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# SPECIAL STUDY
# FIRE EVENTS - FEEDBACK OF U.S. OPERATING EXPERIENCE

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Prepared By:
James R. Houghton

Reliability and Risk Assessment Branch
Safety Programs Division
Office for Analysis and Evaluation of Operational Data
U. S. Nuclear Regulatory Commission

## EXECUTIVE SUMMARY

This report (special study), on fire events covering operating experience from 1965 through 1994, characterizes the frequency and nature of fire event data from U.S. operating plants and examines the potential impact this updated data could have on fire risk assessments.

This report updates the Sandia fire events database (1965 through mid-1985) with fire event data from Licensee Event Reports (LERs), the proprietary EPRI fire events database (1965-1988), and fire-related component failure histories from the Nuclear Plant Reliability Data System (NPRDS) database (also proprietary). Appendix A - Tables I and II, "Overall Fire Events Data," contain proprietary fire event data from the EPRI fire events database (coded in the tables as "++"). The consolidated fire events database and other appendices developed for this study provide a comprehensive and up-to-date compilation of information on fire events, their calculated frequencies, and severity as they have affected U.S. nuclear power plants.

The study reviewed and compared plant location fire frequencies with those used in selected probabilistic risk assessments (PRAs), including the Control Room, the Cable Spreading Room, the Auxiliary Building (Pressurized Water Reactor plants only), the Reactor Building (Boiling Water Reactor plants only), the Switchgear Room, and the Turbine Building.

With the combined and updated data for 1965-1994, the following analyses were performed:

- Listing of fire events data, as input to an updated fire events database.
- Apportionment of fire events by number, major cause, and plant location.
- Evaluation of the duration and frequency of fire events that occurred during power and shutdown operations.
- Grouping of fire events by severity during power operations.
- Comparison of calculated fire frequencies with PRA data and recent industry and NRC sponsored studies for the potential effect on fire induced core damage frequency estimates.
- Comparison of the duration and fire frequency of shutdown fire events with power operations fire events.

- Listing of smoke events, including attributes similar to fire events data, as input to a smoke events database.

This report identified the following major findings and conclusions:

A comparison of fire events in the pre-Appendix R period (1965-1985) with fire events in the subsequent period shows that event frequencies have declined slightly, while the safety significance of events has also been lower. This finding is shown graphically in figures ES-1 and ES-2. The most significant fire event occurred at Browns Ferry in March, 1975 and was a pivotal incident in the recognition of fire safety concerns. It resulted in a scram and propagated without suppression to affect multiple redundant trains of safety equipment. Since the implementation of Appendix R modifications and other industry activities (1986-1994), there were no fire events with similar safety significance. There were only two fire events resulting in a scram and loss of one safety related train or loss of offsite power (LOOP) during this period compared to 10 events previously. Other fires have been severe in terms of the magnitude and duration of combustion (such as some turbine building fires), but their severity in terms of challenges to safety systems operation has been limited. However, such fires could be important if redundant safety trains or decay heat removal systems were dependant on equipment located there.

The fire durations during power operations were generally short (less than 10 minutes). The information available on these short duration fires was not sufficient to evaluate probability of fire detection and suppression used in recent PRAs.

The fire durations during shutdown were also generally short (less than 10 minutes). Shutdown durations in plant locations that contain systems necessary for decay heat removal during shutdown, were the same or lower than fire durations for the same plant locations during power operations.

The 1986-1994 (post-Appendix R implementation) fire event frequencies at power operations were lower for the Control Room and the Cable Spreading Room, approximately the same for the Auxiliary Building (PWR) and the Reactor Building (BWR), and higher for the Switchgear Room and Turbine Building than those values used in most PRAs reviewed for this study. A sensitivity study, based solely on changes to the initiator frequencies, did not indicate the potential for substantial changes to the overall CDF due to fires. Other aspects of fire analyses may be more critical to their risk assessment, including: the mechanics of combustion, combustible loading, and means of detection and suppression. The data in this report was not suitable for addressing these issues.

For the 1986-1994 period, the shutdown fire frequencies varied in comparison to the fire frequencies at power for most risk significant plant locations used in PRAs. Since some plant locations were higher (Containment, Reactor Building, Auxiliary Building, Switchgear Room, and Diesel Generator Building), a more detailed review of shutdown fire events resulted in the following conclusions:

- Containment fires were predominantly caused by welding operations and did not affect decay heat removal.

- There were a limited number of fire events that affected the functional operability of Residual Heat Removal (RHR), Decay Heat Removal (DHR), and Emergency Diesel Generator (EDG) system trains. The number of fire events and fire frequencies and corresponding plant locations are as follows:

| Location | Shutdown System | No. System Fire Events | Plant Shutdown Reactor-Years | Shutdown Mean Fire Frequency* |
|---|---|---|---|---|
| Reactor Bldg | RHR | 2 | 90.4 | $2.7 \times 10^{-2}$ |
| Auxiliary Bldg | RHR & DHR | 2 | 139.8 | $1.8 \times 10^{-2}$ |
| Switchgear Room | RHR | 1 | 230.2 | $6.5 \times 10^{-3}$ |
| Diesel Generator Building | EDG | 7 | 230.2 | $3.2 \times 10^{-2}$ |

* indicates Bayes method mean, with noninformative prior.

Therefore, the operating experience indicates that the frequency and duration of shutdown fire events appears to be similar or less significant than for fire events occurring at power operation. This finding is somewhat tentative considering the limitation in treatment of fires in currently available shutdown risk assessments.

Although archival data is retrievable from the NPRDS database, no new nuclear plant failure history data is available through the NPRDS database after 12/31/96. It is not clear whether there will be an industry initiative to replace it with another data source that would be useful in compiling fire event and smoke event data.

**FIGURE ES-1**

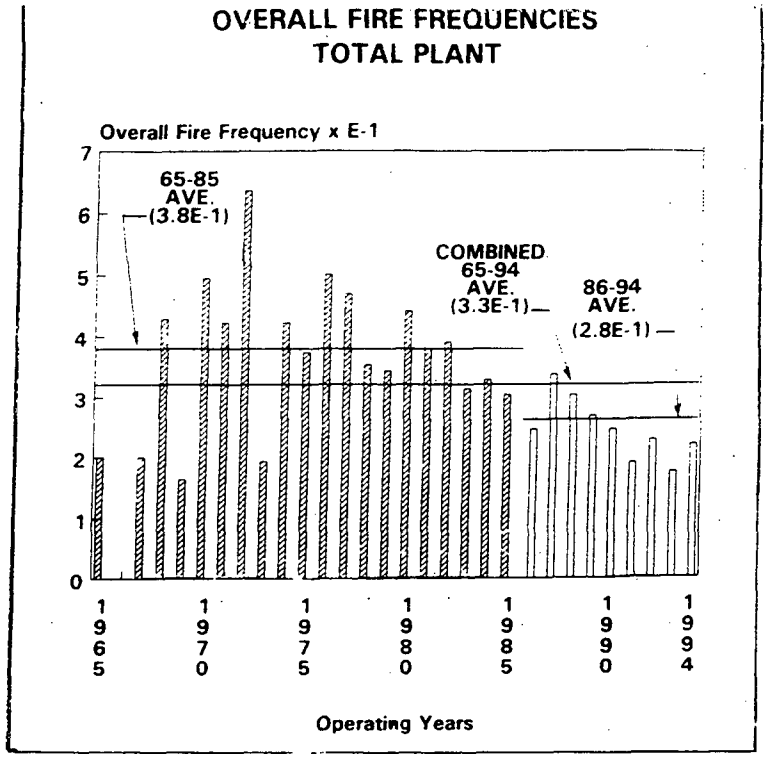
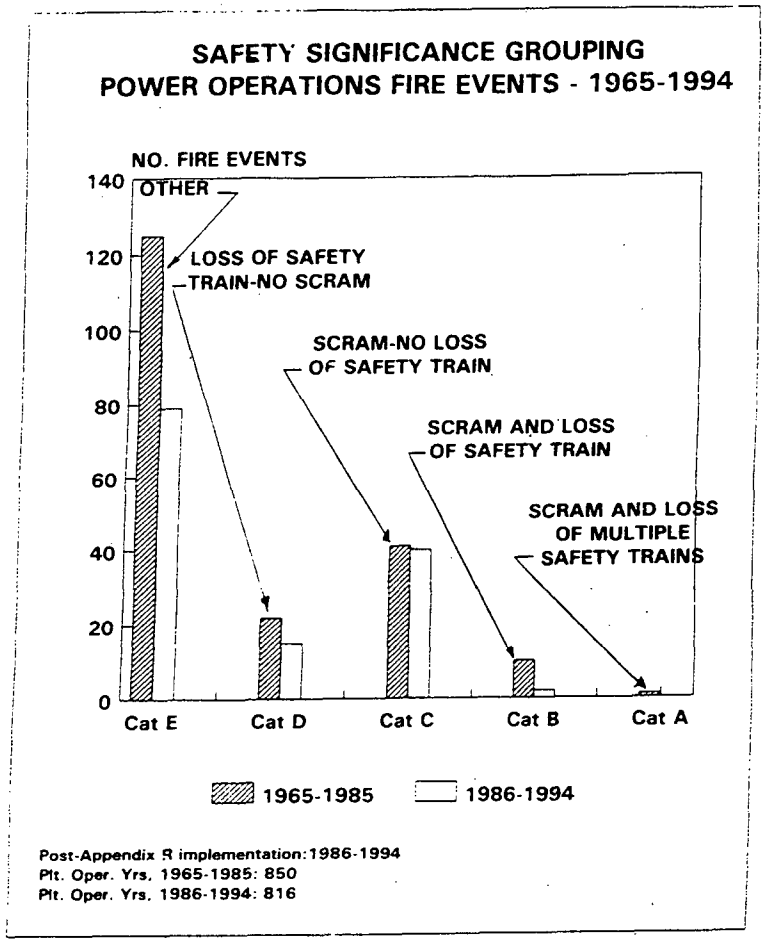



**FIGURE ES-2**



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# SPECIAL STUDY
# FIRE EVENTS - FEEDBACK OF U.S. OPERATING EXPERIENCE

## 1. INTRODUCTION

### 1.1 Purpose of Study

This study characterizes the frequency and nature of fire event data from U.S. operating plants and examines the potential impact this updated data could have on fire risk assessments.

### 1.2 Background

The NRC's "Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities" (NUREG-1407, Reference 1), referenced the NRC sponsored Fire Risk Scoping Study (NUREG/CR-5088, Reference 2), as a confirmation that fire continues to represent a dominant risk contributor. Of the six items listed in the "Internal Fires" section of Reference 1, item 2. addressed fire frequency data as follows:

> *"Most initiating event frequencies were increased based on a much more complete data base available on fire occurrences in nuclear power plants. Under currently applied risk assessment methodologies, this increase in initiating event frequency alone results in a direct increase in overall fire-induced core damage frequency with all other factors remaining constant.*

The fire events data used for the Fire Risk Scoping Study was limited to previous industry gathered data, such as the Sandia Laboratories data base (1965-mid 1985 - NUREG/CR-4586, Reference 3). Therefore, an update of this data was done to evaluate whether PRA insights about fire frequency and consequences were consistent with a comprehensive review of more recent operating experience.

## 2. SCOPE OF STUDY

This study updates the Sandia database (1965 through mid-1985) with fire event data from Licensee Event Reports (LERs), the EPRI database (1965-1988), and fire-related component failure histories from the NPRDS database. The new database covers the period from 1965-1994.

With the combined and updated data for 1965-1994, the following analyses were performed:

- Listing of fire events data, as input to an updated fire events database.
- Apportionment of fire events by number, major cause, and plant location.
- Evaluation of the duration and frequency of fire events that occurred during power and shutdown operations.
- Grouping of fire events by severity during power operations.
- Comparison of calculated fire frequencies with PRA data and recent industry and NRC sponsored studies for the potential effect on fire induced core damage frequency estimates.
- Comparison of the duration and fire frequency of shutdown fire events with power operations fire events.
- Listing of smoke events, including attributes similar to fire events data, as input to a smoke events database.

**Exclusions from Scope:**

Several significant attributes, that were used in the estimation of fire induced core damage frequency by the nuclear power industry, could not be included in the scope of this review due to the limitations of data. These included: the determination of fire suppression probability from the reported fire durations, information on the ignition and damage thresholds of cable insulation, and plant modifications as a result of Appendix R. Other exclusions included the following:

- A review of the requirements of Appendix R was not included in the scope of this review. Reduction of operating plant fire frequency is dependent on a combination of fire protection elements, including: adequacy of initial fire hazards analysis, plant modifications in compliance with Appendix R, reduction of combustibles, and other factors in Appendix R. For this study, 1965-1979 is considered as the pre-implementation period for Appendix R, 1980-1985 is considered as the implementation period, and 1986-1994 is considered as the post-implementation period.
- Although international Commercial nuclear reactor plant fire experience may provide risk insights to U.S. fire experience, this data was also excluded from this study due to the limitations of consistent, available data.

- Domestic and international non-Commercial reactor facilities fire experience were excluded.

## 2.1 Data Sources

Fire event data for this study was initially obtained from the Sandia database for 1965 through mid 1985 (Reference 3). Updates were made from later Sandia data in NUREG/CR-4832 (Reference 4); Sequence Coding and Search System (SCSS) for fire event Licensee Event Reports (LERs) during 1980-1994; the Nuclear Plant Reliability Data System (NPRDS) for component failures that occurred with a fire event during 1965-1994; and the EPRI fire event database (proprietary) for fires that occurred during 1965-1988.

Sources for selected plant PRA fire induced CDF values and fire frequency values were obtained from PRA review documents of selected plants (see References 5 through 12). Other sources included review of EPRI fire requantification for Seabrook and Peach Bottom plants (Reference 13), Kewaunee IPEEE (Reference 14), and the Fire Risk Scoping Study (Reference 2).

The data sources for this report were sufficient for estimating fire frequencies for general plant areas and for characterizing the overall nature, severity, and duration of fire events. However, the level of consistency in reporting items such as the system affected, the means of detection, the size of the fire, the amount of smoke produced, etc. varied among and within the particular data sources. These factors limited the ability to analyze the impact of operating experience used to assess fire risk, such as the severity ratios, probability of non-suppression, or component specific fire frequencies.

Further, these sources are expected to change in the near future, which may make updating this analysis or deriving additional risk related factors problematical. For example, since LERs are expected to continue as before, fires less than 10 minutes duration are not reportable. A significant number of fires in this assessment come from non-LER sources. One of these sources, the NPRDS database, is expected to be replaced by the Equipment Performance Information Exchange (EPIX) system. It is not presently clear if the same level of fire related information from the NPRDS will be captured in EPIX. The proprietary EPRI database and the newer Nuclear Electric Insurance Limited (NEIL) database may or may not be continued in the future. As none of these data sources were sufficient alone to characterize fire events, changes or deletions may affect the ability to extract risk related insights from the data sources in the future.

## 2.2 Description of Terms and Assumptions Used in Study

**Overall Fire Events** - The number of fire events that was reported during plant preoperational testing, power operations, and shutdown. Also included were reconciled EPRI database fire events that included fire events from plant-specific questionnaires that were not reported in LERs or in NPRDS. Excluded from the SANDIA fire database were construction phase fire events. Events where smoke occurred, but no fire occurred were excluded as fire events from all sources. The reporting methods used for review and update of the initial Sandia fire event data base were LER reported fires, NPRDS component failure histories involving fire events, and EPRI database fire events. In general, events where fire or explosion occurred were counted as fire events, regardless of duration. Smoldering was considered as fire and not smoke, where there was indication of fire combustion. Fire events from the questionnaire portion of EPRI database were included after being reconciled (see 3.2 for reconciliation of EPRI database).

**Operating-Years** - The cumulative number of total plants calendar years of operation for the period reviewed (i.e., 1965-1985, 1986-1994, etc.) on an annual basis and as a sum of the period reviewed. New plant starts (commercial operation date) and termination dates for plants were factored into the determination of plant operating-years.

**Overall Fire Frequency** - The number of overall fire events divided by the plant operating-years for the period reviewed.

**Average Unit Availability Factor** - The percentage of plant operating-years at power operation. NRC "Grey Books", NUREG-0020 was used for annual nuclear plant industry average availability factors from 1974 through 1994 (see Reference 14).

**Reactor-Years** - The product of plant operating-years and the Unit Availability factor. For a specified period, the average Unit Availability factor for the years within the period is used. For this study, when the period begins prior to 1974, each prior year was assigned the 1974-1985 average Unit Availability factor.

**Power Operations Fire Events** - The number of fire events that occurred during power operation only.

**Power Operations Fire Frequency** - The number of power operations fire events for the period divided by the number of reactor-years (or divided by the product of operating-years times the average unit availability factor for the period). This value is used for comparison with plant PRA and other data sources, applicable to fire initiated core damage frequency estimates.

**Shutdown Fire Events** - The number of fire events that occurred when the plant was shutdown (i.e., 0% power).

**Average Shutdown-Years** -The result of plants average operating-years minus plants average reactor-years for the period reviewed.

**Fire Duration** - The time that the fire burned before it was suppressed. This time was established either directly or evaluated from reported data. Fire durations that were reported as a specific time in an LER were entered directly with that time. The other event durations used in this study were estimated from the fire data and grouped within 5-minute intervals (see Appendix A - Tables I and II). The maximum duration used was 100 minutes (similar to the maximum time used on probability of manual suppression curves used in the NUREG/CR-4832 for LaSalle Unit 2 (Reference 4).

**Note:** Some of the reported durations may be based on the dispatch of the fire brigade as opposed to the onset of the fire. This would introduce a bias toward shorter durations being reported. However, based on a qualitative review of the event narratives, this bias appears to be small. Therefore, these estimated durations are provided as a qualitative perspective of the apportionment of fire durations within plant locations, between periods, and between power operations and shutdown.

**Fire Extent** - The size of the fire, characterized as follows:
Small - nominally one minute to 19 minutes in duration and may include an explosion.
Medium - nominally 20 minutes to 1 hour in duration. However, when contained and controlled, longer durations may be used.
Large - Usually greater than one hour in duration, except when contained and controlled.

**Fire Safe Shutdown Equipment** - Pump trains used to safely shutdown the nuclear power plant in the event of a fire. This equipment may include nonsafety-related trains or components.

**Smoke Events** - Events that were reported from direct observation or that were evaluated as smoke residue on a component. This excludes fire and odor/smell. When both fire and smoke occurred, the event was categorized as a fire event.

# 3. APPROACH AND METHODOLOGY

## 3.1 Updating the Sandia Fire Event Data Base

The Sandia Fire Event data base contains 354 fire events during a period from 1965 to mid-1985. The listed fire events occurred during the construction phase, preoperational testing phase, and operational phase for U.S. nuclear power plants. Most of the information provided was sufficient to identify the plant location (i.e., building, room, area), duration of the fire, cause of the fire, and effect on the plant operation. When information could not be determined, it was left blank in the tables ("--"). No other reconciliation was made to this fire event data.

The fire event data base update included a review of existing Sandia data for the 1965-mid 1985 period, using NPRDS (1965-1985), SCSS (1980-1985), and other fire event updates made by Sandia and identified in the LaSalle PRA (Reference 4). Construction phase fires were excluded in the update.

The 1986-1994 period was added to the data base, using fire event data from LERs (SCSS) and fire events from component failure histories (NPRDS).

## 3.2 Reconciling the EPRI Fire Event Database for Fire Events Used in This Study

The proprietary EPRI Fire Events database (1968-1988) included the SANDIA database fire events through mid-1985, except for construction phase fire events. A reconciliation of this database was made using the following basis:

Generally, the EPRI fire events, not reported from other sources, that were included in this study had the following attributes:

- Resulted in or were associated with a SCRAM or Loss-of-Offsite Power (LOOP).
- Explosions, except for Recombiners identified below.
- Fire events with duration of 5 minutes or longer in plant areas that have safety-related systems or systems necessary for continued power operations.

EPRI database fire events (predominantly previously unreported fire events from plant-specific questionnaires) were excluded based on the following:

- Reviewed and evaluated as not a fire or explosion (i.e., smoke or odor).
- Not significant, due to at least one of the following:

+ Duration less than 5 minutes (except explosion, SCRAM. or loss of safety-related train or system).
+ Located in a plant area that is not adjacent to or could not propagate to a plant area that contains a safety-related system or system that could cause a plant shutdown (such as a stockroom, hallway trash can fire, warehouse, trailer, temporary building, etc.).
+ Located outside the plant area without affecting the switchyard area (i.e., a non-encroaching forest fire or brush fire).
+ Recombiner explosions (with no corollary fire 5 minutes or longer) that did not affect any plant power operations or safety-related systems that are needed for plant shutdown.

## 3.3 Apportionment of Overall Fire Events by Cause and Location

Overall fire events were apportioned by major causes, and by location (for each major cause) as follows:

- Major causes included: Electrical failure (shorts, faults, grounds, etc.), overheated material (oil, bearing lubrication, insulation, etc.), explosion (hydrogen gas ignition, etc.), Weldind sparks/arcing, and other (unknown, personnel error, component failure, etc.).

- Locations included: Reactor Building (BWR), Auxiliary Building (PWR), Turbine Building, Switch Yard, Switchgear Room, Diesel Generator Building, Control Room, Cable Spreading Room, Containment, Service Water Pumphouse, Battery Room, and Other Buildings.

## 3.4 Overall Fire Frequencies

Overall fire frequencies (i.e., number of overall fire events divided by number of calendar operating-years within the time period) was plotted to provide:

- A plot of overall fire frequencies over the 1965-1994 period for possible trends, including a comparison of the 1965-1985 average overall fire frequency and the 1986-1994 average overall fire frequency for significance of difference.

- Plots of the overall fire frequencies by plant location over the 1965-1994 period for possible trends.

### 3.5 Power Operations Fire Events and Duration of Power Operations Fire Events by Plant Location

The number of power operations fire events and apportionment of these fire events by duration intervals were determined for the two periods by plant location. Plots were made of these power operations fire event duration intervals distribution, including means, to provide a basis for:

- Comparing durations in areas in different time periods.

- Comparing power operations versus shutdown durations by plant locations.

### 3.6 Plant Average Unit Availability Factors and Power Operations Fire Frequencies

It was necessary to determine the power operations fire frequencies by plant location to allow comparison with fire PRAs and other studies, where fire frequency is an used in the calculation of fire induced core damage frequency (CDF) estimates. For this determination, the plants Unit Availability Factor for each year of the two periods (1965-1985 and 1986-1994) was calculated using the "Grey Book" (Reference 14) data and averaged over the period of interest. These averages were used to adjust calendar years to reactor-years of power operation. The power operations fire frequencies were plotted to provide:

- A means to identify trends in power operations fire frequencies over the 1965-1994 total period by plant location.
- A comparison between 1965-1985 and 1986-1994 average fire frequencies by plant location.

Bayes 90% intervals were developed for the power operations fire frequencies for both periods and the overall period by plant location, using a Jeffreys noninformative prior and the area specific data to develop the updated posterior interval. These frequencies were compared with plant fire PRAs and industry studies to determine whether the use of operational fire event data had a significant impact on the fire-induced CDFs or for the total plant fire-induced CDF.

### 3.7 Fire Severity and Risk Implications

Fire risk assessments generally use the following steps to produce an estimate of core damage frequency due to fires:

(1) Estimate fire frequencies for particular locations in the plants.

(2) Estimate the probability of non-suppression of the fire in a given location, depending on factors such as detection and suppression systems, operator response, and combustible loading.

(3) Given a fire that is not suppressed before the equipment in a particular plant location is considered to be failed, the effect of the fire on the PRA model is developed (causes a plant trip or not, causes a LOCA or not, and list of damaged equipment assumed to be unavailable).

(4) With the information on trips, LOCAs, and/or equipment out-of-service, the PRA model is requantified to provide the conditional probability of core damage, given the effects predicted in (3), above.

(5) Combining the frequency of fires with the probability of non-suppression and the conditional probability of core damage produces the core damage frequency estimate due to fire events.

The operating experience data on fire events in this report is suited to providing estimates of fire frequencies and some insight into non-suppression probabilities. However, it does not contain models and data for the other steps. Therefore, this report uses two means of evaluating risk significance as noted in the next two subsections. One is to group operating experience into severity groups and the other is to evaluate existing PRA results (prior to IPEEE submittals) by a sensitivity analysis based solely on differences in fire frequency estimates.

### 3.7.1 Power Operations Fire Events Severity Grouping

The apportionment of power operations fire events among five severity group categories was performed as a qualitative means of judging the significance of these fire initiators. The five categories used in this study are:

**Category A** - Fire events that caused loss of more than one train of a safety-related system or loss of multiple single-train safety-related systems.

**Category B** - Fire events that resulted in a SCRAM and LOOP or resulted in a SCRAM and a loss of one train of a safety-related system and had a duration of 5 minutes or longer, or resulted in a SCRAM and a loss of one train and had an explosion, regardless of the fire's duration.

**Category C** - Fire events that resulted in a SCRAM, regardless of the fire's duration, but no loss of safety-related train occurred.

**Category D** - Fire events that resulted in a loss of one train of fire safe shutdown equipment, regardless of the fire's duration, but without SCRAM.

