it was not allowed to drain, it would have negligible affect on the Class RH motor insulation. In support of this, Limitorque has demonstrated operability of similar actuators with less durable Class B motor insulation, without motor housing drains, in a seven day LOCA test (as documented in Limitorque Report 600198).

All valve actuators listed were fitted with T-drain plugs as soon as they became accessible in order for the actuators to match the tested condition. Work was completed 6/10/84 for all valves except 2KC-424B (refer to LER-370/84-14 for discussion of this valve).

Limitorque installation and instruction manuals will be revised by Duke Power Company to include T-drain plug installation requirements.

Based on the above technical evaluation there is a very high degree of confidence that all valves in question would have functioned without T-drain plugs in place. Therefore, safety consequences to the station were negligible prior to installation of the T-drains. The health and safety of the public were unaffected by this deficiency.

U.S. NUCLEAR REGULATORY COMMISSION

BIBLIOGRAPHIC DATA SHEET

1. REPORT NUMBER (Assigned by TIDC, add Vol. No., if any)

NUREG-1022
Supplement No. 2

3. TITLE AND SUBTITLE

LICENSEE EVENT REPORT SYSTEM
Evaluation of First Year Results, and Recommendations for Improvements

5. AUTHOR(S)

F. J. Hebdon

6. DATE REPORT COMPLETED

MONTH	YEAR
August	1985

7. DATE REPORT ISSUED

MONTH	YEAR
September	1985

9. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)

Office for Analysis and Evaluation of Operational Data
U.S. Nuclear Regulatory Commission
Washington, DC 20555

11. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)

Same as 9. above

12a. TYPE OF REPORT

12b. PERIOD COVERED (Inclusive dates)

13. SUPPLEMENTARY NOTES

Guide

14. ABSTRACT (200 words or less)

This report describes an evaluation of an industry-wide sample of Licensee Event Reports (LERs) that was conducted to determine whether or not these LERs were prepared in accordance with the requirements set forth in 10 CFR 50.73, which became effective on January 1, 1984. The study was performed at the Idaho National Engineering Laboratory (INEL) by EG&G, Inc. The evaluation (NUREG/CR-4178) indicated that although the overall quality of the LERs was good, many LERs failed to meet all of the requirements. This supplementary report presents the methodology that was used to evaluate the LERs, the conclusions reached concerning problem areas in the reports, and suggestions as to how the overall quality and completeness of reports can be improved.

15a. KEY WORDS AND DOCUMENT ANALYSIS

Licensee Event Report System

15b. DESCRIPTORS

16. AVAILABILITY STATEMENT

Unlimited

17. SECURITY CLASSIFICATION

Unclassified

18. NUMBER OF PAGES

19. SECURITY CLASSIFICATION

Unclassified

20. PRICE

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DATE FILMED

10/23/85