**Category E** - All other reported fire events.

### 3.7.2 Comparison of Power Operations Fire Frequencies with Selected Plant PRA Data and Other Data by Plant Location

In order to determine whether updated fire frequencies support the Fire Risk Scoping Study (FRSS) contention that fire events continue to be a dominant contributor to overall plant risk, a sensitivity analysis was performed. Since the data on fires did not provide sufficient information to assess the probabilities of detection and suppression, this sensitivity analysis only addresses potential changes in the fire event frequencies.

The fire locations in PRAs and other analyses (such as the Kewaunee IPEEE and the FRSS) are often different from one analysis to another. These differences may be due to plant-specific features, analysis assumptions, or screening criteria. However, five plant locations [Control Room, Cable Spreading Room, Switchgear Room, Reactor Building (BWR), Auxiliary Building (PWR), and Turbine Building] are common to most analyses. The sensitivity analysis in this study focuses on these plant locations. Appendix F - Table III and Figures 23, 24 and 25 compare fire frequencies developed from operating fire events with the fire frequencies used in individual PRAs and other fire analyses considered in this sensitivity analysis.

The first step in the sensitivity analysis was to compare the operating experience to the mean values used in the PRAs and other analyses. A generic fire frequency for each of the areas noted above was derived using a Bayes 90% interval, based on a Jeffrey's noninformative prior and the pooled data from all plants (see Reference 16 for methodology). Point estimates from PRAs and other analyses that fall completely outside this range are indicative of a significant difference between the generic frequency and the PRA estimate. Conclusions regarding the generic frequencies being higher or lower than the point estimates in the PRAs and other analyses are dependent on a finding of significant difference as noted above.

The next step in the sensitivity analysis was to compare how the resulting CDF of a particular analysis would change if the generic mean for the post-1986 period was substituted for the plant-specific PRA fire frequency mean values. In Appendix F - Table III, the ratio of the generic mean of the post-1986 period to the existing fire frequency is displayed. The ratios for the pre-1986 and overall 1965-1994 periods are also displayed as information. The use of the post-1986 ratio would produce the new CDF for that plant location, had the operating experience fire frequency been used and all other aspects of the analysis remained unchanged.

The last step in the sensitivity analysis was to determine the significance of the resulting CDFs. Although plant-specific analyses varied, many used screening

criteria such as that found in the Fire Induced Vulnerability Evaluation (FIVE) methodology when calculating fire induced CDF for a specific plant location. This study used the FIVE methodology threshold of $10^{-6}$ as the basis for concluding whether the resulting change in the existing CDF for that plant location would be significant or not.

### 3.8 Shutdown Fire Events

Fire initiator frequencies in plant PRAs, including IPEEE internal fire CDF estimates, used fire events that occurred during power operations. However, there are no currently available shutdown PRAs that include fire risk. In light of what is known about fire risk analysis at power, it was decided to review fire events that occurred during plant shutdown, including calculations and evaluation of the following:

- Mean fire durations during shutdown, by plant location, and compared these means with mean fire durations during power operations for each of the two periods (1965-1985 and 1986-1994).

- Average fire frequencies during shutdown, by plant location, and compared these averages with average fire frequencies during power operations for each of the two periods (1965-1985 and 1986-1994).

### 3.9 Overall Smoke Events

Smoke events include incidents where either a flame was not visible or evidence of a fire was not found, but smoke was present or smoke residue was found. They were compiled from LER data (SCSS database) and from the NPRDS database for component failures for each of the two periods. These data have been attributed in the same manner as Fire Events data for the two periods, 1965-1985 and 1986-1994 as an input to a Smoke Events database as information. However, the "extent of smoke" was used instead of "extent of fire" and "cause of smoke" was used instead of "cause of fire."

Three densities were used to characterize the "extent of smoke": Heavy - where a room or area evacuation was necessary; Medium - where room may be filled, but evacuation was not necessary and local action was not impaired; and Light - where smoke or smoke residue, including burning odor (with evidence of component degradation or failure) was at a density less than the other smoke density categories.

# 4. RESULTS

## 4.1 Update of the Sandia Fire Event Data Base - Overall, Power Operations, and Shutdown Fire Events

- The Sandia Fire Event Data Base, for the period 1965-mid-1985, identified 354 fire events, 144 of which were evaluated by this study as Construction Phase fires and excluded. In the update review through the end of 1985, additional fire events reported in LERs, NPRDS, the LaSalle PRA (Reference 4), and the EPRI database identified additional events, resulting in a total of 319 overall fire events for 1965-1985. The fire events were apportioned among plant modes as follows (see Appendix A - Table I and Figure 1):

  - Pre-Operational Testing (Subsequent to Construction Phase, but prior to Power Operations): 23
  - Power Operations: 199
  - Shutdown (0% power): 97

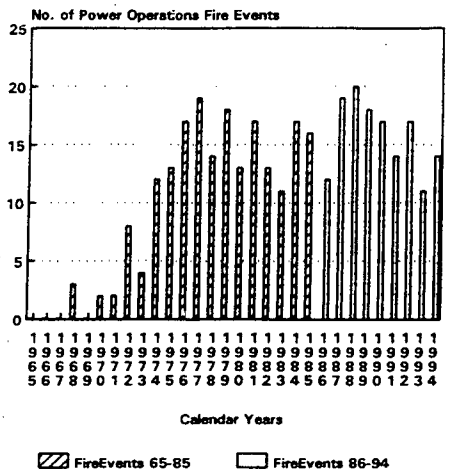
- The balance of the update, for the period 1986-1994, resulted in an additional 232 overall fire events (including extrapolated fire events) The sources for these events included component failure histories from the NPRDS database, LERs, and the EPRI database. These events were apportioned as follows (see Appendix A - Table II and Figure 1):

  - Power Operations (including extrapolated events): 142
  - Shutdown (including extrapolated events): 90

  Since the period before 1989 contained fire events from the SANDIA and EPRI databases that were not reportable in LERs or NPRDS, it was necessary to extrapolate the count of these events for the period after 1989. This was necessary for comparisons of fire frequencies between the pre-1985 and post-1985 periods for a consistent basis. For this extrapolation, the SANDIA database unreported fire events in the 1979 - mid-1985 period were reconciled in the same manner as the EPRI database reconciliation (see 3.2). This extrapolation resulted in 30 additional fire events for Power Operations and 30 additional fire events for Shutdown (average of 5 fire events per year each) and were included for 1989-1994 frequency analysis to account for fire events that were nonreportable through NPRDS or LERs.

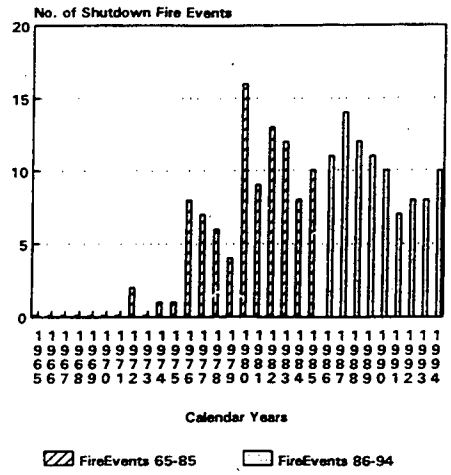
- No trend is evident in the total number for fire events after 1975 for each of the plant modes and overall fire events (see Appendix A, Figure 1).

NUMBER OF POWER OPERATIONS
FIRE EVENTS - TOTAL PLANT



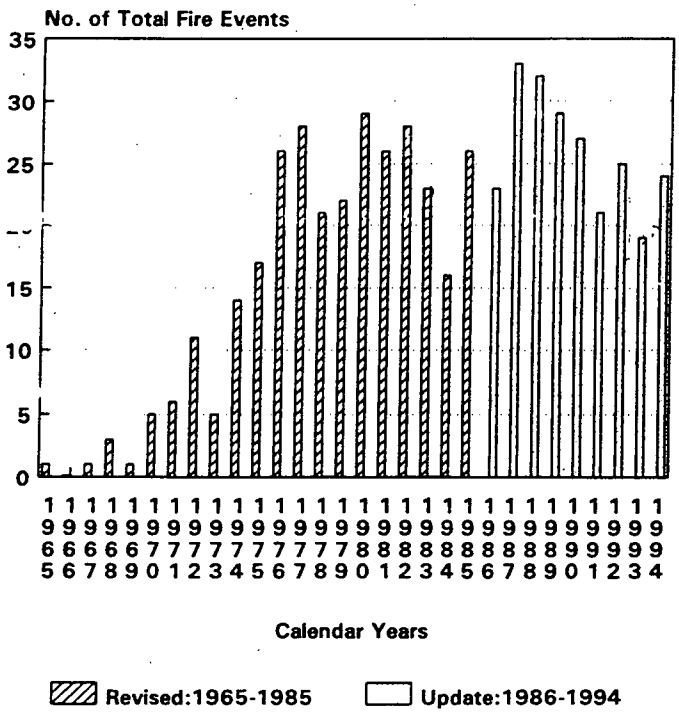

No. Pwr Oper.Fire Events, 1965-1985: 199
No. Pwr Oper. Fire Events,1986-1994:142,
(includes 5/yr extrap. events,1989-1994)

NUMBER OF SHUTDOWN
FIRE EVENTS - TOTAL PLANT




No. Shutdown Fire Events, 1965-1985: 97
No. Shutdown Fire Events, 1986-1994: 90,
(includes 5/yr extrap. events,1989-1994)

## NUMBER OF OVERALL FIRE EVENTS
## TOTAL PLANT




Fire Events,65-85: 319(incl 23 PreOpTst)
Fire Events, 86-94: 232 (Includes 10/yr extrapolated fire events, 89-94).

**FIGURE 1**
**(FROM APPENDIX A)**

## 4.2 Apportionment of Overall Fire Events by Cause and Location

The overall fire events were apportioned to gain insights in fire causes and plant locations, regardless of plant power levels. This data is intended for overall fire event concerns, but not directly applicable to risk assessments without adjustment to power operations only. The following provides the apportionment determined by this study:

- Overall fire events were apportioned among four major causes: Electrical Failure, Overheated Material, Explosion, and Welding. For the overall period (1965-1994), Electrical Failures and Overheated material comprised 69% of the causes (see Appendix B - Table I and Figure 2).

- Electrical Failure (38%) was the predominant cause of fire events during all plant operations (i.e., overall) for the combined period 1965-1994, with an increase in apportionment (to 50%) during the update period, 1986-1994; while the apportionment of the other causes (Overheated Material, Explosion, and Welding) decreased slightly during the update period.

- Overall fire events, apportioned by location only were similar in apportionment for each of the two periods (1965-1985 and 1986-1994). For the overall period, the fire event locations apportionment was predominantly in Auxiliary Building (PWR, 15%), Turbine Building (18%), Diesel Generator Building (15%), and Reactor Building (BWR, 13%)(see Appendix C - Tables II and III and Figure 7).

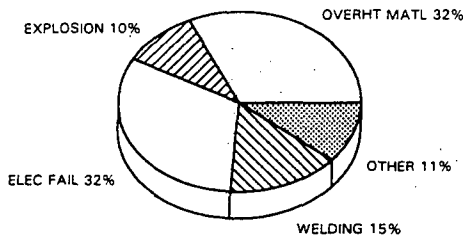
## 4.3 Overall Fire Frequencies

As in the review of overall fire events, the overall fire frequency provides the inclusion of operating (calendar) years in the overall fire review. The following provides a comparison between the two periods, 1965-1985 and 1986-1994, for both total plant and specific internal plant locations:

- The average total plant overall fire frequencies for the update period (1986-1994) were approximately one-third less than for the 1965-1985 period (see Appendix C - Figure 8).

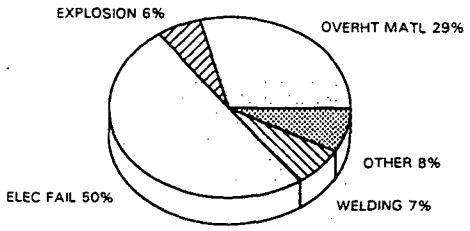
- The overall fire frequencies in most internal plant locations reviewed had a lower average frequency for the updated period (see Figures 9-11 and Appendix C - Tables II and III. Figure 12 depicts Offsite and Temporary Buildings overall fire frequencies for information only).

**OVERALL FIRE EVENT APPORTIONMENT BY CAUSE - 1965-1985**



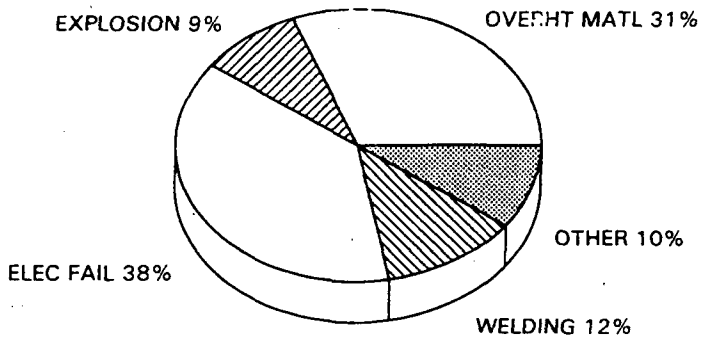

No. Fire Events: 319

**OVERALL FIRE EVENT APPORTIONMENT BY CAUSE - 1986-1994**




No. Fire Events: 173
Excludes extrapolated data, 1989-1994.

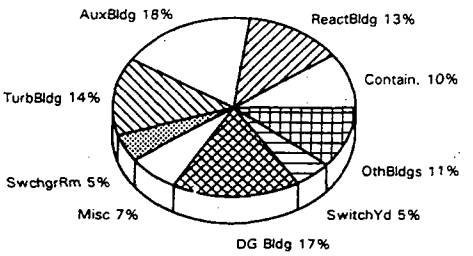
## OVERALL FIRE EVENT APPORTIONMENT BY CAUSE - 1965-1994




No. Fire Events: 492
Excludes extrapolated data, 1989-1990.

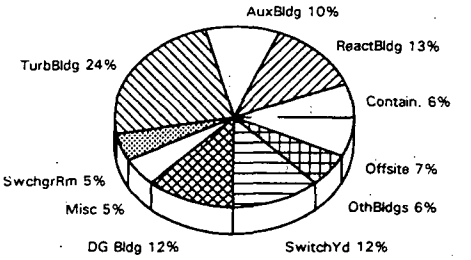
**FIGURE 2 (FROM APPENDIX B)**

**OVERALL FIRE EVENT APPORTIONMENT BY LOCATION - 1965-1985**



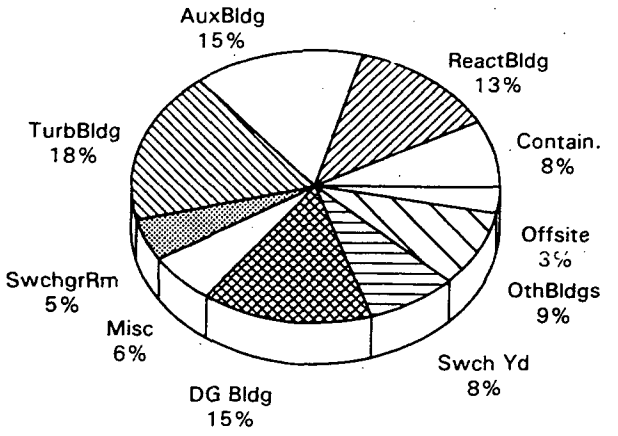

No. Fire Events: 319
Misc.: Cont Rm, Cbl Sprd Rm, SW Pmphse, Batt Rm, Offsite, & Temp Bldgs

**OVERALL FIRE EVENT APPORTIONMENT BY LOCATION - 1986-1994**




Total No. Fire Events: 173
Misc.includes: CablSprdRoom, BattRoom, ControlRoom, and ServWater Pumphouse.

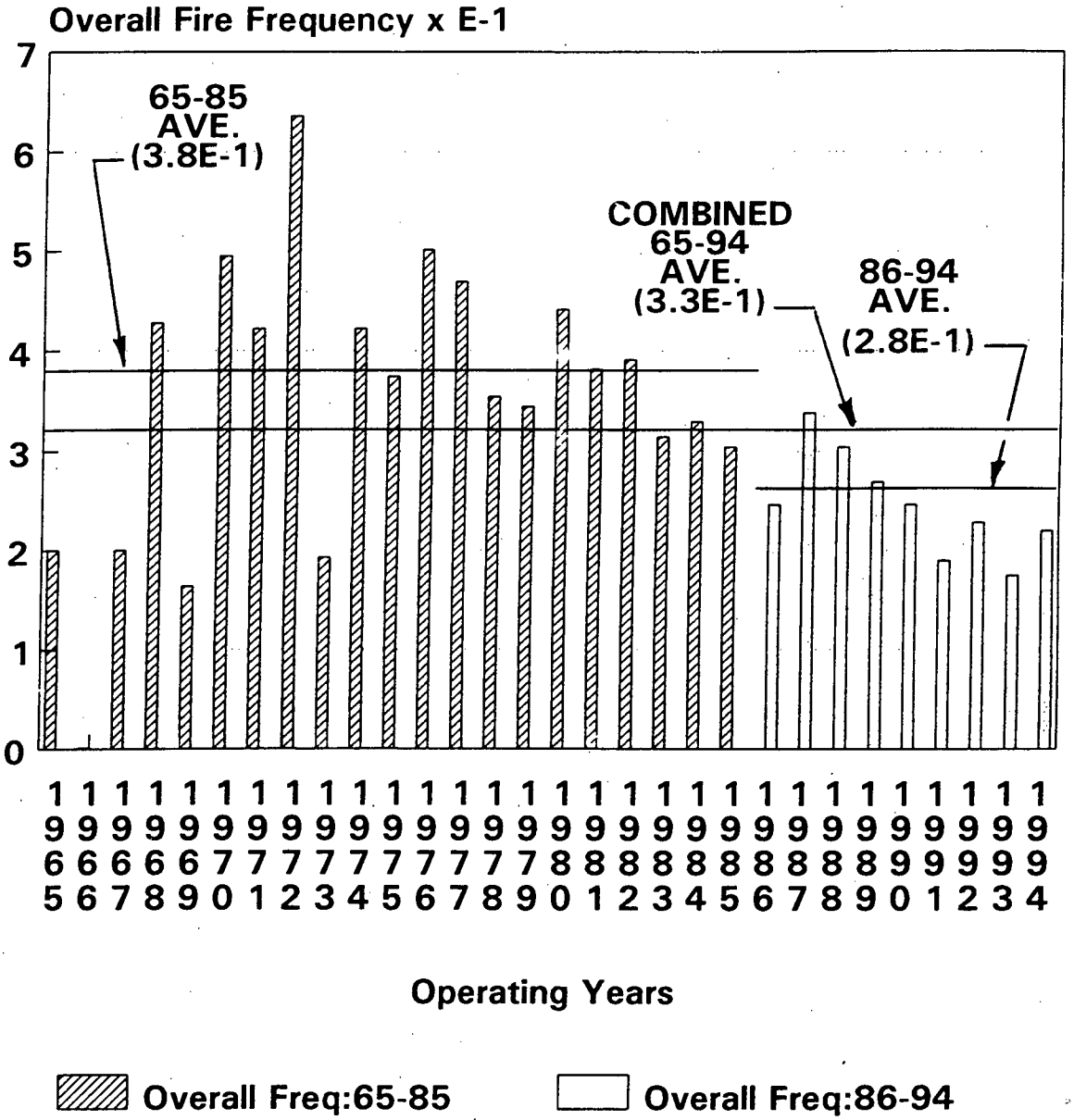
## OVERALL FIRE EVENT APPORTIONMENT BY LOCATION - 1965-1994




**No. Fire Events: 492**
**Misc: ContlRoom, CblSprdRoom, BattRoom, ServWtrPmphse, & Temporary Bldgs.**

**FIGURE 7**
**(FROM APPENDIX B)**

# OVERALL FIRE FREQUENCIES
# TOTAL PLANT




No. fire events: 65-85, 319; 86-94, 233
(incl 60 extrapolated events).
Cal.oper.-yrs:65-85, 850.4; 86-94, 816.3

**FIGURE 8**
**(FROM APPENDIX C)**

## 4.4 Duration of Power Operations Fire Events by Plant Location

- For the 1965-1985 period, the majority of fire events (78%) in plant locations with safety-related systems were less than ten minutes duration; while 68% of these fire events were less than five minutes duration. Mean durations were longer than 10 minutes in some plant locations due to the occurrence of a few long duration fires. The following provides a summary of the durations at the plant locations with safety-related systems:

| Plant Location | No. Fire Events < 5 Min. | <10 Min. | 10 Min. or > | Total | Mean Duration |
|---|---|---|---|---|---|
| Control Room | 3 | 3 | 0 | 3 | 2.5 |
| Containment | 3 | 5 | 1 | 6 | 5.6 |
| Reactor Bldg (BWR) | 12 | 13 | 5 | 18 | 15.3 |
| Auxiliary Bldg (PWR) | 26 | 31 | 9 | 40 | 8.6 |
| Cable Spreading Room | 0 | 0 | 3 | 3 | 52.7* |
| Switchgear Room | 7 | 7 | 2 | 9 | 17.4 |
| Battery Room | 3 | 3 | 0 | 3 | 2.5 |
| Diesel Gen. Bldg | 26 | 30 | 7 | 37 | 6.4 |
| Serv. Water Pumphse | 2 | 2 | 0 | 2 | 2.5 |
| Total No. Events: | 82 | 94 | 27 | 121 | |
| Percent of Total: | 68 | 78 | 22 | 100 | |

* includes Browns Ferry fire, but limited to 100 minutes.

Two nonsafety-related locations, the Turbine Building and Switch Yard, had a higher average duration of approximately 20 minutes (see Appendix D - Figures 13-15 and Table I). For most plants these locations have less risk significance. However, for some plants, the Turbine Building includes fire safe shutdown equipment.

- For the 1986-1994 period, the majority of fire events (58%) in plant locations with safety-related systems were less than ten minutes duration; while 44% of these fire events were less than five minutes duration. Mean durations were longer than 10 minutes in some plant locations due to the occurrence of a few long duration fires. The following provides a summary of the durations at the plant locations with safety-related systems:

| Plant Location | No. Fire Events < 5 Min. | <10 Min. | 10 Min.or > | Total | Mean Duration |
|---|---|---|---|---|---|
| Control Room | 1 | 1 | 0 | 1 | 2.0 |
| Containment | 1 | 1 | 1 | 2 | 18.2 |
| Reactor Bldg (BWR) | 3 | 3 | 6 | 9 | 14.8 |
| Auxiliary Bldg (PWR) | 3 | 4 | 5 | 9 | 9.2 |
| Cable Spreading Room | 0 | 0 | 2 | 2 | 13.8 |
| Switchgear Room | 2 | 2 | 2 | 4 | 28.2 |
| Battery Room | 0 | 0 | 0 | 0 | 0 |
| Diesel Gen. Bldg | 5 | 10 | 1 | 11 | 6.6 |
| Serv. Water Pumphse | 4 | 4 | 1 | 5 | 4.8 |
| Total No. Events: | 19 | 25 | 18 | 43 | |
| Percent of Total: | 44 | 58 | 42 | 100 | |

Two nonsafety-related locations, the Turbine Building and Switch Yard, had a higher mean duration of approximately 25 minutes (see Appendix D -Figures 16-18 and Tables II and III). However, for some plants, the Turbine Building includes safety-related equipment or fire safe shutdown equipment.

- The comparison of power operations fire events by plant location between the 1965-1985 and the 1986-1994 periods showed somewhat similar durations, except that the latter period was lower for the Cable Spreading Room and higher for Other Buildings and Containment. The lower duration was due to no long-term fire (i.e., no Browns Ferry fire type duration), while the higher duration in the Other Buildings was due predominantly to charcoal fires in the waste and off-gas treatment building. The high duration in the Containment was due to one event caused by welding (see Appendix D - Table III).

## 4.5 Power Operations Fire Frequencies

- The power operations fire frequency for the majority of plant locations showed a decrease during the update period (1986-1994) when compared with the 1965-1985 period (see Appendix E - Figures 19-21 and Tables III and IV. Appendix E - Tables I and II provide plant average Unit Availability Factors, used in converting overall fire frequencies to power operations fire frequencies). The following depicts the ratio of 1965-1985 period to 1986-1994 period for these plant locations:

| Plant Location | Ratio |
|---|---|
| Control Room | 3:1 |
| Other Buildings | 2:1 |
| Auxiliary Building (PWR) | 2:1 |
| Diesel Generator Building | 2:1 |
| Cable Spreading Room | 2:1 |
| Reactor Building (BWR) | 1:1 |
| Switchgear Room | 1:1 |
| Containment | 1:1 |
| Switch Yard | 1:1 |
| Turbine Building | 1:1 |
| Service Water Pumphouse | 1:3 |
| Battery Room | (no fire events, 1986-1994) |

## 4.6 Fire Severity and Risk Implications

### 4.6.1 Severity Grouping of Power Operations Fire Events

Appendix F-Tables I and II and Figure 22 depict the plant operational data severity grouping for power operations fire events. The following provides insights to the risk significance of these fire events:

- Of the 341 power operations fire events during the combined 1965-1994 period, one, the Browns Ferry fire in 1975, was not suppressed in time to prevent propagation to other safety-related trains or systems (Category A). Loss of function occurred to multiple systems.

- For the 199 power operations fire events in the 1965-1985 period:

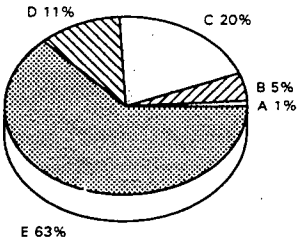
  - Ten fire events caused SCRAM and a loss of safety-related train and were suppressed without propagation (Category B).
  - Forty-one fire events caused a SCRAM, but with no loss of a safety-related train and were suppressed without propagation (Category C).
  - Twenty-two fire events resulted in a loss of one train of safe shutdown equipment, regardless of the fire's duration, but without a SCRAM (Category D).

- For the 142 power operations fire events in the 1986-1994 period:

  - One fire event caused a SCRAM and loss of a safety related train, without further propagation (Category B). A second power operations fire event (Oyster Creek), initiated by an offsite fire, resulted in a SCRAM and Loss-of-Offsite Power (LOOP), but caused no loss of function to safety-related systems (Category B due to SCRAM with LOOP).
  - Forty fire events caused a SCRAM, but with no loss of a safety-related train and were suppressed without propagation (Category C).
  - Twenty-one fire events resulted in a loss of fire safe shutdown equipment, regardless of the fire's duration, but without a SCRAM (Category D).

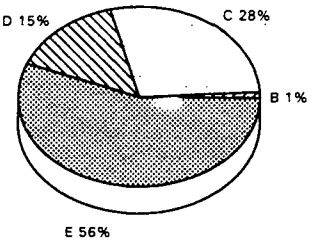
- The balance of power operations fire events were evaluated as less severe (Category E).

RISK INSIGHTS - SEVERITY GROUPING
POWER OPERATIONS FIRE EVENTS- 1965-1985



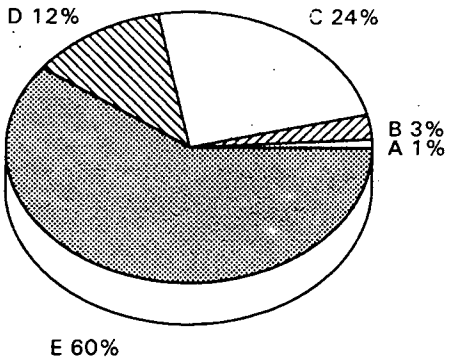

No. of Fire Events at power: 199
Category A: 1; Category B: 10
Category C: 41; Category D: 22

RISK INSIGHTS-SEVERITY GROUPING
POWER OPERATIONS FIRE EVENTS- 1986-1994




No. Fire Events at Power: 142
Category A: 0; Category B: 2;
Category C: 40;Category D: 21

## RISK INSIGHTS - SEVERITY GROUP
## POWER OPERATION FIRE EVENTS - 1965-1994




Total No. of Fire Events at Power: 341
Category A: 1; Category B: 12;
Category C: 81: Category D: 43

**FIGURE 22**
**(FROM APPENDIX F)**

### 4.6.2 Comparison of Power Operations Fire Frequencies with Selected Plant PRA Data and Other Data by Plant Location

The sensitivity analysis for the PRAs and other analyses, based on 1986-1994 operating experience fire frequencies for each of the five plant locations, resulted as follows (see Appendix E-Table V and Appendix F-Table III and Figures 23-25):

**Control Room -** The updated power operations mean fire frequency ($2.6 \times 10^{-3}$) was lower than used in the selected PRAs and the industry studies.

**Cable Spreading Room -** The updated power operations mean fire frequency ($4.3 \times 10^{-3}$) varied from slightly higher to slightly lower than used in the selected PRAs and the industry studies.

**Switchgear Room -** With the exception of the Kewaunee IPEEE (point estimate $1.8 \times 10^{-2}$), the updated power operations mean fire frequency ($1.3 \times 10^{-2}$) was higher than used in the few PRAs and industry studies that had developed Switchgear Room fire frequencies and fire-induced CDF estimates.

**Reactor Building (BWR) -** The updated power operations mean fire frequency ($5.4 \times 10^{-2}$) was approximately the same as the two PRAs (Cooper and LaSalle) used for this study.

**Auxiliary Building (PWR) -** With the exception of the Kewaunee IPEEE (point estimate $7.3 \times 10^{-2}$), the updated power operations mean fire frequency ($4.6 \times 10^{-2}$) was approximately the same as all other point estimate fire frequencies used for specific PRAs and other studies.

**Turbine Building -** The updated power operations mean fire frequency ($6.9 \times 10^{-2}$) was higher than all the point estimate fire frequencies used for specific PRAs and other studies.

There was little significant change in the specific plant location fire induced CDFs (the majority were still in the $10^{-6}$ screening range for the FIVE threshold). Therefore, the following summarizes the comparison and addresses the major purpose of this review:

- The updated fire events database provides new information for assessing fire frequencies. The 1986-1994 fire event frequencies at power operations were lower for the Control Room and Cable Spreading Room, approximately the same for the Auxiliary Building (PWR) and the Reactor Building (BWR), and higher for the Switchgear Room and Turbine Building than those assumed by most PRAs reviewed in this study.

- The updated fire events database and estimated frequencies should provide an improved source of fire initiation information for use in estimating fire frequencies for risk assessment or for reviewing such assessments. However, some more recent fire risk studies are using component level ignition source estimates for calculating fire initiation rates in specific plant locations as opposed to the approach in this report of calculating frequencies based on operating experience in particular areas. Either approach can be used, but comparisons between frequencies in this report and analyses using these other approaches requires some care in their application.

- The use of these updated fire frequencies has the potential for proportionally lowering generic fire-induced CDF estimates for the Control Room and the Cable Spreading Room than those previously estimated in PRAs; while the potential for proportionally raising generic fire-induced CDF estimates for the Switchgear Room and Turbine Building. However, based on these updated fire frequencies alone, there appears to be no significant impact on the fire-induced CDFs by major plant location or for the total plant fire-induced CDF (see Appendix F - Table III and Figures 23 through 25 and Appendix F - Table IV).

## 4.7 Shutdown Fire Events

**4.7.1 Duration of Shutdown Events for the 1965-1985 Period** - The majority of fire events (77%) in plant locations with safety-related systems were less than 10 minutes duration; while 67% of the fire events were less than 5 minutes duration. The mean duration was longer than 10 minutes in the Containment due to two longer duration fires caused by welding. The following provides a summary of the durations at the plant locations with safety-related systems.

| Plant Location | No. Fire Events < 5 Min. | <10 Min. | 10 Min.or > | Total | Mean Duration |
|---|---|---|---|---|---|
| Control Room | 1 | 1 | 0 | 1 | 2.5 |
| Containment | 7 | 10 | 12 | 22 | 21.5 |
| Reactor Bldg (BWR) | 14 | 16 | 2 | 18 | 4.7 |
| Auxiliary Bldg (PWR) | 10 | 10 | 3 | 13 | 7.3 |
| Cable Spreading Room | 1 | 1 | 0 | 1 | 3.0 |
| Switchgear Room | 7 | 8 | 0 | 8 | 3.1 |
| Battery Room | 0 | 0 | 0 | 0 | 0 |
| Diesel Gen. Bldg | 12 | 13 | 1 | 14 | 4.2 |
| Serv. Water Pumphse | 0 | 1 | 0 | 1 | 8.0 |
| Total No. Events: | 52 | 60 | 18 | 78 | |
| Percent of Total: | 67 | 77 | 23 | 100 | |

**4.7.2 Duration of Shutdown Events for the 1986-1994 Period** - The majority of fire events (67%) in plant locations with safety-related systems were less than 10 minutes duration; while 43% of the fire events were less than 5 minutes duration. The mean duration was longer than 10 minutes in the Containment due to longer duration fires caused by welding. The following provides a summary of the durations at the plant locations with safety-related systems:

| Plant Location | No. Fire Events < 5 Min. | <10 Min. | 10 Min.or > | Total | Mean Duration |
|---|---|---|---|---|---|
| Control Room | 0 | 0 | 0 | 0 | 0 |
| Containment | 1 | 2 | 7 | 9 | 31.3 |
| Reactor Bldg (BWR) | 9 | 11 | 3 | 14 | 13.1 |
| Auxiliary Bldg (PWR) | 5 | 7 | 1 | 8 | 5.1 |
| Cable Spreading Room | 0 | 0 | 0 | 0 | 0 |
| Switchgear Room | 3 | 4 | 1 | 5 | 5.9 |
| Battery Room | 0 | 0 | 0 | 0 | 0 |
| Diesel Gen. Bldg | 1 | 6 | 3 | 9 | 10.9 |
| Serv. Water Pumphse | 1 | 1 | 0 | 1 | 2.5 |
| Total No. Events: | 20 | 31 | 15 | 46 | |
| Percent of Total: | 43 | 67 | 33 | 100 | |

- Except for the Containment, the mean duration of shutdown fire events for plant locations was approximately the same to lower than for mean durations occurring during power operations for both the 1965-1985 and 1986-1994 periods. The Containment fire events were predominantly caused by welding sparks/arcing (see Appendix G-Tables I-IV and Figures 26-31).

**4.7.3 Shutdown Fire Frequencies**

- For the 1965-1985 period, the shutdown fire frequencies were approximately the same or lower in comparison to the fire frequencies at power for most risk significant plant locations used in PRAs; while higher fire frequencies were calculated for the Containment and Reactor Building (BWR)(see Appendix H-Tables I).

- For the 1986-1994 period, the shutdown fire frequencies varied in comparison to the fire frequencies at power for most risk significant plant locations used in PRAs. Since some plant locations were higher (Containment, Reactor Building, Auxiliary Building, Switchgear Room, and Diesel Generator Building - see Appendix H-Tables II), a more detailed review of shutdown fire events, resulted in the following conclusions:

  - Containment fires were predominantly caused by welding operations and did not affect decay heat removal.

- There were a limited number of fire events that affected the functional operability of Residual Heat Removal (RHR), Decay Heat Removal (DHR), and Emergency Diesel Generator (EDG) system trains. The number of fire events and fire frequencies and corresponding plant locations are as follows:

| Location | Shutdown System | No. System Fire Events | Plant Shutdown Reactor-Years | Shutdown Mean* Fire Frequency |
|---|---|---|---|---|
| Reactor Bldg | RHR | 2 | 90.4 | $2.7 \times 10^{-2}$ |
| Auxiliary Bldg | RHR & DHR | 2 | 139.8 | $1.8 \times 10^{-2}$ |
| Switchgear Room | RHR | 1 | 230.2 | $6.5 \times 10^{-3}$ |
| Dies. Gen. Bldg | EDG | 7 | 230.2 | $3.2 \times 10^{-2}$ |

* indicates Bayes method mean, with noninformative prior.

### 4.7.4 Summary of Shutdown Fire Events

Therefore, the operating experience indicates that the frequency and duration of shutdown fire events appears to be similar or less significant than for fire events occurring at power operation. This finding is somewhat tentative considering the limitation in treatment of fires in currently available shutdown risk assessments.

## 4.8 Smoke Events

The overall smoke events are compiled in Appendix J - Tables I and II for the 1965-1985 period (95 events) and 1986-1994 period (296 events), respectively. The major results are as follows:

- The density of smoke events throughout the 1965-1994 period were predominantly Light (91%), followed by Medium (8%) and Heavy (1%).
- Smoke Event Causes for the 1965-1994 period were predominantly Electric Failure (66%), followed by Overheated Material (31%).
- Smoke Event Locations for the 1965-1994 period were predominantly in the Auxiliary Building for PWRs (44%), in the Reactor Building for BWRs (17%), and jointly in the Turbine Building (13%), Diesel Generator Building (13%), and Service Water Pumphouse (6%). Smoke events in the Control Room were limited to approximately 3% over the entire period.

No risk significant effects were found from the review of Smoke Events for either of the two periods or for the combined period.

## 5. CONCLUSIONS

The major results of this study are as follows:

- A comparison of fire events in the pre-Appendix R period (1965-1985) with fire events in the subsequent period shows that event frequencies have declined slightly, while the safety significance of events has also been lower. The most significant fire event occurred at Browns Ferry in March, 1975 and was a pivotal incident in the recognition of fire safety concerns. It resulted in a scram and propagated without suppression to affect multiple redundant trains of safety equipment. Since the implementation of Appendix R modifications and other industry activities (1986-1994), there were no fire events with similar safety significance. There were only two fire events resulting in a scram and loss of one safety related train or loss of offsite power (LOOP) during this period compared to 10 events previously. Other fires have been severe in terms of the magnitude and duration of combustion (such as some turbine building fires), but their severity in terms of challenges to safety systems operation has been limited. However, such fires could be important if redundant safety trains or decay heat removal systems were dependant on equipment located there.

- The fire durations during power operations were generally short (less than 10 minutes). The information available on these short duration fires was not sufficient to evaluate probability of fire detection and suppression used in recent PRAs.

- The fire durations during shutdown were also generally short (less than 10 minutes). Shutdown durations in plant locations that contain systems necessary for decay heat removal during shutdown, were the same or lower than fire durations for the same plant locations during power operations.

- The 1986-1994 (post-Appendix R implementation) fire event frequencies at power operations were lower for the Control Room and the Cable Spreading Room, approximately the same for the Auxiliary Building (PWR) and the Reactor Building (BWR), and higher for the Switchgear Room and Turbine Building than those values used in most PRAs reviewed for this study. A sensitivity study, based solely on changes to the initiator frequencies, did not reveal substantial changes to the overall CDF due to fires. Other aspects of fire analyses may be more critical to their risk assessments, including: the mechanics of combustion, combustible loading, and means of detection and suppression. The data in this report was not suitable for addressing these issues.

- For the 1986-1994 period, the shutdown fire frequencies varied in comparison to the fire frequencies at power for most risk significant plant locations used in PRAs. Since some plant locations were higher (Containment, Reactor Building, Auxiliary Building, Switchgear Room, and Diesel Generator Building), a more detailed review of shutdown fire events resulted in the following conclusions:

  - Containment fires were predominantly caused by welding operations and did not affect decay heat removal.

  - There were a limited number of fire events that affected the functional operability of Residual Heat Removal (RHR), Decay Heat Removal (DHR), and Emergency Diesel Generator (EDG) system trains. The number of fire events and fire frequencies and corresponding plant locations are as follows:

| Location | Shutdown System | No. System Fire Events | Plant Shutdown Reactor-Years | Shutdown Mean Fire Frequency* |
|---|---|---|---|---|
| Reactor Bldg | RHR | 2 | 90.4 | $2.7 \times 10^{-2}$ |
| Auxiliary Bldg | RHR & DHR | 2 | 139.8 | $1.8 \times 10^{-2}$ |
| Switchgear Room | RHR | 1 | 230.2 | $6.5 \times 10^{-3}$ |
| Diesel Generator Building | EDG | 7 | 230.2 | $3.2 \times 10^{-2}$ |

* Indicates Bayes method mean, with noninformative prior.

Therefore, the operating experience indicates that the frequency and duration of shutdown fire events appears to be similar or less significant than for fire events occurring at power operation. This finding is somewhat tentative considering the limitation in treatment of fires in currently available shutdown risk assessments.

- Other results include:

  - Of the 341 power operations fire events during 1965-1994, one, the Browns Ferry fire in 1975, was not suppressed in time to prevent propagation to other safety-related trains or systems.

  - For the 199 power operations fire events in the 1965-1985 period, 10 fire events (in addition to the Browns Ferry fire) caused a SCRAM and a loss of one safety-related train. All but the Browns Ferry fire were suppressed without propagation.

- For the 142 power operations fire events in the 1986-1994 period, only one fire event caused a SCRAM and loss of one safety related train, but without further propagation. A second power operations fire event (Oyster Creek), initiated by an offsite fire, resulted in a SCRAM and Loss-of-Offsite Power (LOOP), but caused no loss of function to safety-related systems.

- The frequency of fires at power operations for the majority of plant locations showed a decrease during the update period (1986-1994) when compared with the 1965-1985 period.

- Electrical Failure was the predominant cause of fire events during all operations (i. e., overall) for the combined period 1965-1994, with an increase in apportionment during the update period, 1986-1994; while the apportionment of the other causes (Overheated Material, Explosion, and Welding) decreased during the update period.

- No risk significant effects were found from the review of Smoke Events for either of the two periods or for the combined period.

- Although archival data is retrievable from the NPRDS database, no new nuclear plant failure history data is available through the NPRDS database after 12/31/96. It is not clear whether there will be an industry initiative to replace it with another data source that would be useful in compiling fire event and smoke event data.

## 6. REFERENCES


1. NUREG-1407, "Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities," dated June, 1991.

2. NUREG/CR-5088 (SAND88-0177), "Fire Risk Scoping Study: Investigation of Nuclear Power Plant Fire Risk, Including Previously Unaddressed Issues," dated January 1989.

3. NUREG/CR-4586 (SAND 86-0300), "User's Guide for a Personal Computer-Based Nuclear Power Plant Fire Data Base," dated August, 1986.

4. NUREG/CR-4832 (SAND 92-0537) Vol. 9, "Analysis of the LaSalle Unit 2 Nuclear Power Plant: Risk Methods Integration and Evaluation Program (RMIEP)," dated March 1993.

5. NUREG/CR-2934 (SAND 82-2929), "Review and Evaluation of the Indian Point Probabilistic Safety Study," dated December 1982.

6. NUREG/CR-4142 (UCID-20330), "A Review of Millstone 3 Probabilistic Safety Study," dated April 1986.

7. NUREG/CR-4458 (SAND 86-2496), "Shutdown Decay Heat Removal Analysis of a Westinghouse 2-Loop Pressurized Water Reactor," dated March 1987. (Point Beach)

8. NUREG/CR-4448 (SAND 85-2373), "Shutdown Decay Heat Removal Analysis of a General Electric BWR 3/Mark I," dated March 1987. (Quad Cities)

9. NUREG/CR-4767 (SAND 86-2419), "Shutdown Decay Heat Removal of a General Electric BWR 4/Mark I," dated July 1987. (Cooper)

10. NUREG/CR-4710 (SAND 86-1797), "Shutdown Decay Heat Removal of a Combustion Engineering 2-Loop Pressurized Water Reactor," dated August 1987. (St. Lucie)

11. NUREG/CR-4762 (SAND 86-2377), "Shutdown Decay Heat Removal of a Westinghouse 3-Loop Pressurized Water Reactor," dated March 1987 (Turkey Pt. 3 & 4)

12. NUREG/CR-5726 (BNL-NUREG-52288), "Review of the Diablo Canyon Probabilistic Risk Assessment, " dated August 1994.

13. (Draft) "A Review of Fire PRA Requantification Studies Reported in NSAC/181," (Sandia National Laboratories). (Seabrook and Peach Bottom).

14. Wisconsin Public Service Corporation "Kewaunee Nuclear Power Plant - Individual Plant Examination of External Events Summary Report," dated June 28, 1994.

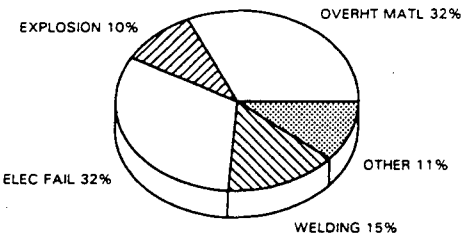
15. NUREG-0020, "Licensed Operating Reactor Status Summary," 1974-1994.

16. Idaho National Engineering Laboratory report, EGG-RAAM-11088, "Events in Time: Basic Analysis of Poisson Data," dated September 1994.

# APPENDIX B

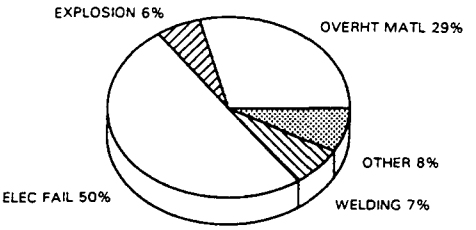
# OVERALL FIRE EVENT APPORTIONMENT BY CAUSE AND LOCATION

OVERALL FIRE EVENT APPORTIONMENT
BY CAUSE - 1965-1985



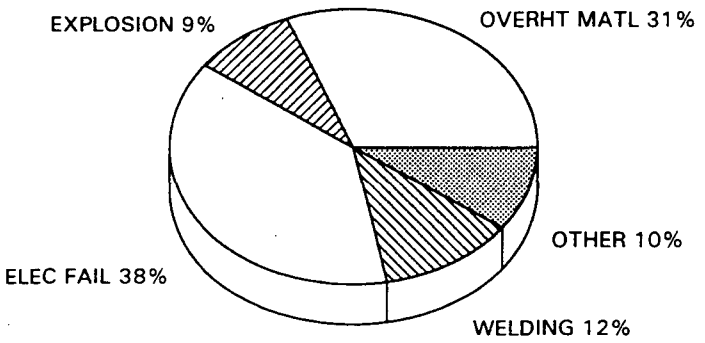

No. Fire Events: 319

OVERALL FIRE EVENT APPORTIONMENT
BY CAUSE - 1986-1994




No. Fire Events: 173
Excludes extrapolated data, 1989-1994.

## OVERALL FIRE EVENT APPORTIONMENT
## BY CAUSE - 1965-1994




**No. Fire Events: 492**
**Excludes extrapolated data, 1989-1990.**

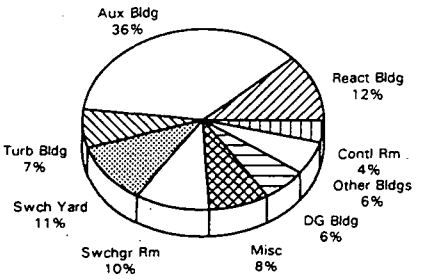
**FIGURE 2**

APPENDIX B - TABLE I
OVERALL FIRE EVENT APPORTIONMENT BY CAUSE - TOTAL PLANT

| | PERIOD: 1965-1985 | | PERIOD: 1986-1994 | | PERIOD: 1965-1994 | |
|---|---|---|---|---|---|---|
| CAUSE | NO. | PERCENT | NO. | PERCENT | NO. | PERCENT |
| Electrical Failures (Shorts, Faults, Grounds, etc.) | 102 | 32 | 86 | 50 | 188 | 38 |
| Overheated Material (Oil, Bearings, Insulation, etc.) | 101 | 32 | 51 | 29 | 152 | 31 |
| Explosion (Hydrogen gas ignition) | 33 | 10 | 10 | 6 | 43 | 9 |
| Welding Sparks/Arcing | 47 | 15 | 12 | 7 | 59 | 12 |
| Other (Unknown, Personnel Error, Component Failure, etc.) | 36 | 11 | 14 | 8 | 50 | 10 |
| **Totals:** | **319** | **100** | **173** | **100** | **492** | **100** |

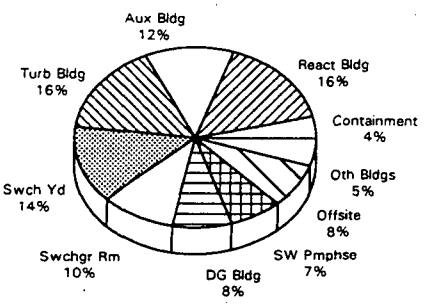
NOTE: 1. See Figure 2 and Appendix A, Tables I and II.
2. Extrapolated data for 1989-1994 (10/yr.) is excluded from this table.

OVERALL FIRE EVENTS APPORTIONMENT
BY LOCATION-"ELECT. FAILURE"-1965-1985



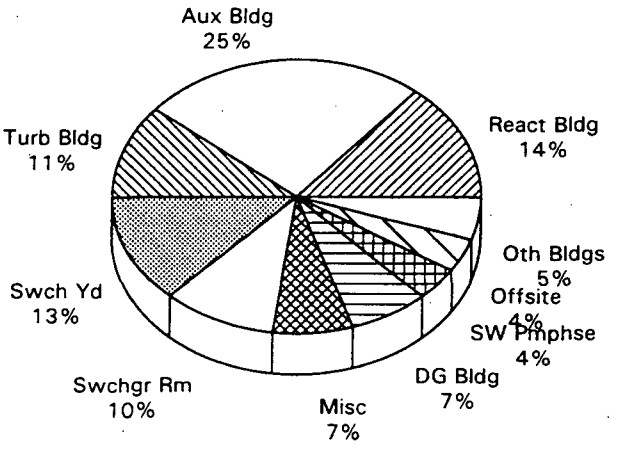

No. Events for 1965-1985 Period: 102
Misc.: Containment, CablSprdRm, Serv.Wtr Pmphse, Offsite, Temp. Bldgs.& Batt.Room

OVERALL FIRE EVENTS APPORTIONMENT
BY LOCATION-"ELECT. FAILURE"-1986-1994




No. Events for 1986-1994 Period: 86
No Elect.Failures: Contl Rm, Cable Sprd Rm, and Battery Room.

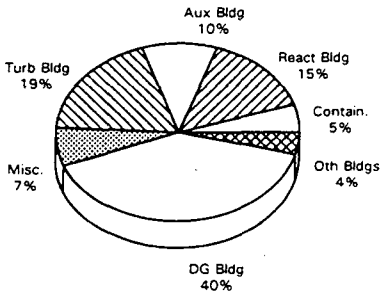
## OVERALL FIRE EVENTS APPORTIONMENT BY LOCATION-"ELECT.FAILURE"-1965-1994




**No. Events for 1965-1994 Period: 188**
**Misc.: Containment, Contl Rm, Cabl.Sprd Rm, Batt. Rm, and Temporary Bldgs.**

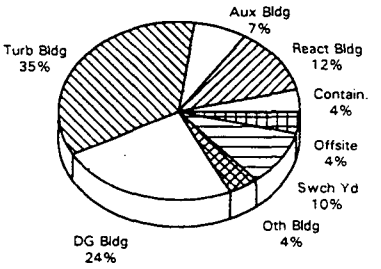
**FIGURE 3**

OVERALL FIRE EVENTS APPORTIONMENT
BY LOCATION-"OVERHEATED MAT'L"-1965-1985



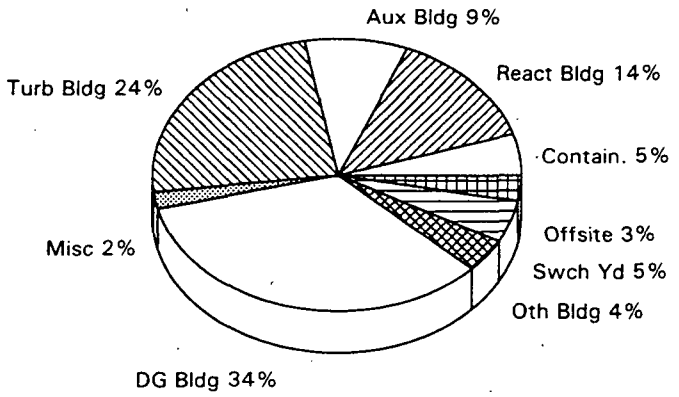

No. Events for 1965-1985 Period: 101
Misc.: Cbl Spd Rm,Switch Yd,
Offsite, and Temporary Bldgs

OVERALL FIRE EVENTS APPORTIONMENT
BY LOCATION-"OVERHEATED MAT'L"-1986-1994




No. Events for 1986-1994 Period: 51

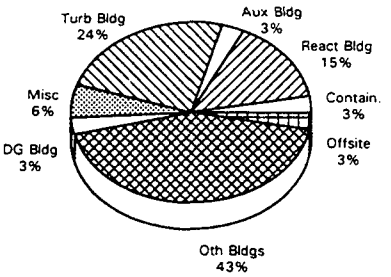
## OVERALL FIRE EVENTS APPORTIONMENT BY LOCATION-"OVERHEATED MAT'L"-1965-1994




No. Events for 1965-1994 Period: 152
Misc.: Cable Spread Rm and Temp Bldgs

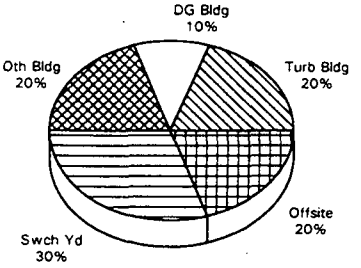
**FIGURE 4**

OVERALL FIRE EVENTS APPORTIONMENT
BY LOCATION-"EXPLOSION"-1965-198



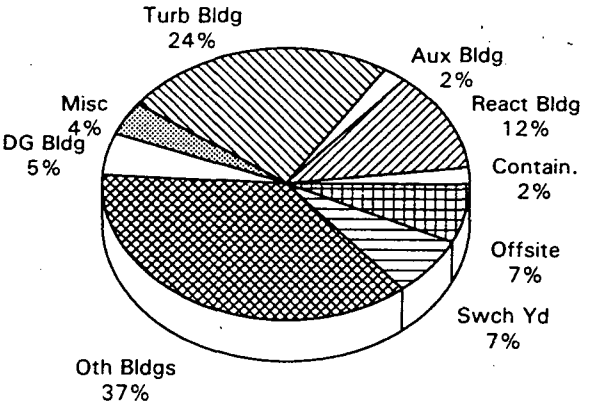

No. Events for 1965-1985 Period: 33
Misc.: Batt Rm and Temporary Bldgs.

OVERALL FIRE EVENTS APPORTIONMENT
By LOCATION-"EXPLOSION"-1986-1994




No. Events for 1986-1994 Period: 10

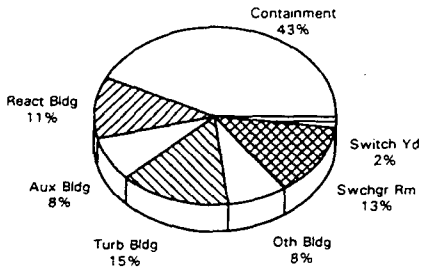
## OVERALL FIRE EVENTS APPORTIONMENT BY LOCATION-"EXPLOSION"-1965-1994




No. Events for 1965-1994 Period: 43
Misc.:Battery Room and Temporary Bldgs.

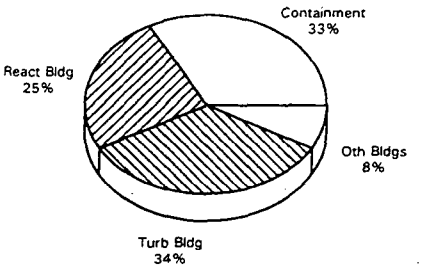
**FIGURE 5**

OVERALL FIRE EVENTS APPORTIONMENT
BY LOCATION-"WELDING SPARKS"-1965-1985




No. Events for 1965-1985 Period: 47

OVERALL FIRE EVENTS APPORTIONMENT
BY LOCATION-"WELDING SPARKS"-1986-1994




No. Events for 1986-1994 Period: 12

## OVERALL FIRE EVENTS APPORTIONMENT BY LOCATION-"WELDING SPARKS"-1965-1994

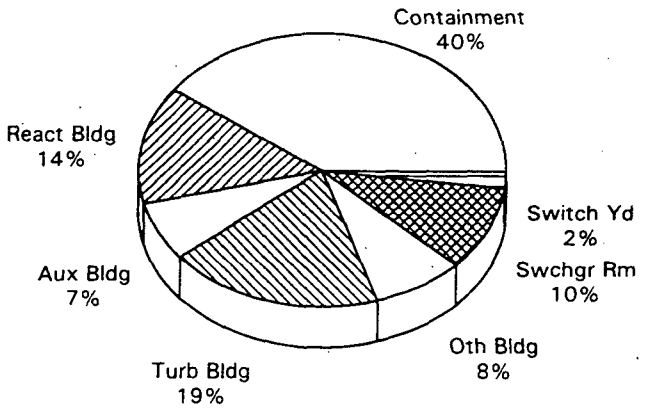
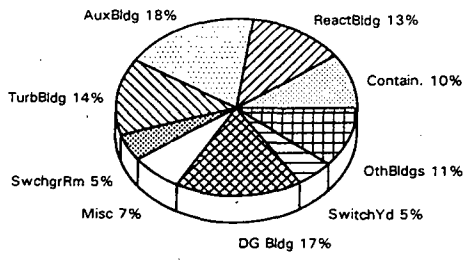



**FIGURE 6**

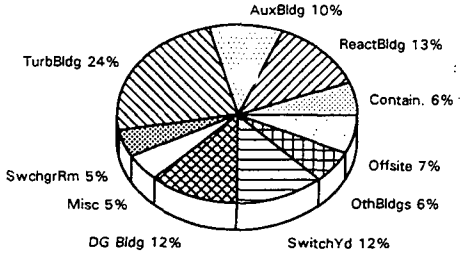
No. Events for 1965-1994 Period: 59

**OVERALL FIRE EVENT APPORTIONMENT BY LOCATION - 1965-1985**



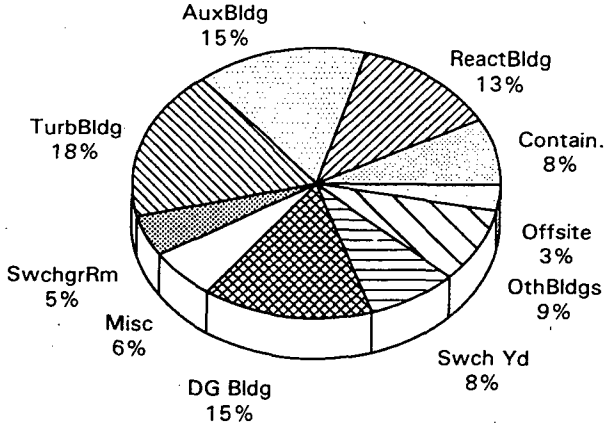

No. Fire Events: 319
Misc.: Contl Rm, Cbl Sprd Rm, SW Pmphse, Batt Rm, Offsite, & Temp Bldgs

**OVERALL FIRE EVENT APPORTIONMENT BY LOCATION - 1986-1994**




Total No. Fire Events: 173
Misc.includes: CablSprdRoom, BattRoom, ControlRoom, and ServWater Pumphouse.

## OVERALL FIRE EVENT APPORTIONMENT BY LOCATION - 1965-1994




No. Fire Events: 492
Misc: ContlRoom, CblSprdRoom, BattRoom, ServWtrPmphse, & Temporary Bldgs.

**FIGURE 7**

APPENDIX B - TABLE II

OVERALL FIRE EVENTS LOCATION APPORTIONMENT BY CAUSES - PERIOD: 1965-1985

| ITEM NO. | LOCATION | ELECTRICAL FAILURE NO. | ELECTRICAL FAILURE PERCENT | OVERHEATED MATERIAL No. | OVERHEATED MATERIAL PERCENT | EXPLOSION No. | EXPLOSION PERCENT | WELDING SPARKS/ARCING No. | WELDING SPARKS/ARCING PERCENT | OTHER No. | OTHER PERCENT | TOTAL NO. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Containment | 1 | 1 | 5 | 5 | 1 | 3 | 20 | 43 | 3 | 8 | 30 |
| 2. | Reactor Bldg(BWR) | 12 | 12 | 15 | 15 | 5 | 15 | 5 | 11 | 3 | 8 | 40 |
| 3. | Auxiliary Bldg(PWR) | 37 | 36 | 10 | 10 | 1 | 3 | 4 | 8 | 4 | 11 | 56 |
| 4. | Turbine Bldg | 7 | 7 | 19 | 19 | 8 | 24 | 7 | 15 | 5 | 14 | 46 |
| 5. | Control Room | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 6. | Cable Spreading Room | 1 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 1 | 3 | 4 |
| 7. | Switchgear Room | 10 | 10 | 0 | 0 | 0 | 0 | 6 | 13 | 1 | 3 | 17 |
| 8. | Diesel Gen. Bldg | 6 | 6 | 41 | 40 | 1 | 3 | 0 | 0 | 5 | 14 | 53 |
| 9. | Service Water Pumphouse | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 3 |
| 10. | Switch Yard | 12 | 11 | 2 | 2 | 0 | 0 | 1 | 2 | 2 | 6 | 17 |
| 11. | Battery Room | 2 | 2 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 3 |
| 12. | Other Bldgs | 6 | 6 | 4 | 4 | 14 | 43 | 4 | 8 | 7 | 19 | 35 |
| 13. | Offsite | 1 | 1 | 2 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 4 |
| 14. | Temporary Bldgs | 1 | 1 | 1 | 1 | 1 | 3 | 0 | 0 | 4 | 11 | 7 |
| | **Totals:** | **102** | **100** | **101** | **100** | **33** | **100** | **47** | **100** | **36** | **100** | **319** |
| **Percent of Period Total:** | | | **32** | | **32** | | **10** | | **15** | | **11** | |

NOTES: 1. Includes pre-operational testing fire events.

2. See Figures 3 - 7; Appendix A, Table I; and Appendix B, Table I.

APPENDIX B - TABLE III
OVERALL FIRE EVENTS LOCATION APPORTIONMENT BY CAUSES - PERIOD: 1986-1994

| ITEM NO. | LOCATION | ELECTRICAL FAILURE NO. | ELECTRICAL FAILURE PERCENT | OVERHEATED MATERIAL No. | OVERHEATED MATERIAL PERCENT | EXPLOSION No. | EXPLOSION PERCENT | WELDING SPARKS/ARCING No. | WELDING SPARKS/ARCING PERCENT | OTHER No. | OTHER PERCENT | TOTAL NO. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Containment | 3 | 4 | 2 | 4 | 0 | 0 | 4 | 33 | 2 | 14 | 11 |
| 2. | Reactor Bldg(BWR) | 14 | 16 | 6 | 12 | 0 | 0 | 3 | 25 | 0 | 0 | 23 |
| 3. | Auxiliary Bldg(PWR) | 10 | 12 | 4 | 7 | 0 | 0 | 0 | 0 | 3 | 21 | 17 |
| 4. | Turbine Bldg | 14 | 16 | 18 | 35 | 2 | 20 | 4 | 34 | 4 | 29 | 42 |
| 5. | Control Room | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 1 |
| 6. | Cable Spreading Room | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 14 | 2 |
| 7. | Switchgear Room | 9 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 8. | Diesel Gen. Bldg | 7 | 8 | 12 | 24 | 1 | 10 | 0 | 0 | 0 | 0 | 20 |
| 9. | Service Water Pumphouse | 6 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 10. | Switch Yard | 12 | 14 | 5 | 10 | 3 | 30 | 0 | 0 | 0 | 0 | 20 |
| 11. | Battery Room | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. | Other Bldgs | 4 | 5 | 2 | 4 | 2 | 20 | 1 | 8 | 1 | 7 | 10 |
| 13. | Offsite | 7 | 8 | 2 | 4 | 2 | 20 | 0 | 0 | 1 | 7 | 12 |
| | **Totals:** | 86 | 100 | 51 | 100 | 10 | 100 | 12 | 100 | 14 | 100 | 173 |
| **Percent of Period Total:** | | | 50 | | 29 | | 6 | | 7 | | 8 | |

**NOTES:** 1. See Figures 3, 4, 5, and 6; Appendix A, Table II; and Appendix B, Table I.

2. Excludes extrapolated data, 1989-1994 (10 fire events per year).

APPENDIX B - TABLE IV
OVERALL FIRE EVENTS LOCATION APPORTIONMENT BY CAUSES - COMBINED PERIOD: 1965-1994

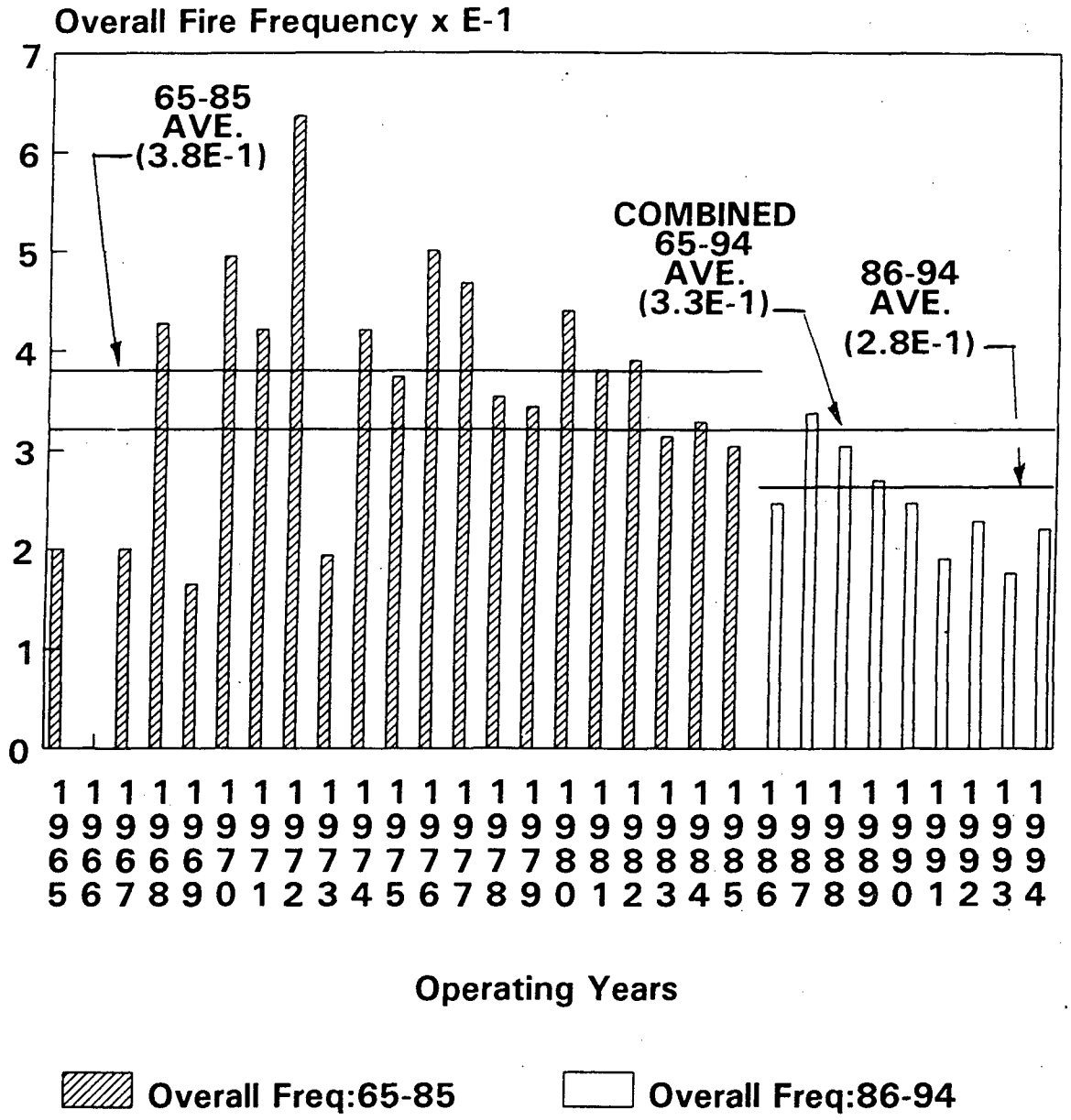
| ITEM NO. | LOCATION | ELECTRICAL FAILURE NO. | ELECTRICAL FAILURE PERCENT | OVERHEATED MATERIAL No. | OVERHEATED MATERIAL PERCENT | EXPLOSION No. | EXPLOSION PERCENT | WELDING SPARKS/ARCING No. | WELDING SPARKS/ARCING PERCENT | OTHER No. | OTHER PERCENT | TOTAL NO. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Containment | 4 | 2 | 7 | 5 | 1 | 2 | 24 | 40 | 5 | 10 | 41 |
| 2. | Reactor Bldg(BWR) | 26 | 14 | 21 | 14 | 5 | 12 | 8 | 14 | 3 | 6 | 63 |
| 3. | Auxiliary Bldg(PWR) | 47 | 25 | 14 | 9 | 1 | 2 | 7 | 7 | 7 | 14 | 73 |
| 4. | Turbine Bldg | 21 | 11 | 37 | 24 | 10 | 24 | 11 | 19 | 9 | 18 | 88 |
| 5. | Control Room | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 5 |
| 6. | Cable Spreading Room | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 6 | 6 |
| 7. | Switchgear Room | 19 | 10 | 0 | 0 | 0 | 0 | 6 | 10 | 1 | 2 | 26 |
| 8. | Diesel Gen. Bldg | 13 | 7 | 53 | 34 | 2 | 5 | 0 | 0 | 5 | 10 | 73 |
| 9. | Service Water Pumphouse | 8 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 9 |
| 10. | Switch Yard | 24 | 13 | 7 | 5 | 3 | 7 | 1 | 2 | 2 | 4 | 37 |
| 11. | Battery Room | 2 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 |
| 12. | Other Bldgs | 10 | 5 | 6 | 4 | 16 | 37 | 5 | 8 | 8 | 16 | 45 |
| 13. | Offsite | 8 | 4 | 4 | 3 | 3 | 7 | 0 | 0 | 1 | 2 | 16 |
| 14. | Temporary Bldgs | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 0 | 4 | 8 | 7 |
| | **Totals:** | **188** | **100** | **152** | **100** | **43** | **100** | **59** | **100** | **50** | **100** | **492** |
| **Percent of Period Total:** | | | **38** | | **31** | | **9** | | **12** | | **10** | **100** |

NOTES: 1. See Figures 3, 4, 5, and 6; Appendix A, Table I AND II; and Appendix B, Table I, II, and III.
2. Excludes extrapolated data, 1989-1994 (10 fire events per year).
3. Includes pre-operational testing fire events (1965-1985).

# APPENDIX C

# OVERALL FIRE FREQUENCIES

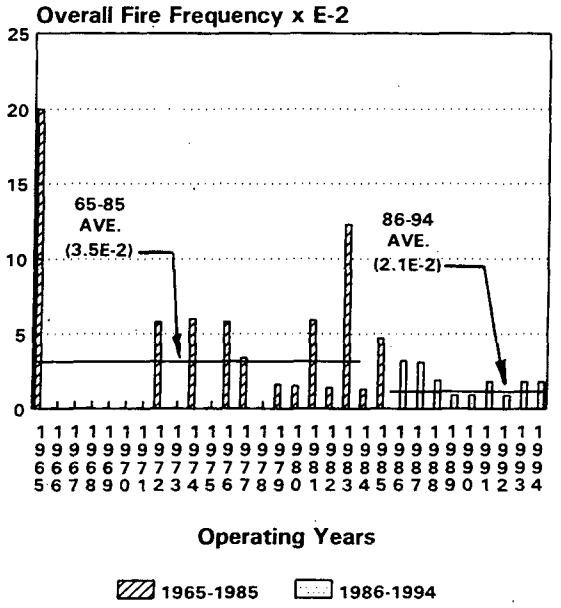
# OVERALL FIRE FREQUENCIES
# TOTAL PLANT



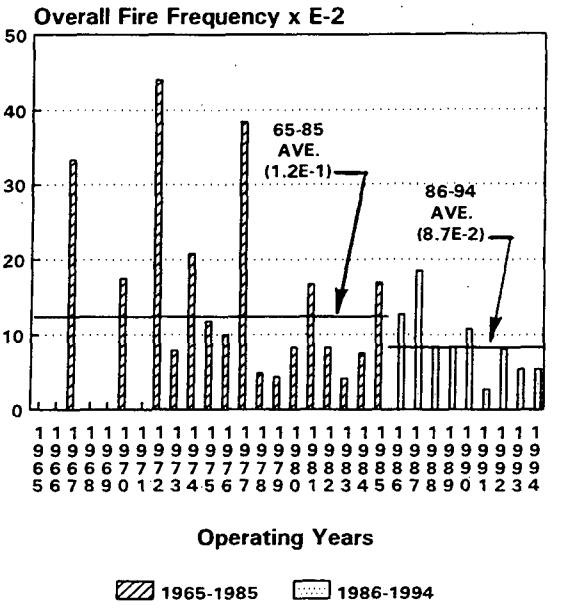

No. fire events: 65-85, 319; 86-94, 233
(incl 60 extrapolated events).
Cal.oper.-yrs:65-85, 850.4; 86-94, 816.3

FIGURE 8

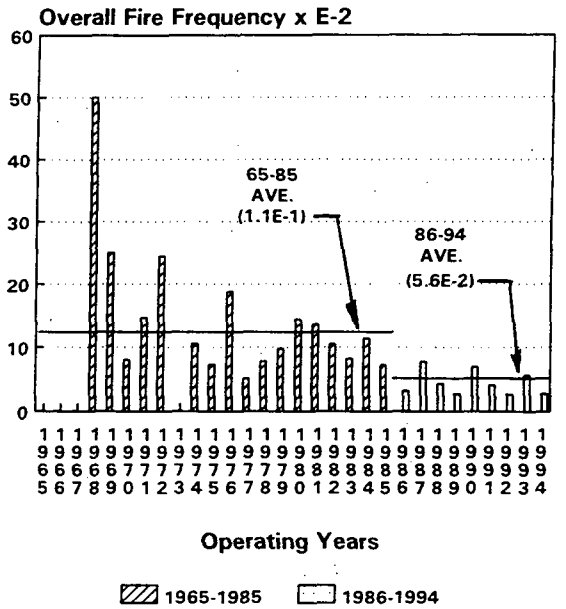
## OVERALL FIRE FREQUENCIES CONTAINMENT




## OVERALL FIRE FREQUENCIES REACTOR BUILDING (BWR)




## OVERALL FIRE FREQUENCIES AUXILIARY BUILDING (PWR)




## OVERALL FIRE FREQUENCIES TURBINE BUILDING

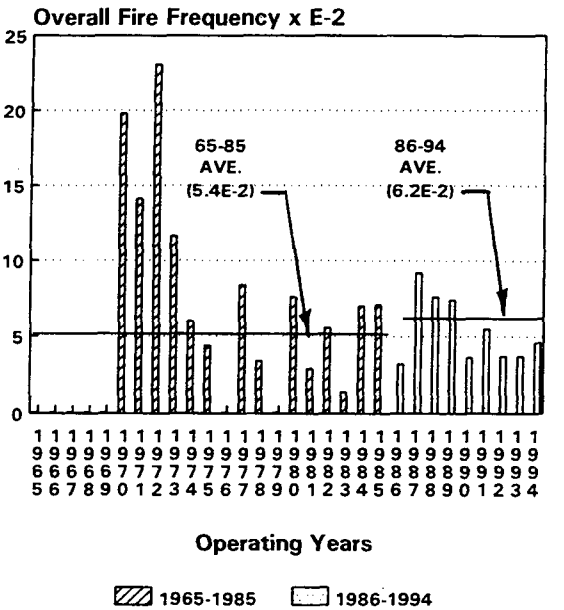
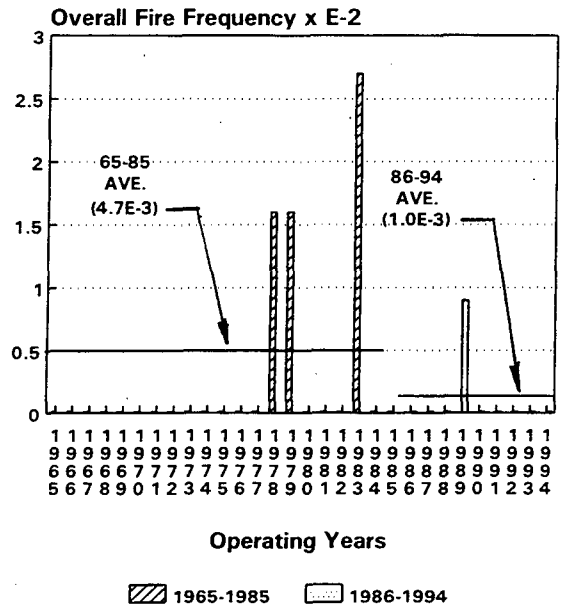


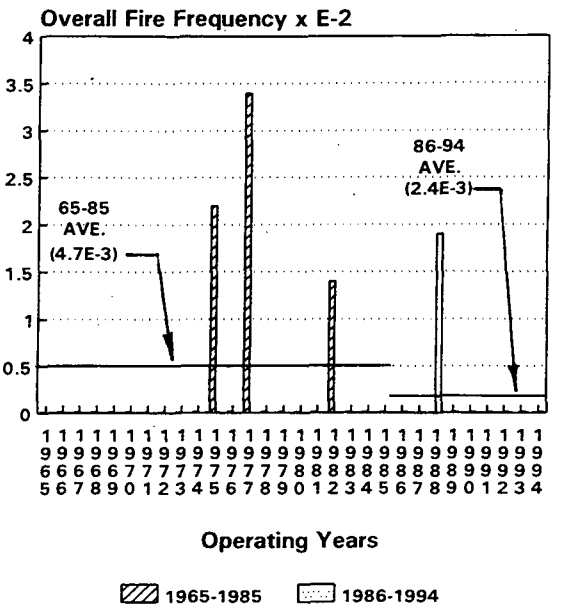

**FIGURE 9**

## OVERALL FIRE FREQUENCIES
## CONTROL ROOM

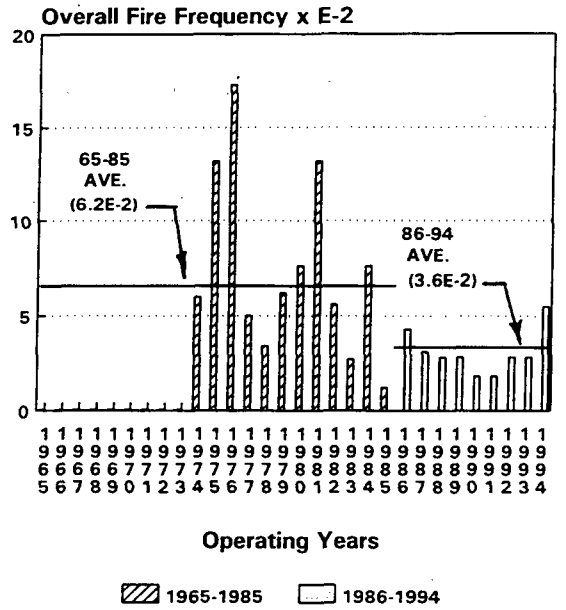



No fire events, 1986-1994.

## OVERALL FIRE FREQUENCIES
## CABLE SPREADING ROOM




## OVERALL FIRE FREQUENCIES
## DIESEL GEN. BUILDING




## OVERALL FIRE FREQUENCIES
## SWITCHGEAR ROOM

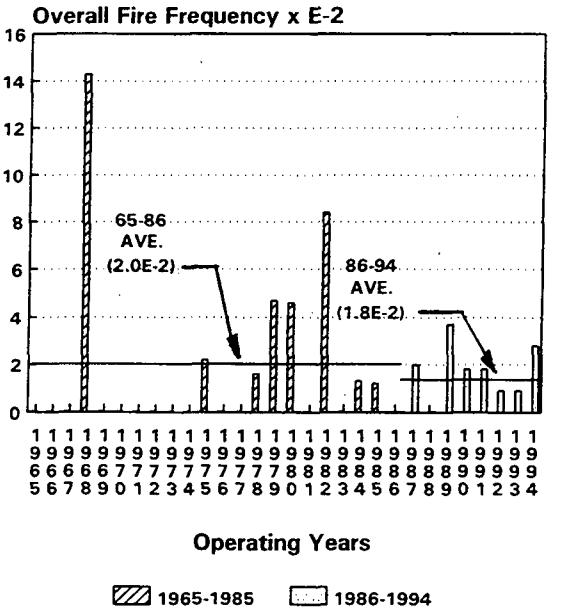
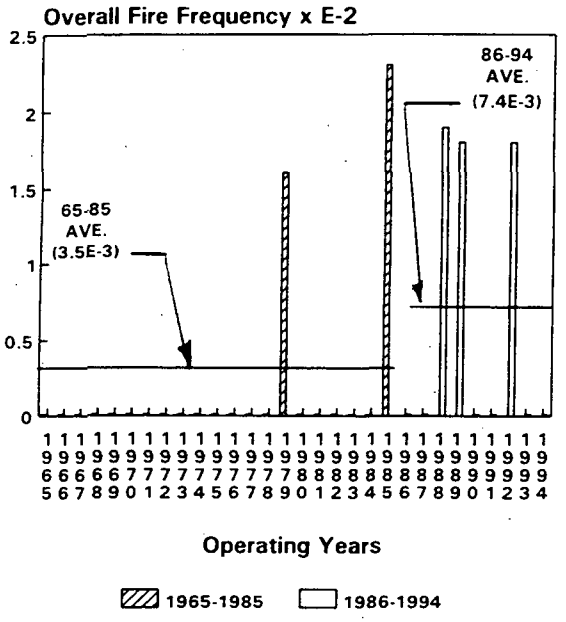
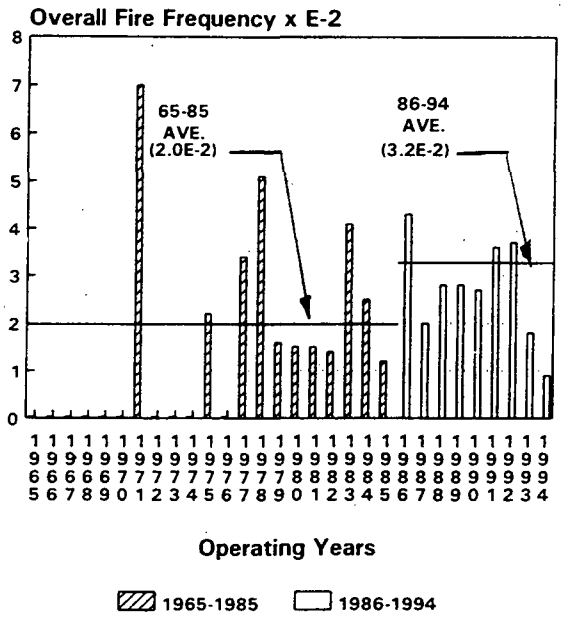



**FIGURE 10**

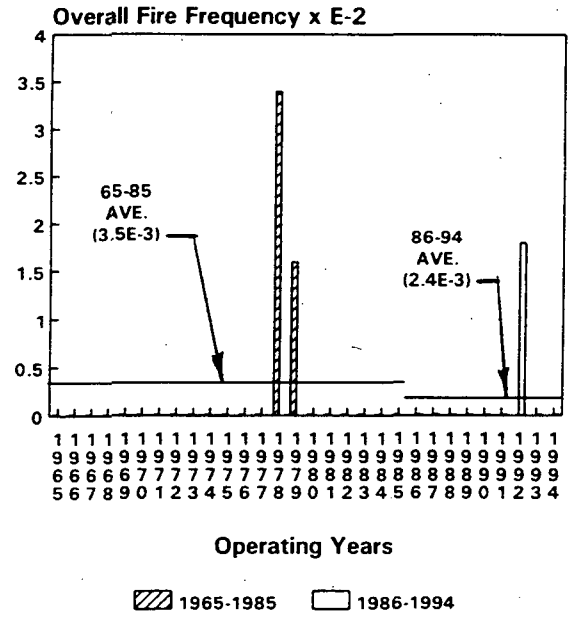
## OVERALL FIRE FREQUENCIES SERVICE WATER PUMPHOUSE




## OVERALL FIRE FREQUENCIES SWITCH YARD




## OVERALL FIRE FREQUENCIES BATTERY ROOM




## OVERALL FIRE FREQUENCIES OTHER BUILDINGS

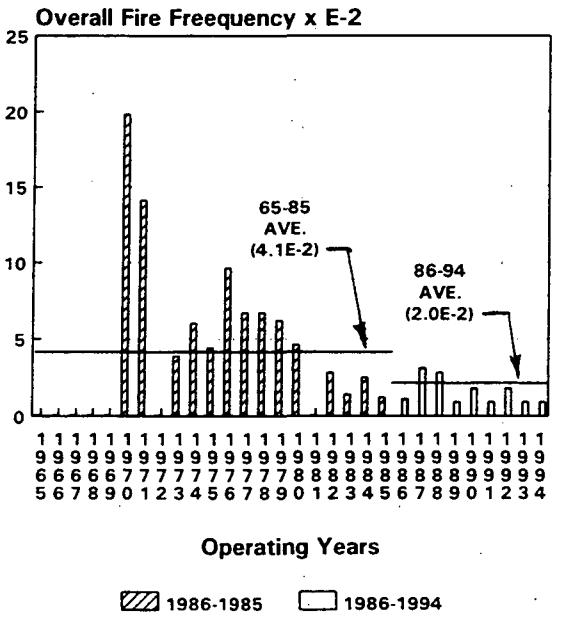
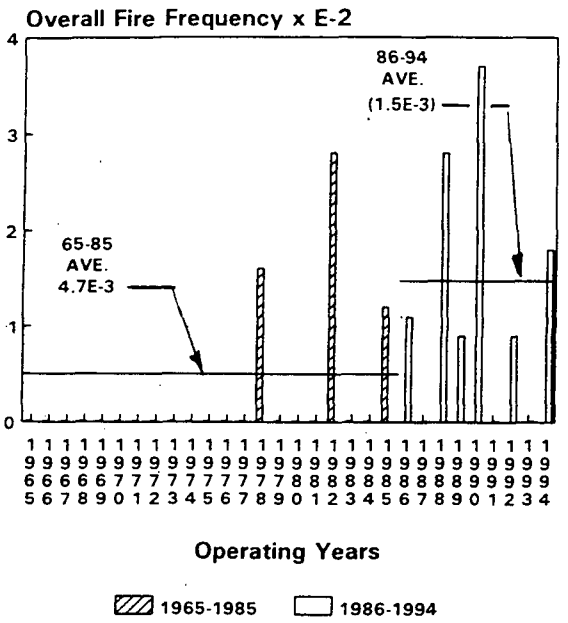
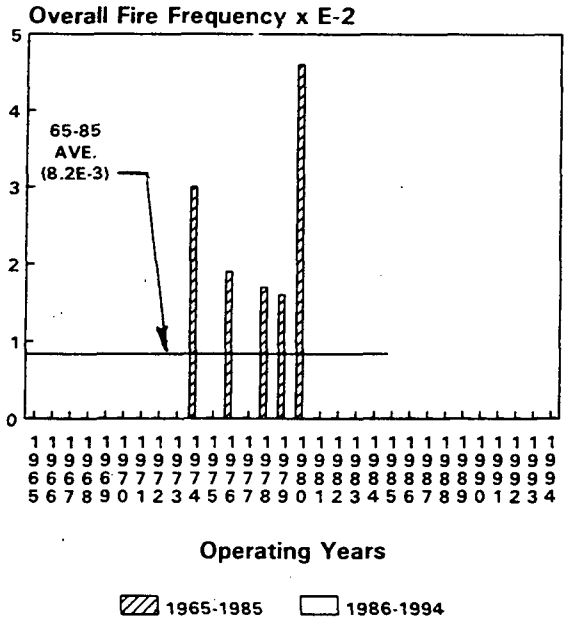



**FIGURE 11**

## OVERALL FIRE FREQUENCIES
## OFFSITE




## OVERALL FIRE FREQUENCIES
## TEMPORARY BLDG




No 1986-1994 data available

**FIGURE 12**

APPENDIX C - TABLE I
PLANT OPERATING YEARS - 01/01/65 -12/31/94

| YEAR | NO. PLANT OPERATING-YEARS PWR | BWR | ALL PLANTS TOTAL |
|---|---|---|---|
| 1965 | 2.0 | 3.0 | 5.0 |
| 1966 | 2.0 | 3.0 | 5.0 |
| 1967 | 2.0 | 3.0 | 5.0 |
| 1968 | 4.0 | 3.0 | 7.0 |
| 1969 | 4.0 | 2.1 | 6.1 |
| 1970 | 4.4 | 5.7 | 10.1 |
| 1971 | 6.8 | 7.4 | 14.2 |
| 1972 | 8.2 | 9.1 | 17.3 |
| 1973 | 13.3 | 12.6 | 25.9 |
| 1974 | 18.8 | 14.4 | 33.2 |
| 1975 | 27.4 | 17.9 | 45.4 |
| 1976 | 31.9 | 20.0 | 51.9 |
| 1977 | 38.9 | 20.8 | 59.7 |
| 1978 | 38.5 | 20.8 | 59.3 |
| 1979 | 40.7 | 23.3 | 64.0 |
| 1980 | 41.7 | 24.0 | 65.7 |
| 1981 | 44.2 | 24.0 | 68.2 |
| 1982 | 47.6 | 24.0 | 71.6 |
| 1983 | 48.8 | 24.2 | 73.3 |
| 1984 | 52.5 | 26.5 | 79.0 |
| 1985 | 55.9 | 29.5 | 85.4 |
| Subtotals: | 521.9 | 328.5 | 850.4 |
| 1986 | 62.1 | 31.4 | 93.5 |
| 1987 | 65.2 | 32.5 | 97.7 |
| 1988 | 69.8 | 35.6 | 105.4 |
| 1989 | 71.8 | 36.0 | 107.8 |
| 1990 | 72.8 | 37.0 | 109.8 |
| 1991 | 73.8 | 37.0 | 110.8 |
| 1992 | 72.8 | 37.0 | 109.8 |
| 1993 | 71.4 | 37.0 | 108.4 |
| 1994 | 72.0 | 37.0 | 109.0 |
| Subtotals: | 495.8 | 320.5 | 816.3 |
| Totals: | 1017.7 | 649.0 | 1666.7 |

NOTES:

1. The Sandia database was used for Fire events, 1965 through 1985. The plant operating-years total for the 21 year period = 850.4.

2. The updated database period for Fire Events is 1986 through 1994, based on LER, component failure histories, and other industry database information. The plant operating-years total for the 9 year period = 816.3.

3. The plant operating-years total for the two periods combined (i.e., 1965-1994) = 1666.7.

4. For overall fire frequency calculations in Tables II and III of this Apppendix, use PWR values for Auxiliary Bldg and BWR values for Reactor Bldg. All other locations are considered combined PWR and BWR values for No. Plant Operating-Years.

APPENDIX C - TABLE II

OVERALL FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1965-1985

| ITEM NO. | LOCATION | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Containment | | | | | | | | | | | |
| | No. Fire Events | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.2 | 45.4 |
| | Overall Fire Freq. | 0.200 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.058 | 0.000 | 0.060 | 0.000 |
| 2 | Reactor Building (BWR) | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 4 | 1 | 3 | 2 |
| | Plt Oper.-Yrs | 3 | 3 | 3 | 3 | 2.1 | 5.7 | 7.4 | 9.1 | 12.6 | 14.4 | 17.9 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.333 | 0.000 | 0.000 | 0.175 | 0.000 | 0.440 | 0.079 | 0.208 | 0.118 |
| 3 | Auxiliary Building (PWR) | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 2 | 0 | 2 | 2 |
| | Plt Oper.-Yrs | 2 | 2 | 2 | 4 | 4 | 4.4 | 6.8 | 8.2 | 13.3 | 18.8 | 27.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.500 | 0.250 | 0.000 | 0.147 | 0.244 | 0.000 | 0.106 | 0.073 |
| 4 | Turbine Building | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 4 | 3 | 2 | 2 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.2 | 45.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.198 | 0.141 | 0.231 | 0.116 | 0.060 | 0.044 |
| 5 | Control Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.2 | 45.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 6 | Cable Spreading Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.2 | 45.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.022 |
| 7 | Switchgear Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.2 | 45.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.143 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.022 |
| 8 | Diesel Gen. Bldg | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.2 | 45.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.060 | 0.132 |

APPENDIX C - TABLE II (CONTINUED)
OVERALL FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1965-1985

| ITEM NO. | LOCATION | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Service Water Pumphouse | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.2 | 45.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 10 | Switch Yard | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.2 | 45.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.070 | 0.000 | 0.000 | 0.000 | 0.022 |
| 11 | Battery Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.7 | 45.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 12 | Other Building | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 2 | 2 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.2 | 45.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.198 | 0.141 | 0.000 | 0.039 | 0.060 | 0.044 |
| 13 | Offsite | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.2 | 45.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 14 | Temporary Bldg | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | Plt Oper.-Yrs | 5 | 5 | 5 | 7 | 6.1 | 10.1 | 14.2 | 17.3 | 25.9 | 33.2 | 45.4 |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.030 | 0.000 |
| **Yearly Total No. Fire Events:** | | **1** | **0** | **1** | **3** | **1** | **5** | **6** | **11** | **5** | **14** | **17** |
| **Plant Operating-Years:** | | **5** | **5** | **5** | **7** | **6.1** | **10.1** | **14.2** | **17.3** | **25.9** | **33.2** | **45.4** |
| **Yearly Ave. Overall Fire Freq.:** | | **0.200** | **0.000** | **0.200** | **0.428** | **0.164** | **0.495** | **0.422** | **0.636** | **0.193** | **0.422** | **0.374** |

APPENDIX C - TABLE II (CONTINUED)
OVERALL FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1965-1985

| ITEM NO. | LOCATION | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | PERIOD TOTAL | PERCENTAGE TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Containment | | | | | | | | | | | | |
| | No. Fire Events | 3 | 2 | 0 | 1 | 1 | 4 | 1 | 9 | 1 | 4 | 30 | 10 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.058 | 0.034 | 0.000 | 0.016 | 0.015 | 0.059 | 0.014 | 0.123 | 0.013 | 0.047 | 0.035 | |
| 2 | Reactor Building (BWR) | | | | | | | | | | | | |
| | No. Fire Events | 2 | 8 | 1 | 1 | 2 | 4 | 2 | 1 | 2 | 5 | 40 | 13 |
| | Plt Oper.-Yrs | 20 | 20.8 | 20.8 | 23.3 | 24 | 24 | 24 | 24.2 | 26.5 | 29.5 | 328.5 | |
| | Overall Fire Freq. | 0.100 | 0.385 | 0.048 | 0.043 | 0.083 | 0.167 | 0.083 | 0.041 | 0.075 | 0.169 | 0.122 | |
| 3 | Auxiliary Building (PWR) | | | | | | | | | | | | |
| | No. Fire Events | 6 | 2 | 3 | 4 | 6 | 6 | 5 | 4 | 6 | 4 | 56 | 18 |
| | Plt Oper.-Yrs | 31.9 | 38.9 | 38.5 | 40.7 | 41.7 | 44.2 | 47.6 | 48.8 | 52.5 | 55.9 | 521.9 | |
| | Overall Fire Freq. | 0.188 | 0.051 | 0.078 | 0.098 | 0.144 | 0.136 | 0.105 | 0.082 | 0.114 | 0.072 | 0.107 | |
| 4 | Turbine Building | | | | | | | | | | | | |
| | No. Fire Events | 0 | 5 | 2 | 0 | 5 | 2 | 4 | 1 | 6 | 6 | 46 | 14 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.000 | 0.084 | 0.034 | 0.000 | 0.076 | 0.029 | 0.056 | 0.014 | 0.070 | 0.071 | 0.054 | |
| 5 | Control Room | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 4 | 1 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.016 | 0.016 | 0.000 | 0.000 | 0.000 | 0.027 | 0.000 | 0.000 | 0.005 | |
| 6 | Cable Spreading Room | | | | | | | | | | | | |
| | No. Fire Events | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 1 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.000 | 0.034 | 0.000 | 0.000 | 0.000 | 0.000 | 0.014 | 0.000 | 0.000 | 0.000 | 0.005 | |
| 7 | Switchgear Room | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 1 | 3 | 3 | 0 | 6 | 0 | 1 | 1 | 17 | 5 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.016 | 0.047 | 0.046 | 0.000 | 0.084 | 0.000 | 0.013 | 0.012 | 0.020 | |
| 8 | Diesel Gen. Bldg | | | | | | | | | | | | |
| | No. Fire Events | 9 | 3 | 2 | 4 | 5 | 9 | 4 | 2 | 6 | 1 | 53 | 17 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.173 | 0.050 | 0.034 | 0.062 | 0.076 | 0.132 | 0.056 | 0.027 | 0.076 | 0.012 | 0.062 | |

APPENDIX C - TABLE II (CONTINUED)
OVERALL FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1965-1985

| ITEM NO. | LOCATION | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | PERIOD TOTAL | PERCENTAGE TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Service Water Pumphouse | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 1 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.016 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.023 | 0.004 | |
| 10 | Switch Yard | | | | | | | | | | | | |
| | No. Fire Events | 0 | 2 | 3 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 17 | 5 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.000 | 0.034 | 0.051 | 0.016 | 0.015 | 0.015 | 0.014 | 0.041 | 0.025 | 0.012 | 0.020 | |
| 11 | Battery Room | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.034 | 0.016 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | |
| 12 | Other Building | | | | | | | | | | | | |
| | No. Fire Events | 5 | 4 | 4 | 4 | 3 | 0 | 2 | 1 | 2 | 1 | 35 | 11 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.096 | 0.067 | 0.067 | 0.062 | 0.046 | 0.000 | 0.028 | 0.014 | 0.025 | 0.012 | 0.041 | |
| 13 | Offsite | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 4 | 1 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.016 | 0.000 | 0.000 | 0.000 | 0.028 | 0.000 | 0.000 | 0.012 | 0.005 | |
| 14 | Temporary Bldg | | | | | | | | | | | | |
| | No. Fire Events | 1 | 0 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 7 | 2 |
| | Plt Oper.-Yrs | 51.9 | 59.7 | 59.3 | 64 | 65.7 | 68.2 | 71.6 | 73.3 | 79 | 85.4 | 850.4 | |
| | Overall Fire Freq. | 0.019 | 0.000 | 0.017 | 0.016 | 0.046 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | |
| **Yearly Total No. Fire Events:** | | **26** | **28** | **21** | **22** | **29** | **26** | **28** | **23** | **26** | **26** | **319** | **100%** |
| **Plant Operating-Years:** | | **51.9** | **59.7** | **59.3** | **64** | **65.7** | **68.2** | **71.6** | **73.3** | **79** | **85.4** | **850.4** | |
| **Yearly Ave. Overall Fire Freq.:** | | **0.501** | **0.469** | **0.354** | **0.344** | **0.441** | **0.381** | **0.391** | **0.314** | **0.329** | **0.304** | **0.375** | |

NOTE: See Figures 7, 8, 9, 10, 11, and 12 and Appendix A, Table I.

APPENDIX C - TABLE III

OVERALL FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1986-1994 (WITH EXTRAPOLATED DATA)

| ITEM NO. | LOCATION | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | PERIOD TOTAL | PERCENTAGE TOTAL | 1965-1994 NO. | COMBINED PERCENT. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Containment | | | | | | | | | | | | | |
| | No. Fire Events | 3 | 3 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 17 | 7 | 47 | 8 |
| | Plt Oper.-Yrs | 93.5 | 97.7 | 105.4 | 107.8 | 109.8 | 110.8 | 109.8 | 108.4 | 109 | 816.3 | | 1666.4 | |
| | Overall Fire Freq. | 0.032 | 0.031 | 0.019 | 0.009 | 0.009 | 0.018 | 0.009 | 0.018 | 0.018 | 0.021 | | 0.028 | |
| 2 | Reactor Building (BWR) | | | | | | | | | | | | | |
| | No. Fire Events | 4 | 6 | 3 | 3 | 4 | 1 | 3 | 2 | 2 | 28 | 12 | 68 | 12 |
| | Plt Oper.-Yrs | 31.4 | 32.5 | 35.6 | 36 | 37 | 37 | 37 | 37 | 37 | 320.5 | | 649.0 | |
| | Overall Fire Freq. | 0.127 | 0.185 | 0.084 | 0.083 | 0.108 | 0.027 | 0.081 | 0.054 | 0.054 | 0.087 | | 0.105 | |
| 3 | Auxiliary Building (PWR) | | | | | | | | | | | | | |
| | No. Fire Events | 2 | 5 | 3 | 2 | 5 | 3 | 2 | 4 | 2 | 28 | 12 | 84 | 15 |
| | Plt Oper.-Yrs | 62.1 | 65.2 | 69.8 | 71.8 | 72.8 | 73.8 | 72.8 | 71.4 | 72 | 495.8 | | 1017.7 | |
| | Overall Fire Freq. | 0.032 | 0.077 | 0.043 | 0.028 | 0.069 | 0.041 | 0.027 | 0.056 | 0.028 | 0.056 | | 0.082 | |
| 4 | Turbine Building | | | | | | | | | | | | | |
| | No. Fire Events | 3 | 9 | 8 | 8 | 4 | 6 | 4 | 4 | 5 | 51 | 22 | 97 | 18 |
| | Plt Oper.-Yrs | 93.5 | 97.7 | 105.4 | 107.8 | 109.8 | 110.8 | 109.8 | 108.4 | 109 | 816.3 | | 1666.4 | |
| | Overall Fire Freq. | 0.032 | 0.092 | 0.076 | 0.074 | 0.036 | 0.055 | 0.037 | 0.037 | 0.046 | 0.062 | | 0.058 | |
| 5 | Control Room | | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 1 |
| | Plt Oper.-Yrs | 93.5 | 97.7 | 105.4 | 107.8 | 109.8 | 110.8 | 109.8 | 108.4 | 109 | 816.3 | | 1666.4 | |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.009 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | | 0.003 | |
| 6 | Cable Spreading Room | | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 6 | 1 |
| | Plt Oper.-Yrs | 93.5 | 97.7 | 105.4 | 107.8 | 109.8 | 110.8 | 109.8 | 108.4 | 109 | 816.3 | | 1666.4 | |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.019 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | | 0.004 | |
| 7 | Switchgear Room | | | | | | | | | | | | | |
| | No. Fire Events | 0 | 2 | 0 | 4 | 2 | 2 | 1 | 1 | 3 | 15 | 6 | 32 | 6 |
| | Plt Oper.-Yrs | 93.5 | 97.7 | 105.4 | 107.8 | 109.8 | 110.8 | 109.8 | 108.4 | 109 | 816.3 | | 1666.4 | |
| | Overall Fire Freq. | 0.000 | 0.020 | 0.000 | 0.037 | 0.018 | 0.018 | 0.009 | 0.009 | 0.028 | 0.018 | | 0.019 | |
| 8 | Diesel Gen. Bldg | | | | | | | | | | | | | |
| | No. Fire Events | 4 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 6 | 29 | 12 | 82 | 15 |
| | Plt Oper.-Yrs | 93.5 | 97.7 | 105.4 | 107.8 | 109.8 | 110.8 | 109.8 | 108.4 | 109 | 816.3 | | 1666.4 | |
| | Overall Fire Freq. | 0.043 | 0.031 | 0.028 | 0.028 | 0.018 | 0.018 | 0.028 | 0.028 | 0.055 | 0.036 | | 0.049 | |

APPENDIX C - TABLE III (CONTINUED)
OVERALL FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1986-1994 (WITH EXTRAPOLATED DATA)

| ITEM NO. | LOCATION | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | PERIOD TOTAL | PERCENTAGE TOTAL | 1965-1994 NO. | COMBINED PERCENT. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Service Water Pumphse | | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 6 | 3 | 9 | 2 |
| | Plt Oper.-Yrs | 93.5 | 97.7 | 105.4 | 107.8 | 109.8 | 110.8 | 109.8 | 108.4 | 109 | 816.3 | | 1666.4 | |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.019 | 0.018 | 0.000 | 0.000 | 0.018 | 0.000 | 0.000 | 0.007 | | 0.005 | |
| 10 | Switch Yard | | | | | | | | | | | | | |
| | No. Fire Events | 4 | 2 | 3 | 3 | 3 | 4 | 4 | 2 | 1 | 26 | 11 | 43 | 8 |
| | Plt Oper.-Yrs | 93.5 | 97.7 | 105.4 | 107.8 | 109.8 | 110.8 | 109.8 | 108.4 | 109 | 816.3 | | 1666.4 | |
| | Overall Fire Freq. | 0.043 | 0.020 | 0.028 | 0.028 | 0.027 | 0.036 | 0.037 | 0.018 | 0.009 | 0.032 | | 0.026 | |
| 11 | Battery Room | | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 5 | 1 |
| | Plt Oper.-Yrs | 93.5 | 97.7 | 105.4 | 107.8 | 109.8 | 110.8 | 109.8 | 108.4 | 109 | 816.3 | | 1666.4 | |
| | Overall Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.018 | 0.000 | 0.000 | 0.002 | | 0.003 | |
| 12 | Other Building | | | | | | | | | | | | | |
| | No. Fire Events | 1 | 3 | 3 | 1 | 2 | 1 | 2 | 1 | 1 | 16 | 7 | 51 | 9 |
| | Plt Oper.-Yrs | 93.5 | 97.7 | 105.4 | 107.8 | 109.8 | 110.8 | 109.8 | 108.4 | 109 | 816.3 | | 1666.4 | |
| | Overall Fire Freq. | 0.011 | 0.031 | 0.028 | 0.009 | 0.018 | 0.009 | 0.018 | 0.009 | 0.009 | 0.020 | | 0.031 | |
| 13 | Offsite | | | | | | | | | | | | | |
| | No. Fire Events | 1 | 0 | 3 | 1 | 4 | 0 | 1 | 0 | 2 | 12 | 5 | 16 | 3 |
| | Plt Oper.-Yrs | 93.5 | 97.7 | 105.4 | 107.8 | 109.8 | 110.8 | 109.8 | 108.4 | 109 | 816.3 | | 1666.4 | |
| | Overall Fire Freq. | 0.011 | 0.000 | 0.028 | 0.009 | 0.037 | 0.000 | 0.009 | 0.000 | 0.018 | 0.015 | | 0.010 | |
| 14 | Temporary Bldgs | ----------(No Data Available for 1986-1994)---------- | | | | | | | | | | | 7 | 1 |
| | | | | | | | | | | | | | 1666.4 | |
| | | | | | | | | | | | | | 0.004 | |
| **Yearly Total No. Fire Events:** | | **23** | **33** | **32** | **29** | **27** | **21** | **25** | **19** | **24** | **233** | **100%** | **552** | **100%** |
| **Plant Operating-Years:** | | **93.5** | **97.7** | **105.4** | **107.8** | **109.8** | **110.8** | **109.8** | **108.4** | **109** | **816.3** | | **1666.4** | |
| **Yearly Ave. Overall Fire Freq.:** | | **0.246** | **0.338** | **0.304** | **0.269** | **0.246** | **0.190** | **0.228** | **0.175** | **0.220** | **0.285** | | **0.331** | |

**NOTES:** 1. See Figures 7, 8, 9, 10, 11, and 12 and Appendix A, Table II.

2. Extrapolated data is included for 1989-1994 at 10 fire events per year. Apportionment of extrapolated data by plant location was based on 1979-1988 fire events data.

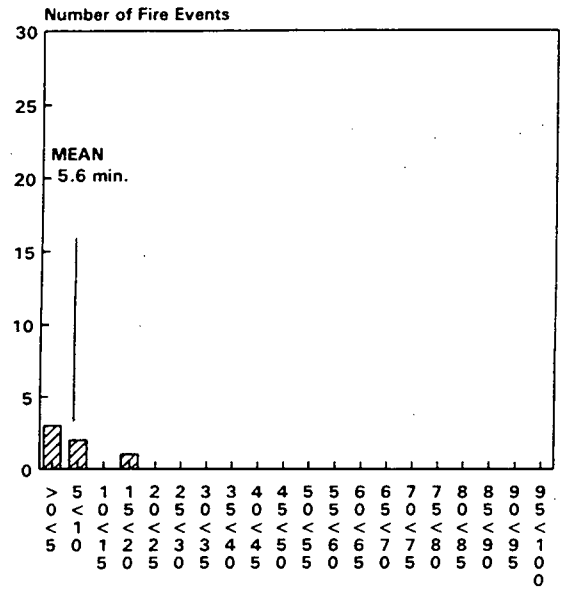
# APPENDIX D

## POWER OPERATIONS FIRE EVENTS
## MEAN DURATIONS BY PLANT LOCATION

## AND

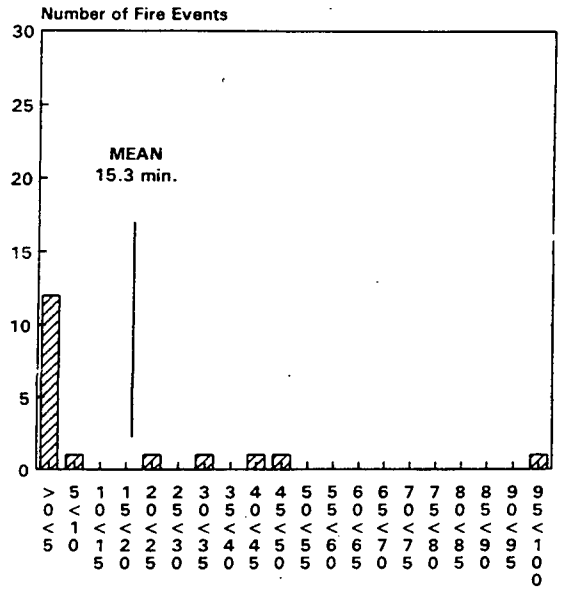
## COMPARISON OF 1965-1985 DURATIONS WITH 1986-1994 DURATIONS

POWER OPERATIONS FIRE EVENTS DURATION
CONTAINMENT BUILDING - 1965-1985



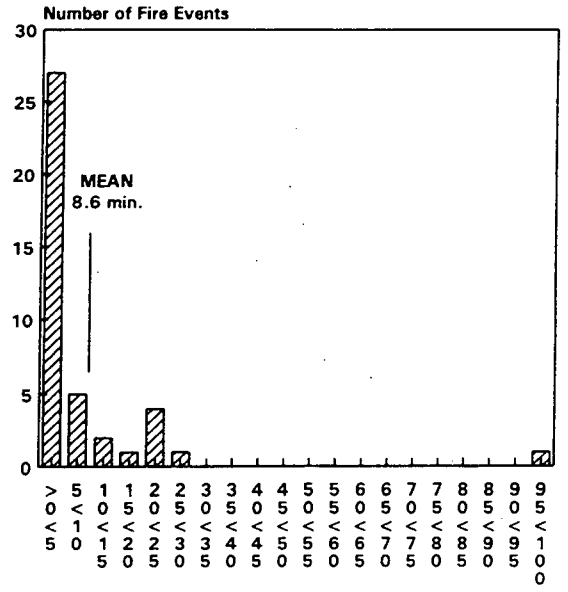

No. fire events during power oper.: 6.

POWER OPERATIONS FIRE EVENTS DURATION
REACTOR BUILDING (BWR) - 1965-1985



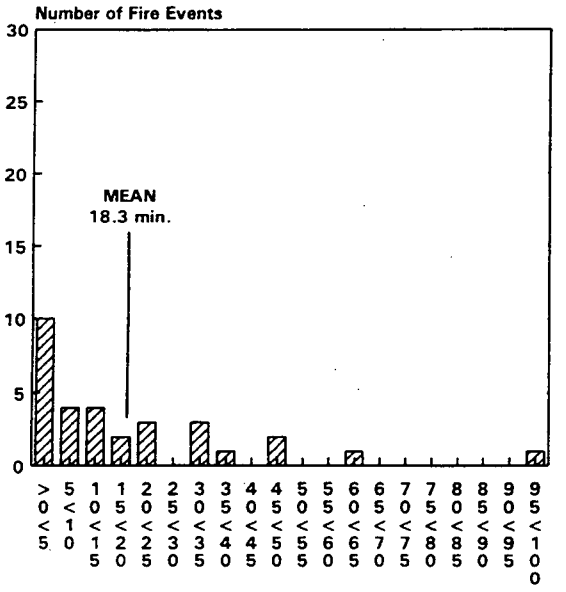

No. fire events during power oper.: 18.

POWER OPERATIONS FIRE EVENTS DURATION
AUXILIARY BUILDING (PWR) - 1965-1985




No. fire events during power oper.: 40.

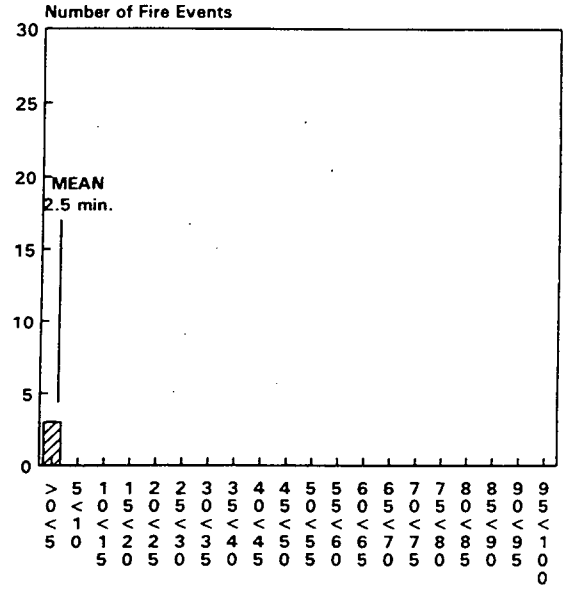
POWER OPERATIONS FIRE EVENTS DURATION
TURBINE BUILDING - 1965-1985




No. fire events during power oper.: 31.

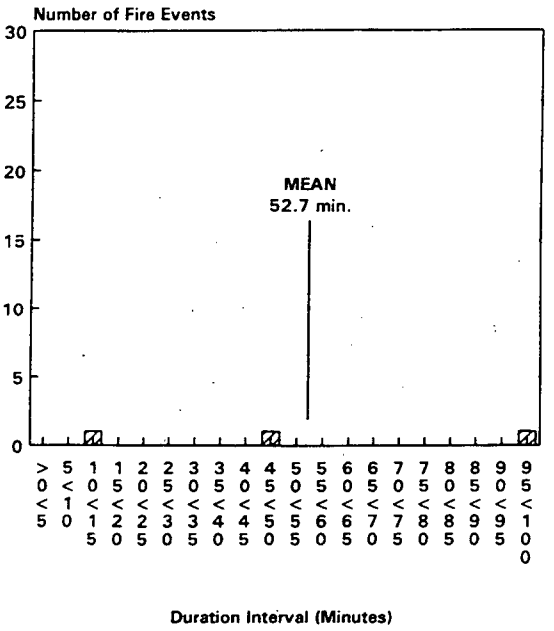
**FIGURE 13**

POWER OPERATIONS FIRE EVENTS DURATION
CONTROL ROOM - 1965-1989



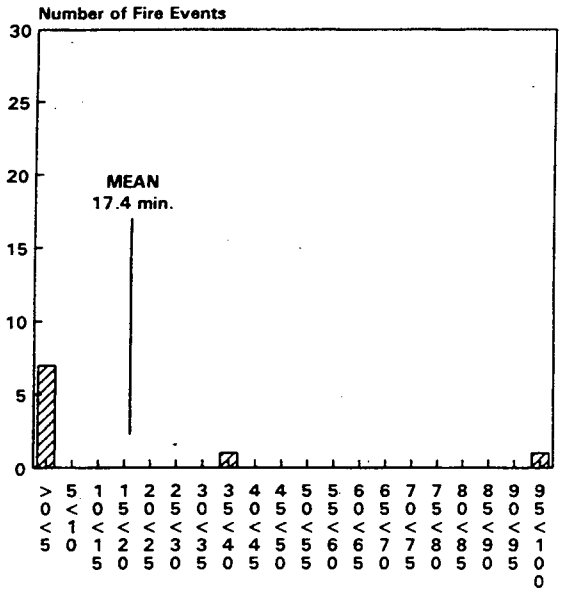

No. fire events during power oper.: 3.

POWER OPERATIONS FIRE EVENTS DURATION
CABLE SPREADING ROOM - 1965-1985



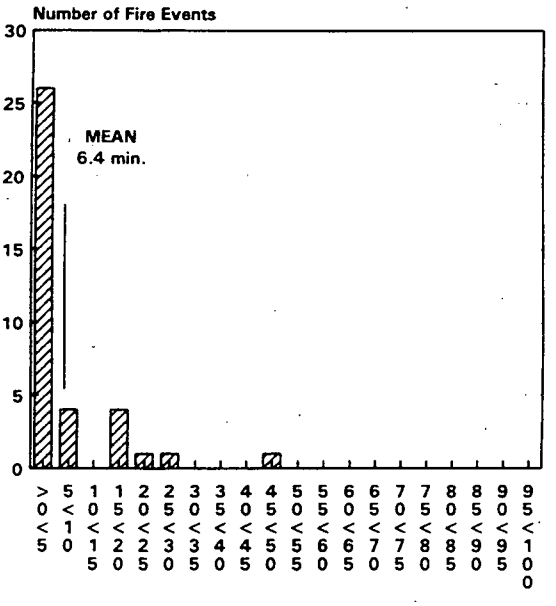

No. fire events during power oper.: 3.
Includes Browns Ferry Fire (100min.,max)

POWER OPERATIONS FIRE EVENTS DURATION
SWITCHGEAR ROOM - 1965-1985




No. fire events during power oper.: 9.

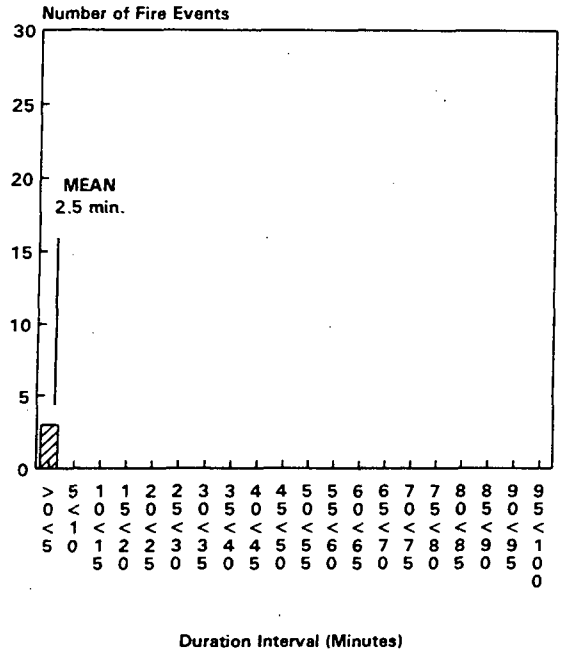
POWER OPERATIONS FIRE EVENTS DURATION
DIESEL GENERATOR BUILDING - 1965-1985




No. fire events during power oper.: 37.

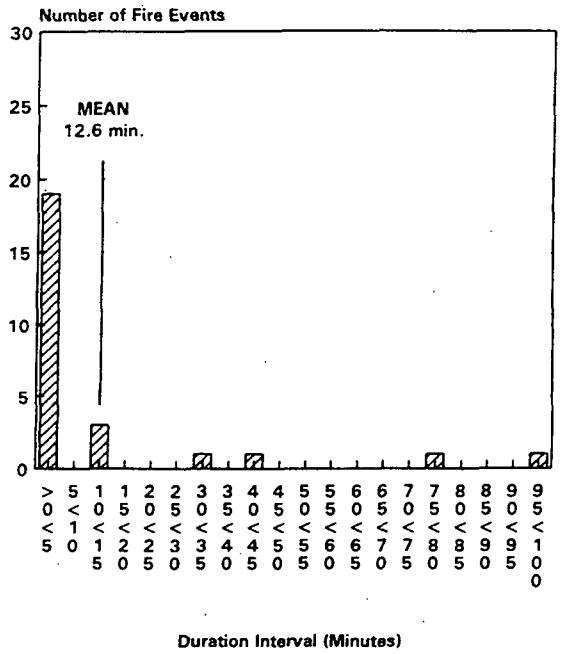
**FIGURE 14**

POWER OPERATIONS FIRE EVENTS DURATION
BATTERY ROOM - 1965-1985



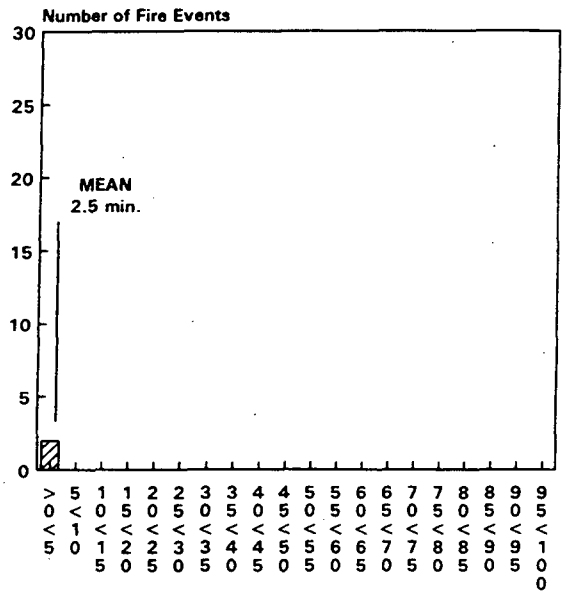

No. fire events during power oper.: 3.

POWER OPERATIONS FIRE EVENTS DURATION
OTHER BUILDINGS - 1965-1985



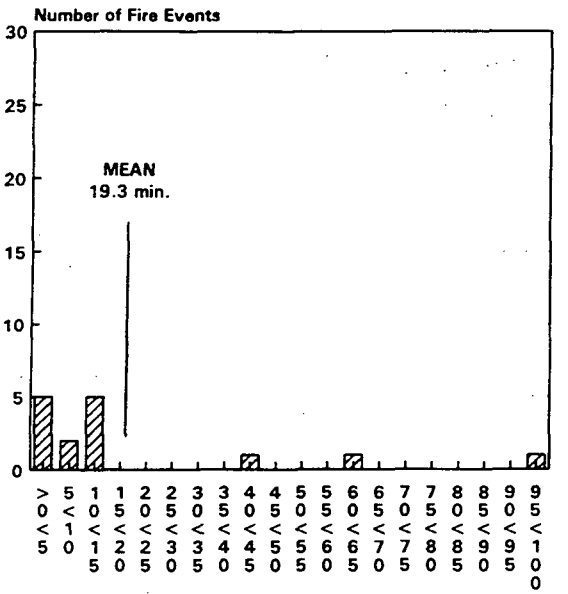

No. fire events during power oper.: 26.

POWER OPERATIONS FIRE EVENTS DURATION
SERVICE WATER PUMPHOUSE - 1965-1985




No. fire events during power oper.: 2.

POWER OPERATIONS FIRE EVENTS DURATION
SWITCH YARD - 1965-1985




No. fire events during power oper.: 15.

**FIGURE 15**

APPENDIX D - TABLE I
POWER OPERATIONS FIRE EVENTS DURATION BY PLANT LOCATION - 1965-1985

| LOCATION | DURATION (MINUTES) >0<5 | 5<10 | 10<15 | 15<20 | 20<25 | 25<30 | 30<35 | 35<40 | 40<45 | 45<50 | 50<55 | 55<60 | 60<65 | 95<100 | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Containment:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 3 | 2 | - | 1 | - | - | - | - | - | - | - | - | - | - | 6 |
| Percent of Fire Events: | 50 | 33 | - | 17 | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 6 | 12.5 | - | 15 | - | - | - | - | - | - | - | - | - | - | 33.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **5.6** |
| **REACTOR BUILDING: (BWR)** | | | | | | | | | | | | | | | |
| No. Fire Events: | 12 | 1 | - | - | 1 | - | 1 | - | 1 | 1 | - | - | - | 1 | 18 |
| Percent of Fire Events: | 66 | 6 | - | - | 6 | - | 6 | - | 6 | 6 | - | - | - | 6 | 100 |
| No. Fire Event-Min.: | 29.5 | 7.5 | - | - | 23 | - | 30 | - | 40 | 45 | - | - | - | 100 | 275 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **15.3** |
| **AUXILIARY BUILDING: (PWR)** | | | | | | | | | | | | | | | |
| No. Fire Events: | 26 | 5 | 2 | 1 | 4 | 1 | - | - | - | - | - | - | - | 1 | 40 |
| Percent of Fire Events: | 65 | 12 | 5 | 2 | 10 | 2 | - | - | - | - | - | - | - | 2 | 100 |
| No. Fire Event-Min.: | 65 | 35 | 22 | 15 | 80 | 25 | - | - | - | - | - | - | - | 100 | 342 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **8.6** |
| **TURBINE BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 10 | 4 | 4 | 2 | 3 | - | 3 | 1 | - | 2 | - | - | 1 | 1 | 31 |
| Percent of Fire Events: | 32 | 13 | 13 | 6 | 10 | - | 10 | 3 | - | 6 | - | - | 3 | 3 | 100 |
| No. Fire Event-Min.: | 23.5 | 30 | 49 | 30 | 60 | - | 90 | 35 | - | 90 | - | - | 60 | 100 | 567.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **18.3** |
| **Control Room:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 |
| Percent of Fire Events: | 100 | - | - | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 7.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **2.5** |

APPENDIX D - TABLE I (CONTINUED)
POWER OPERATIONS FIRE EVENTS DURATION BY PLANT LOCATION - 1965-1985

| LOCATION | DURATION (MINUTES) >0<5 | 5<10 | 10<15 | 15<20 | 20<25 | 25<30 | 30<35 | 35<40 | 40<45 | 45<50 | 50<55 | 55<60 | 75<80 | 95<100 | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CABLE SPREADING ROOM:** | | | | | | | | | | | | | | | |
| No. Fire Events: | - | - | 1 | - | - | - | - | - | - | 1 | - | - | - | 1 | 3 |
| Percent of Fire Events: | - | - | 33 | - | - | - | - | - | - | 33 | - | - | - | 33 | 100 |
| No. Fire Event-Min.: | - | - | 13 | - | - | - | - | - | - | 45 | - | - | - | 100 | 158 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 52.7 |
| **SWITCHGEAR ROOM:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 7 | - | - | - | - | - | - | 1 | - | - | - | - | - | 1 | 9 |
| Percent of Fire Events: | 75 | - | - | - | - | - | - | 12 | - | - | - | - | - | 12 | 100 |
| No. Fire Event-Min.: | 17.5 | - | - | - | - | - | - | 39 | - | - | - | - | - | 100 | 156.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 17.4 |
| **DIESEL GENERATOR BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 26 | 4 | - | 4 | 1 | 1 | - | - | - | 1 | - | - | - | - | 37 |
| Percent of Fire Events: | 70 | 11 | - | 11 | 3 | 3 | - | - | - | 3 | - | - | - | - | 100 |
| No. Fire Event-Min.: | 65 | 23 | - | 60 | 20 | 25 | - | - | - | 45 | - | - | - | - | 238 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 6.4 |
| **Battery Room:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 |
| Percent of Fire Events: | 100 | - | - | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 7.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 2.5 |
| **OTHER BUILDINGS:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 19 | - | 3 | - | - | - | 1 | - | 1 | - | - | - | 1 | 1 | 26 |
| Percent of Fire Events: | 73 | - | 12 | - | - | - | 4 | - | 4 | - | - | - | 4 | 4 | 100 |
| No. Fire Event-Min.: | 47.5 | - | 35 | - | - | - | 30 | - | 40 | - | - | - | 75 | 100 | 327.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 12.6 |
| **SERVICE WATER PUMPHOUSE:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
| Percent of Fire Events: | 100 | - | - | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 2.5 |

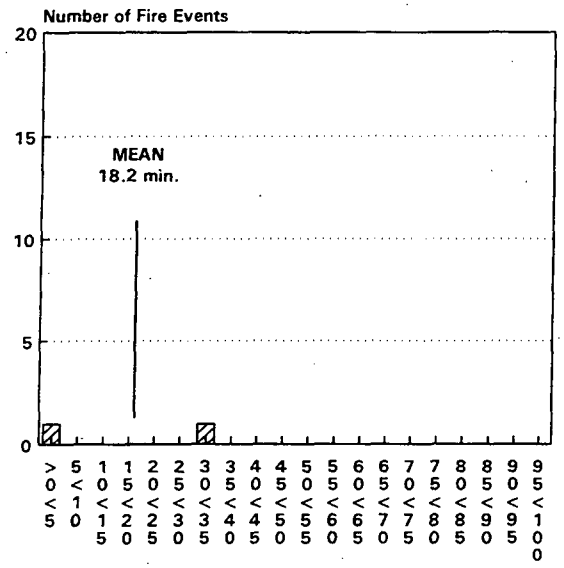
APPENDIX D - TABLE I (CONTINUED)
POWER OPERATIONS FIRE EVENTS DURATION BY PLANT LOCATION - 1965-1985

| LOCATION | DURATION (MINUTES) >0<5 | 5<10 | 10<15 | 15<20 | 20<25 | 25<30 | 30<35 | 35<40 | 40<45 | 45<50 | 50<55 | 55<60 | 60<65 | 95<100 | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SWITCH YARD:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 5 | 2 | 5 | - | - | - | - | - | 1 | - | - | - | 1 | 1 | 15 |
| Percent of Fire Events: | 33 | 13 | 33 | - | - | - | - | - | 6 | - | - | - | 6 | 6 | 100 |
| No. Fire Event-Min.: | 12.5 | 15 | 62.5 | - | - | - | - | - | 40 | - | - | - | 60 | 100 | 290 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 19.3 |

NOTES:

1. The maximum duration of all fires used in this study was 100 minutes.
2. The Switchgear Room number of fire events includes the Browns Ferry fire, but the duration is also limited to 100 minutes, maximum.
3. Durations for temporary buildings and offsite locations are not included in this table.
4. See Figures 13, 14, and 15.

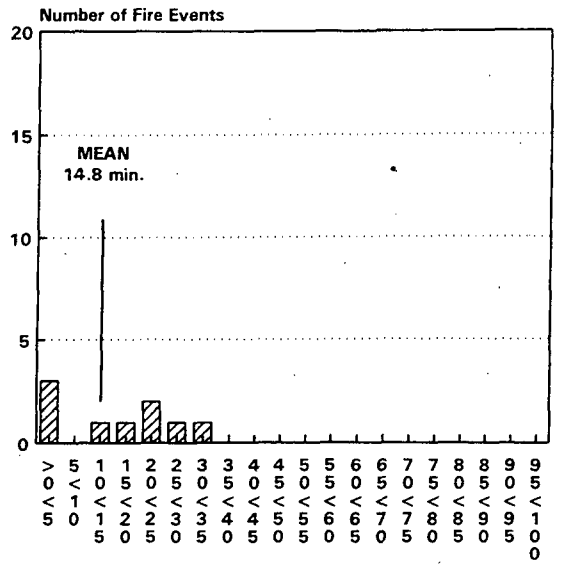
POWER OPERATIONS FIRE EVENTS DURATION
CONTAINMENT BUILDING - 1986-1994




Duration Interval (Minutes)

No. fire events during power oper.: 2
(excludes extrapolated events)

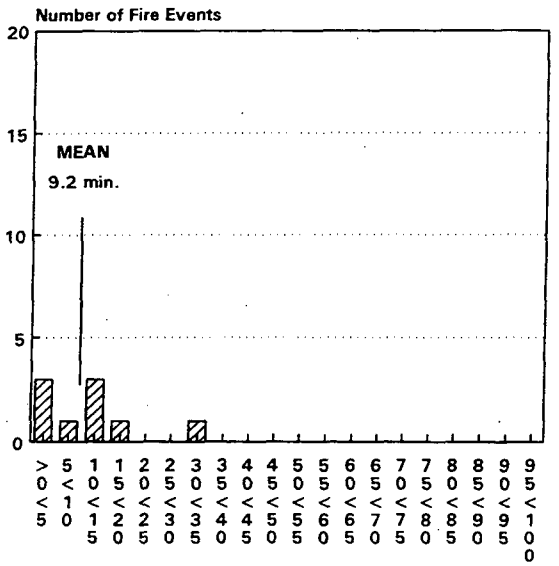
POWER OPERATIONS FIRE EVENTS DURATION
REACTOR BUILDING (BWR) - 1986-1994




Duration Interval (Minutes)

No. fire events during power oper.: 9
Excludes extrapolated fire events.

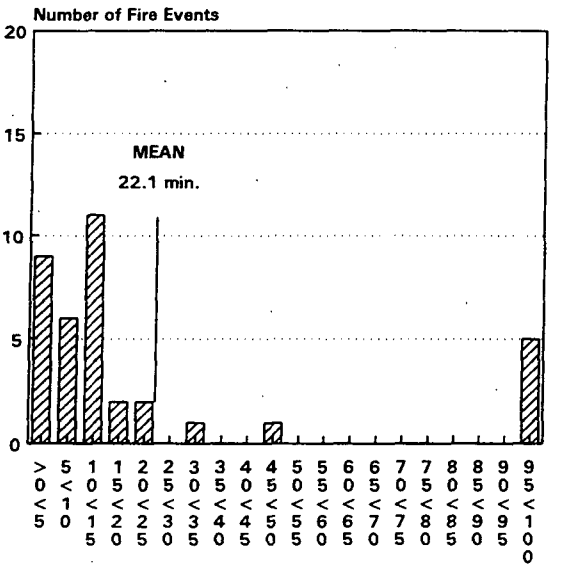
POWER OPERATIONS FIRE EVENTS DURATION
AUXILIARY BUILDING (PWR) - 1986-1994




Duration Interval (Minutes)

No. fire events during power oper.: 9.
Excludes extrapolated fire events.

POWER OPERATIONS FIRE EVENTS DURATION
TURBINE BUILDING - 1986-1994

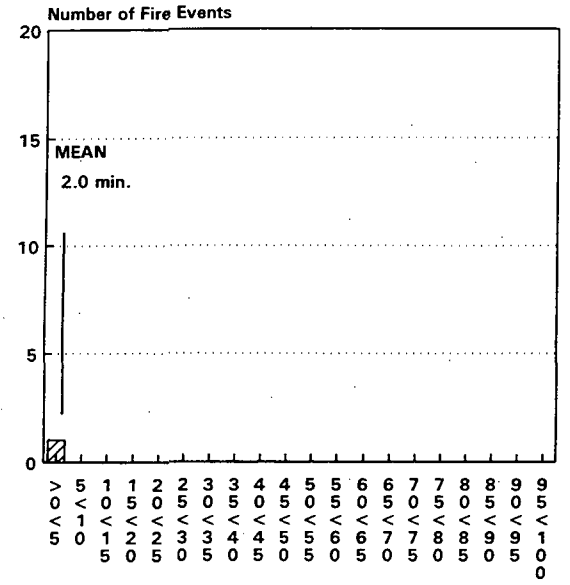



Duration Interval (Minutes)

No. fire events during power oper.: 37
Excludes extrapolated fire events.

**FIGURE 16**

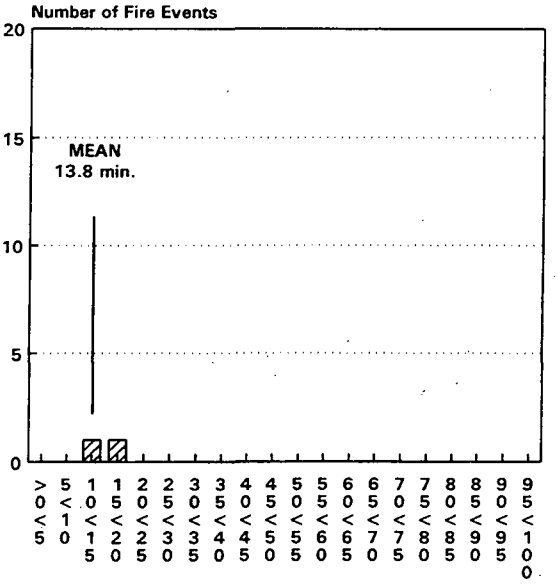
POWER OPERATIONS FIRE EVENTS DURATION
CONTROL ROOM - 1986-1994




Duration Interval (Minutes)

No. fire events during power oper.: 1.

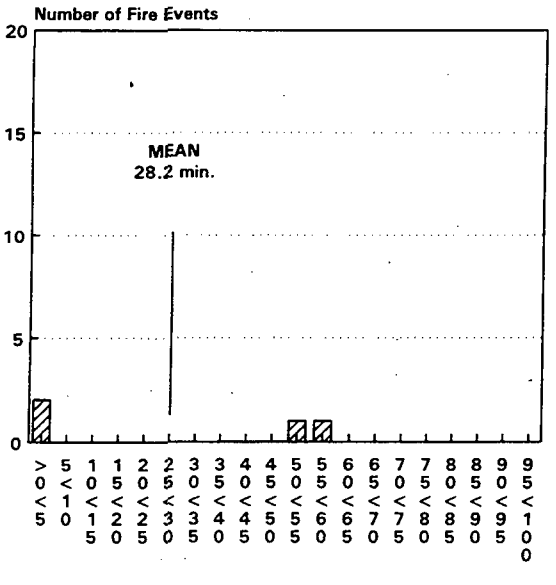
POWER OPERATIONS FIRE EVENTS DURATION
CABLE SPREADING ROOM - 1986-1994




Duration Interval (Minutes)

No. fire events during power oper.: 2

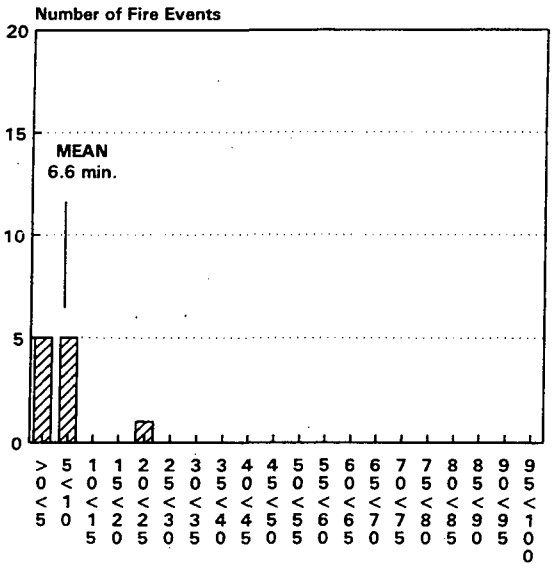
POWER OPERATIONS FIRE EVENTS DURATION
SWITCHGEAR ROOM - 1986-1994




Duration Interval (Minutes)

No. fire events during power oper.: 4
Excludes extrapolated fire events.

POWER OPERATIONS FIRE EVENTS DURATION
DIESEL GENERATOR BUILDING - 1986-1994

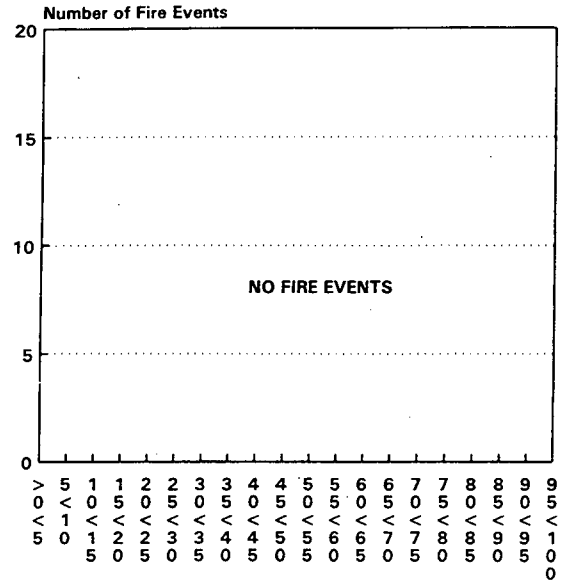



Duration Interval (Minutes)

No. fire events during power oper.: 11.
Excludes extrapolated fire events.

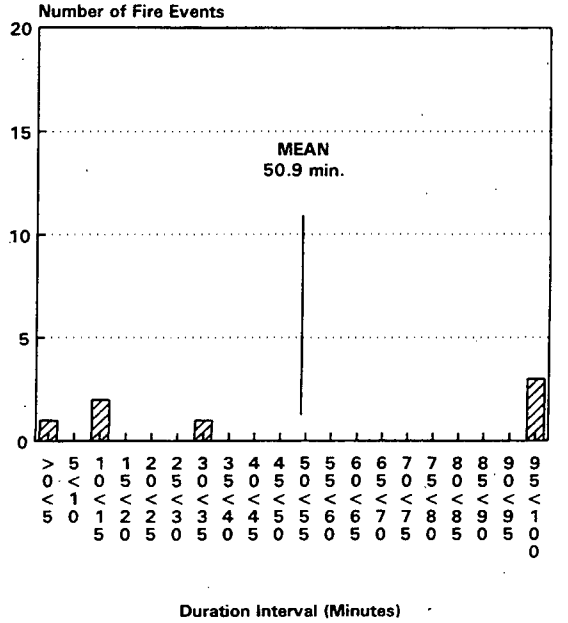
**FIGURE 17**

POWER OPERATIONS FIRE EVENTS DURATION
BATTERY ROOM - 1986-1994



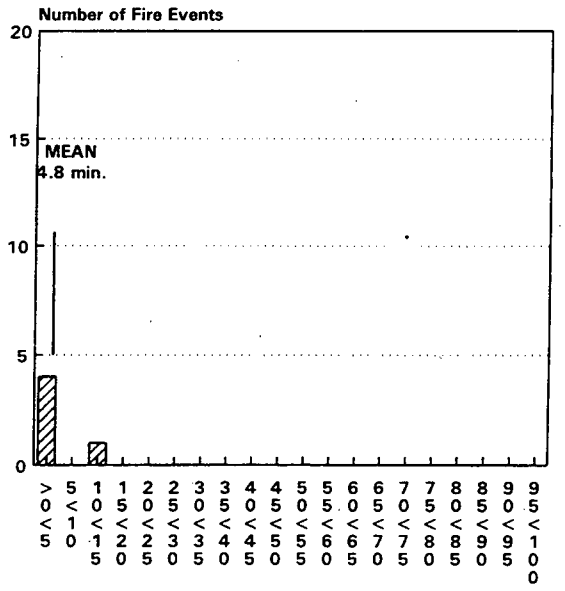

No. fire events during power oper.: 0.

POWER OPERATIONS FIRE EVENTS DURATION
OTHER BUILDINGS - 1986-1994



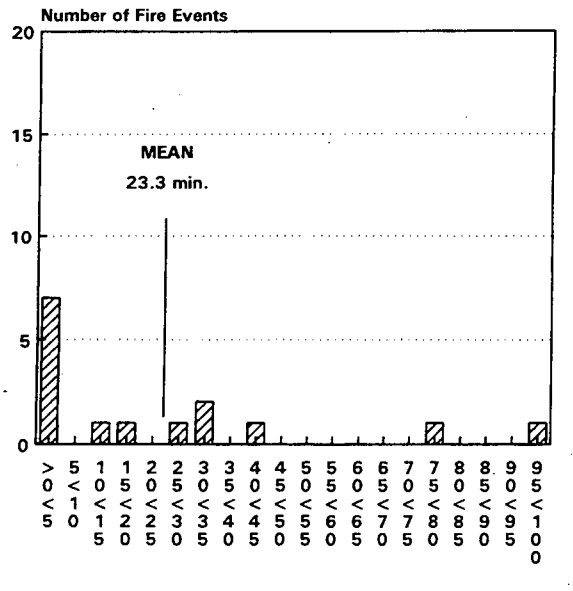

No. fire events during power oper.: 7.
Excludes extrapolated fire events.

POWER OPERATIONS FIRE EVENTS DURATION
SERVICE WATER PUMPHOUSE - 1986-1994




No. fire events during power oper.: 5.

POWER OPERATIONS FIRE EVENTS DURATION
SWITCH YARD - 1986-1994




No. fire events during power oper.: 15.
Excludes extrapolated fire events.

**FIGURE 18**

APPENDIX D - TABLE II
POWER OPERATIONS FIRE EVENTS DURATION BY PLANT LOCATION - 1986-1994

| LOCATION | DURATION (MINUTES) >0<5 | 5<10 | 10<15 | 15<20 | 20<25 | 25<30 | 30<35 | 35<40 | 40<45 | 45<50 | 50<55 | 55<60 | 75<80 | 95<100 | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Containment:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 1 | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 2 |
| Percent of Fire Events: | 50 | - | - | - | - | - | 50 | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 2.5 | - | - | - | - | - | 34 | - | - | - | - | - | - | - | 36.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **18.2** |
| **REACTOR BUILDING:** (BWR) | | | | | | | | | | | | | | | |
| No. Fire Events: | 3 | - | 1 | 1 | 2 | 1 | 1 | - | - | - | - | - | - | - | 9 |
| Percent of Fire Events: | 33 | - | 11 | 11 | 22 | 11 | 11 | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 7.5 | - | 12.5 | 18 | 40 | 25 | 30 | - | - | - | - | - | - | - | 133 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **14.8** |
| **AUXILIARY BUILDING:** (PWR) | | | | | | | | | | | | | | | |
| No. Fire Events: | 3 | 1 | 3 | 1 | - | - | 1 | - | - | - | - | - | - | - | 9 |
| Percent of Fire Events: | 33 | 11 | 33 | 11 | - | - | 11 | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 7.5 | 7.5 | 37.5 | 17 | - | - | 30 | - | - | - | - | - | - | - | 82.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **9.2** |
| **TURBINE BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 9 | 6 | 11 | 2 | 1 | - | 2 | - | - | 1 | - | - | - | 5 | 37 |
| Percent of Fire Events: | 24 | 16 | 30 | 5 | 3 | - | 5 | - | - | 3 | - | - | - | 14 | 100 |
| No. Fire Event-Min.: | 32.5 | 45.5 | 111.5 | 40 | 31 | - | 63.5 | - | - | 45 | - | - | - | 495 | 820.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **22.1** |
| **Control Room:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Percent of Fire Events: | 100 | - | - | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **2.0** |

APPENDIX D - TABLE II (CONTINUED)
POWER OPERATIONS FIRE EVENTS DURATION BY PLANT LOCATION - 1986-1994

| LOCATION | DURATION (MINUTES) >0<5 | 5<10 | 10<15 | 15<20 | 20<25 | 25<30 | 30<35 | 35<40 | 40<45 | 45<50 | 50<55 | 55<60 | 75<80 | 95<100 | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CABLE SPREADING ROOM:** | | | | | | | | | | | | | | | |
| No. Fire Events: | - | - | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 2 |
| Percent of Fire Events: | - | - | 50 | 50 | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | - | - | 12.5 | 15 | - | - | - | - | - | - | - | - | - | - | 27.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **13.8** |
| **SWITCHGEAR ROOM:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 2 | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - | 4 |
| Percent of Fire Events: | 50 | - | - | - | - | - | - | - | - | - | 25 | 25 | - | - | 100 |
| No. Fire Event-Min.: | 5 | - | - | - | - | - | - | - | - | - | 50 | 58 | - | - | 113 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **28.2** |
| **DIESEL GENERATOR BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 5 | 5 | - | - | 1 | - | - | - | - | - | - | - | - | - | 11 |
| Percent of Fire Events: | 45 | 45 | - | - | 10 | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 12.5 | 37.5 | - | - | 23 | - | - | - | - | - | - | - | - | - | 73 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **6.6** |
| **Battery Room: (No Fire Events)** | | | | | | | | | | | | | | | |
| No. Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Percent of Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| No. Fire Event-Min.: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **0** |
| **OTHER BUILDINGS:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 1 | - | 2 | | - | - | 1 | - | - | - | - | - | - | 3 | 7 |
| Percent of Fire Events: | 14 | - | 20 | - | - | - | 14 | - | - | - | - | - | - | 43 | 100 |
| No. Fire Event-Min.: | 1 | - | 23 | - | - | - | 32.5 | - | - | - | - | - | - | 300 | 356.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **50.9** |
| **SERVICE WATER PUMPHOUSE:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 4 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 5 |
| Percent of Fire Events: | 80 | - | 20 | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 10 | - | 14 | - | - | - | - | - | - | - | - | - | - | - | 24 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **4.8** |

APPENDIX D - TABLE II (CONTINUED)
POWER OPERATIONS FIRE EVENTS DURATION BY PLANT LOCATION - 1986-1994

| LOCATION | DURATION (MINUTES) >0<5 | 5<10 | 10<15 | 15<20 | 20<25 | 25<30 | 30<35 | 35<40 | 40<45 | 45<50 | 50<55 | 55<60 | 75<80 | 95<100 | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SWITCH YARD:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 7 | - | 1 | 1 | - | 1 | 2 | - | 1 | - | - | - | 1 | 1 | 15 |
| Percent of Fire Events: | 46 | - | 7 | 7 | - | 7 | 12 | - | 7 | - | - | - | 7 | 7 | 100 |
| No. Fire Event-Min.: | 17.5 | - | 10 | 16 | - | 10 | 60 | - | 40 | - | - | - | 77 | 100 | 349.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 23.3 |

NOTES:

1. The maximum duration of all fires used in this study was 100 minutes.
2. No fire events occurred in the Control Room and Battery Room during the 1986-1994 period.
3. Durations for Offsite fire events were not included in this table.
4. Extrapolated fire events (1989-1994) are not included.
5. See Figures 16, 17, and 18.

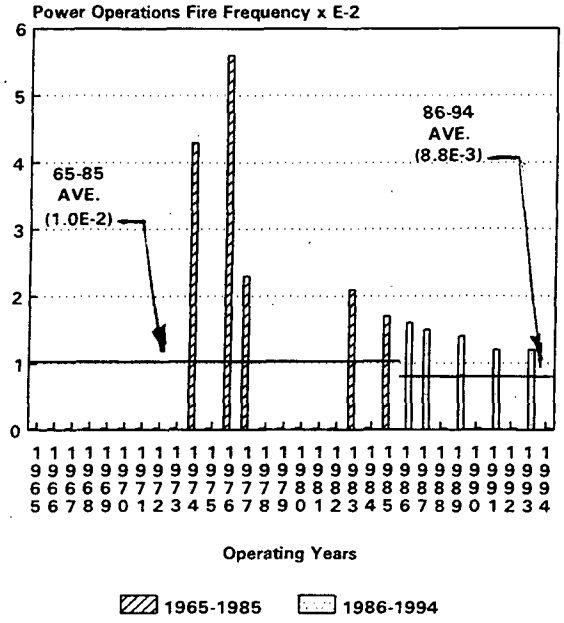
# APPENDIX E

# PLANT AVERAGE UNIT AVAILABILITY FACTORS

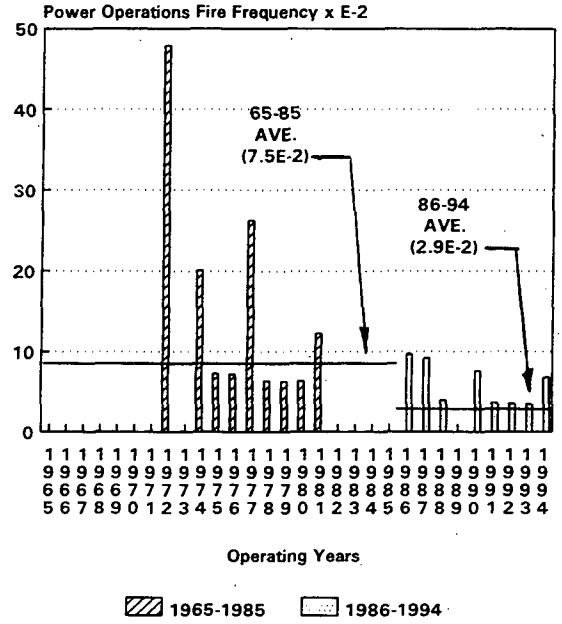
# AND

# POWER OPERATIONS FIRE FREQUENCIES

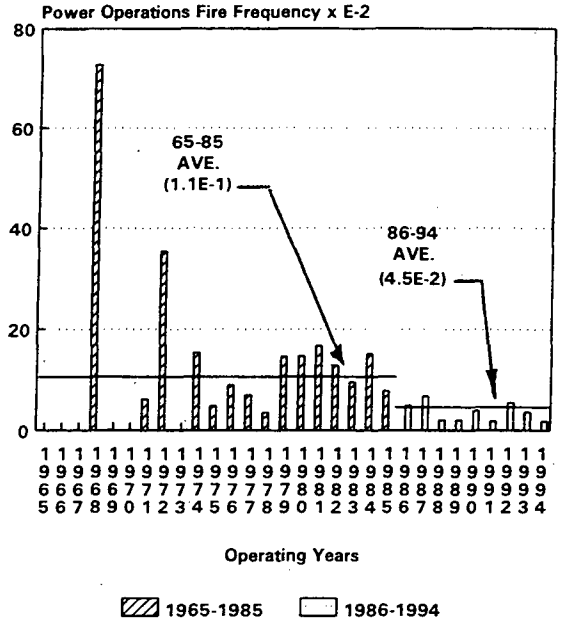
## POWER OPERATIONS FIRE FREQUENCIES CONTAINMENT - 1965-1994 and 1986-1994




## POWER OPERATIONS FIRE FREQUENCIES REACTOR BLDG (BWR) - 1965-1994




## POWER OPERATIONS FIRE FREQUENCIES AUXILIARY BLDG (PWR) - 1965-1994




## POWER OPERATIONS FIRE FREQUENCIES TURBINE BLDG - 1965-1985 AND 1986-1994

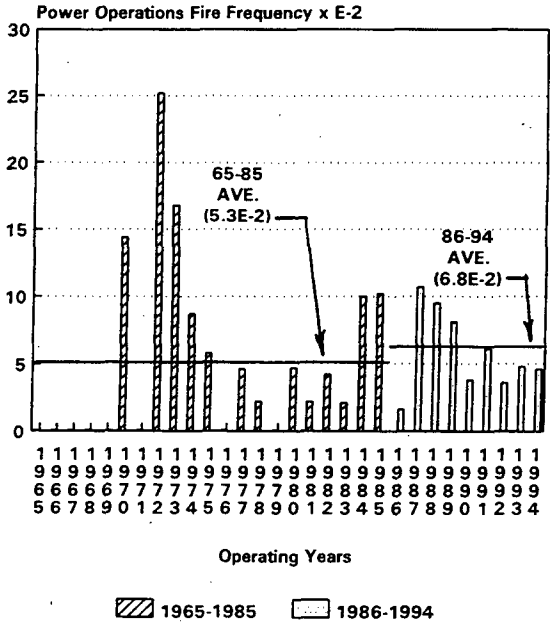
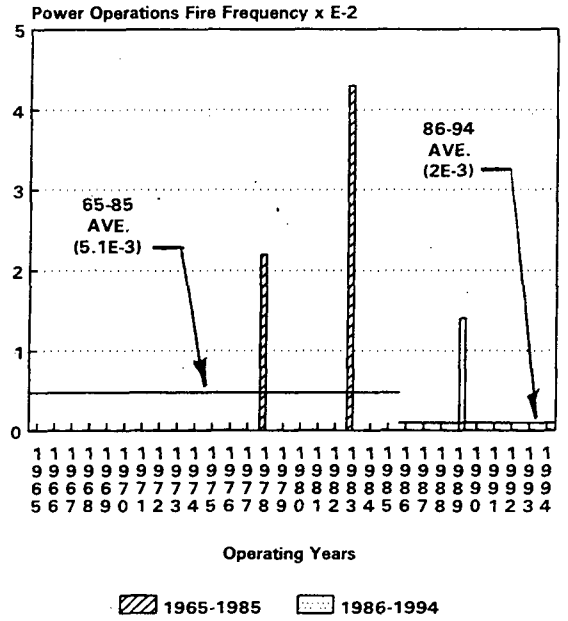
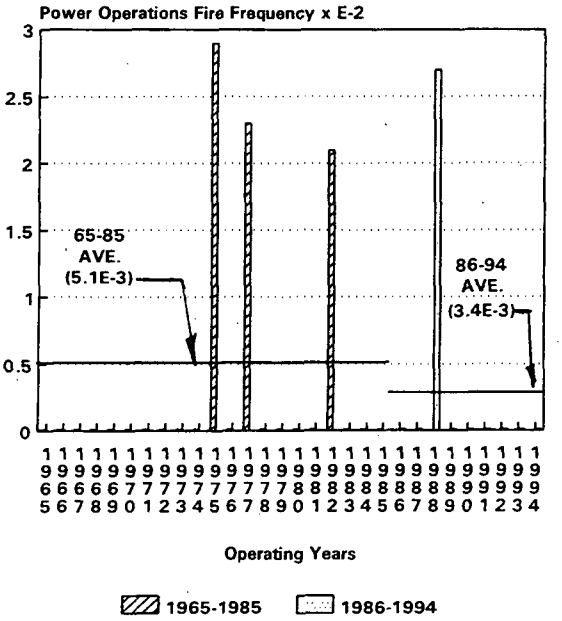



**FIGURE 19**

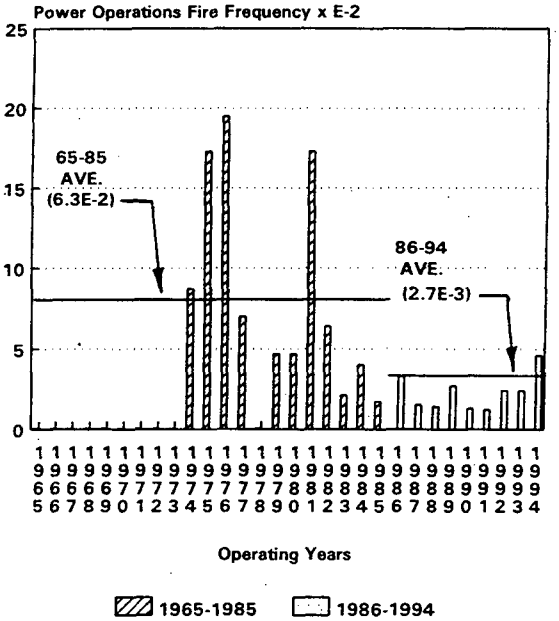
## POWER OPERATIONS FIRE FREQUENCIES CONTROL ROOM - 1965-1985 AND 1986-1994




## POWER OPERATIONS FIRE FREQUENCIES CABLE SPREAD RM- 1965-1985 AND 1986-1994




## POWER OPERATIONS FIRE FREQUENCIES DIESEL GEN.BLDG- 1965-1985 AND 1986-1994




## POWER OPERATIONS FIRE FREQUENCIES SWITCHGEAR ROOM- 1965-1985 AND 1986-1994

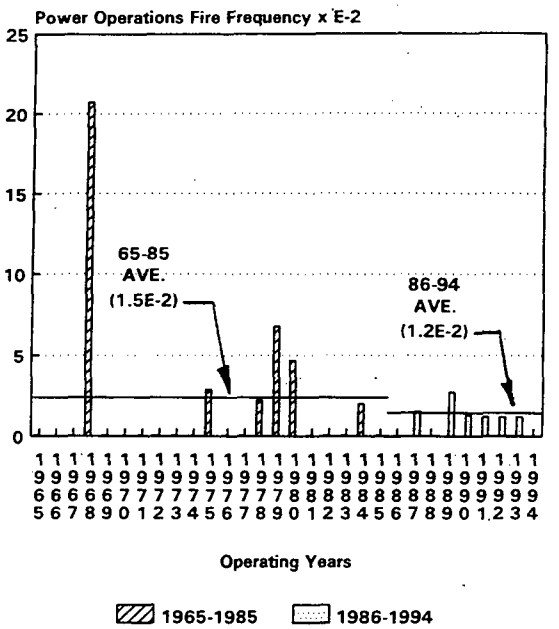
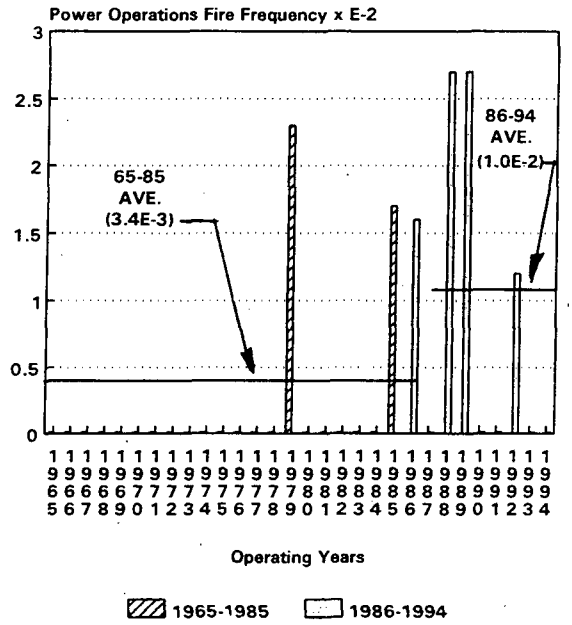
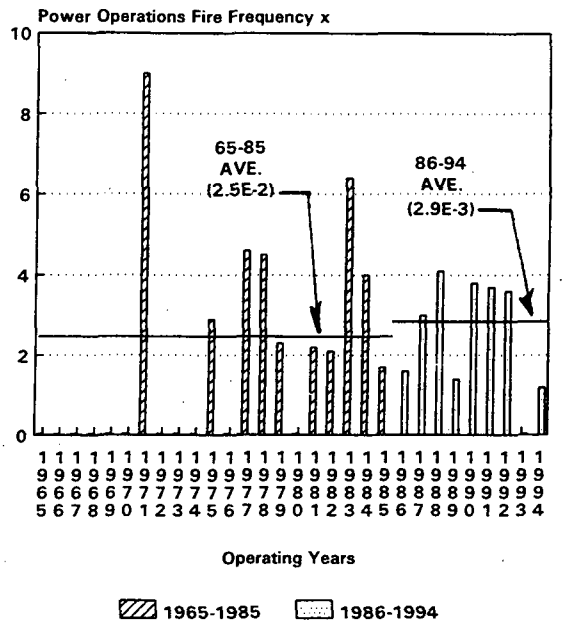



**FIGURE 20**

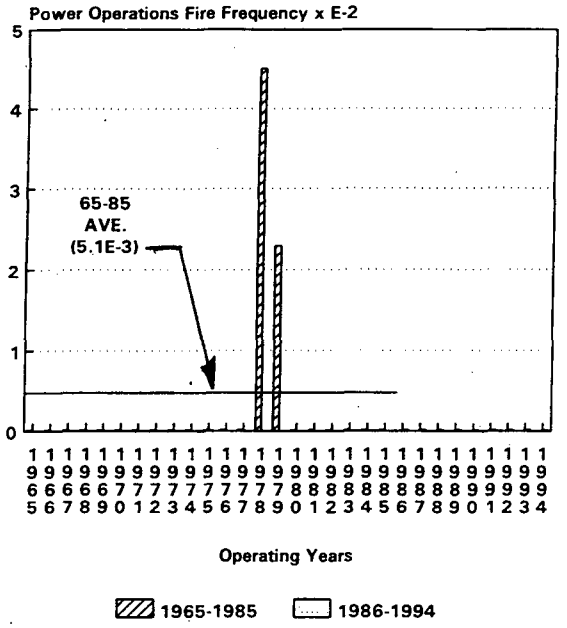
## POWER OPERATIONS FIRE FREQUENCIES SERV WTR PUMPHSE-1965-1985 AND 1986-1994




## POWER OPERATIONS FIRE FREQUENCIES SWITCH YARD - 1965-1985 AND 1986-1994

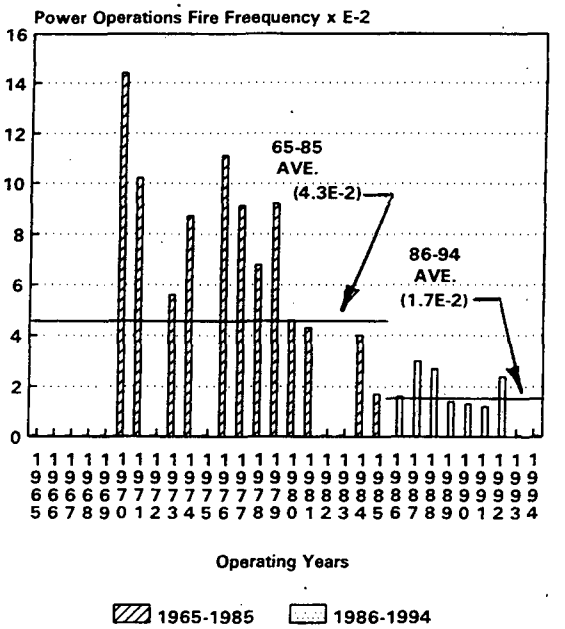



## POWER OPERATIONS FIRE FREQUENCIES BATTERY ROOM - 1965-1985 AND 1986-1994




No fire events, 1986-1994.

## POWER OPERATIONS FIRE FREQUENCIES OTHER BLDGS - 1965-1985 AND 1986-1994




Mostly Recombiner and Offgas Bldgs

**FIGURE 21**

APPENDIX E - TABLE I
PLANT AVERAGE UNIT AVAILABILITY FACTOR - 1965-1985

| 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
|---|---|---|---|---|---|---|---|---|---|---|
| 68.8* | 68.8* | 68.8* | 68.8* | 68.8* | 68.8* | 68.8* | 68.8* | 68.8* | 69.2 | 76.5 |

| 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | PERIOD AVERAGE |
|---|---|---|---|---|---|---|---|---|---|---|
| 69.3 | 73.4 | 74.8 | 67.9 | 65.4 | 67.8 | 65.7 | 63.9 | 63.0 | 68.5 | 68.8% |

NOTES:

1. Source for Plant Average Unit Availability Factor was NUREG-0020, "Licenced Operating Reactor Status Summary," ("Grey Books) starting 1974.

2. Plants' Average Unit Availability for 1974-1985 = $\frac{825.4}{12}$ = 68.8 %.

3. * denotes use of 1974-1985 average for 1965-1973, resulting in Plants' Average Unit Availability for 1965-1985 = $\frac{1444.6}{21}$ = 68.8%.

APPENDIX E - TABLE II
PLANT AVERAGE UNIT AVAILABILITY FACTOR - 1986-1994

| 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | PERIOD AVERAGE |
|---|---|---|---|---|---|---|---|---|---|
| 65.5 | 67.2 | 69.8 | 68 5 | 71.1 | 73.6 | 74.8 | 76.6 | 79.1 | 71.8% |

NOTES:

1. Source for Plant Average Unit Availability Factor was NUREG-0020, "Licenced Operating Reactor Status Summary," ("Grey Books).

2. Plants' Average Unit Availability for 1986-1994 = $\frac{646.2}{9}$ = 71.8%.

3. Plants' Average Unit Availability for 1965-1994 = $\frac{2090.8}{30}$ = 69.7%.

## APPENDIX E - TABLE III
## POWER OPERATIONS FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1965-1985

| ITEM NO. | LOCATION | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Containment | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.043 | 0.000 |
| 2 | Reactor Building (BWR) | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 1 |
| | Plt React-Yrs | 2.06 | 2.06 | 2.06 | 2.06 | 1.44 | 3.92 | 5.09 | 6.26 | 8.66 | 9.96 | 13.69 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.479 | 0.000 | 0.201 | 0.073 |
| 3 | Auxiliary Building (PWR) | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 2 | 1 |
| | Plt React-Yrs | 1.38 | 1.38 | 1.38 | 2.75 | 2.75 | 3.02 | 4.68 | 5.64 | 9.15 | 13.01 | 20.96 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.727 | 0.000 | 0.000 | 0.062 | 0.354 | 0.000 | 0.154 | 0.048 |
| 4 | Turbine Building | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 3 | 2 | 2 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.144 | 0.000 | 0.252 | 0.168 | 0.087 | 0.058 |
| 5 | Control Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 6 | Cable Spreading Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.029 |
| 7 | Switchgear Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.207 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.029 |
| 8 | Diesel Gen. Bldg | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.087 | 0.173 |

APPENDIX E - TABLE III (CONTINUED)
POWER OPERATIONS FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1965-1985

| ITEM NO. | LOCATION | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Service Water Pumphouse | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 10 | Switch Yard | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.090 | 0.000 | 0.000 | 0.000 | 0.029 |
| 11 | Battery Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0000 | 0.000 | 0.000 | 0.000 |
| 12 | Other Building | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 0 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.144 | 0.102 | 0.000 | 0.056 | 0.087 | 0.000 |
| 13 | Offsite | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 14 | Temporary Bldg | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | Plt React-Yrs | 3.44 | 3.44 | 3.44 | 4.82 | 4.20 | 6.94 | 9.77 | 11.90 | 17.82 | 22.97 | 34.70 |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.044 | 0.000 |
| **Yearly Total No. Fire Events:** | | **0** | **0** | **0** | **3** | **0** | **2** | **2** | **8** | **4** | **12** | **13** |
| **Plant Reactor-Years:** | | **3.44** | **3.44** | **3.44** | **4.82** | **4.20** | **6.94** | **9.77** | **11.90** | **17.82** | **22.97** | **34.70** |
| **Yearly Ave. Pwr Oper.Fire Freq.:** | | **0.000** | **0.000** | **0.000** | **0.622** | **0.000** | **0.288** | **0.205** | **0.672** | **0.224** | **0.522** | **0.375** |

APPENDIX E - TABLE III (CONTINUED)
POWER OPERATIONS FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1965-1985

| ITEM NO. | LOCATION | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | PERIOD TOTAL | PERCENTAGE TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Containment | | | | | | | | | | | | |
| | No. Fire Events | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 6 | 3 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.46 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.056 | 0.023 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.021 | 0.000 | 0.017 | 0.010 | |
| 2 | Reactor Building (BWR) | | | | | | | | | | | | |
| | No. Fire Events | 1 | 4 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 17 | 9 |
| | Plt React-Yrs | 13.86 | 15.27 | 15.56 | 15.82 | 15.70 | 16.27 | 15.77 | 15.46 | 16.70 | 20.21 | 226.01 | |
| | Pwr Oper. Fire Freq. | 0.072 | 0.262 | 0.064 | 0.063 | 0.064 | 0.123 | 0.000 | 0.000 | 0.000 | 0.000 | 0.075 | |
| 3 | Auxiliary Building (PWR) | | | | | | | | | | | | |
| | No. Fire Events | 2 | 2 | 1 | 4 | 4 | 5 | 4 | 3 | 5 | 3 | 40 | 20 |
| | Plt React-Yrs | 22.11 | 28.55 | 28.80 | 27.64 | 27.27 | 29.97 | 31.27 | 31.38 | 33.07 | 38.29 | 359.07 | |
| | Pwr Oper. Fire Freq. | 0.090 | 0.070 | 0.035 | 0.145 | 0.147 | 0.167 | 0.128 | 0.096 | 0.151 | 0.078 | 0.111 | |
| 4 | Turbine Building | | | | | | | | | | | | |
| | No. Fire Events | 0 | 2 | 1 | 0 | 2 | 1 | 2 | 1 | 5 | 6 | 31 | 16 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.96 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.046 | 0.022 | 0.000 | 0.047 | 0.022 | 0.042 | 0.021 | 0.100 | 0.102 | 0.053 | |
| 5 | Control Room | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 3 | 2 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.96 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.023 | 0.000 | 0.000 | 0.000 | 0.043 | 0.000 | 0.000 | 0.005 | |
| 6 | Cable Spreading Room | | | | | | | | | | | | |
| | No. Fire Events | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 2 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.96 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.023 | 0.000 | 0.000 | 0.000 | 0.000 | 0.021 | 0.000 | 0.000 | 0.000 | 0.005 | |
| 7 | Switchgear Room | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 1 | 3 | 2 | 0 | 0 | 0 | 1 | 0 | 9 | 4 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.96 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.022 | 0.068 | 0.047 | 0.000 | 0.000 | 0.0000 | 0.020 | 0.000 | 0.015 | |
| 8 | Diesel Gen. Bldg | | | | | | | | | | | | |
| | No. Fire Events | 7 | 3 | 0 | 2 | 2 | 8 | 3 | 1 | 2 | 1 | 37 | 18 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.96 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.195 | 0.070 | 0.000 | 0.047 | 0.047 | 0.173 | 0.064 | 0.021 | 0.040 | 0.017 | 0.063 | |

APPENDIX E - TABLE III (CONTINUED)
POWER OPERATIONS FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1965-1985

| ITEM NO. | LOCATION | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | PERIOD TOTAL | PERCENTAGE TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Service Water Pumphouse | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.46 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.023 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.017 | 0.003 | |
| 10 | Switch Yard | | | | | | | | | | | | |
| | No. Fire Events | 0 | 2 | 2 | 1 | 0 | 1 | 1 | 3 | 2 | 1 | 15 | 7 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.46 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.046 | 0.045 | 0.023 | 0.000 | 0.022 | 0.021 | 0.064 | 0.040 | 0.017 | 0.025 | |
| 11 | Battery Room | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.46 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.045 | 0.023 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | |
| 12 | Other Building | | | | | | | | | | | | |
| | No. Fire Events | 4 | 4 | 3 | 4 | 2 | 2 | 0 | 0 | 2 | 1 | 25 | 12 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.46 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.111 | 0.091 | 0.068 | 0.092 | 0.046 | 0.043 | 0.000 | 0.000 | 0.040 | 0.017 | 0.043 | |
| 13 | Offsite | | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 4 | 2 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.46 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.022 | 0.000 | 0.000 | 0.000 | 0.042 | 0.000 | 0.000 | 0.017 | 0.007 | |
| 14 | Temporary Bldg | | | | | | | | | | | | |
| | No. Fire Events | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 |
| | Plt React-Yrs | 35.97 | 43.82 | 44.36 | 43.46 | 42.97 | 46.24 | 47.04 | 46.84 | 49.77 | 58.50 | 585.08 | |
| | Pwr Oper. Fire Freq. | 0.027 | 0.000 | 0.022 | 0.023 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 | |
| **Yearly Total No. Fire Events:** | | **17** | **19** | **14** | **18** | **13** | **17** | **13** | **11** | **17** | **16** | **199** | **100%** |
| **Plant Reactor-Years:** | | **35.97** | **43.82** | **44.36** | **43.46** | **42.97** | **46.24** | **47.04** | **46.84** | **49.77** | **58.50** | **585.08** | |
| **Yearly Ave. Pwr Oper.Fire Freq.:** | | **0.473** | **0.434** | **0.316** | **0.414** | **0.302** | **0.368** | **0.276** | **0.235** | **0.342** | **0.274** | **0.345** | |

**NOTES:**

1. See Figures 19, 20, and 21.

APPENDIX E - TABLE IV
POWER OPERATIONS EXTRAPOLATED FIRE EVENTS BY TOTAL PLANT AND PLANT LOCATION - 1989-1994

| | | NUMBER OF EXTRAPOLATED FIRE EVENTS | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | LOCATION | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | TOTAL |
| 1. | Containment | 1 | 0 | 1 | 0 | 1 | 0 | 3 |
| 2. | Reactor Bldg (BWR) | 0 | 1 | 0 | 1 | 0 | 1 | 3 |
| 3. | Auxiliary Bldg (PWR) | 1 | 1 | 1 | 1 | 1 | 1 | 6 |
| 4. | Turbine Bldg | 0 | 1 | 0 | 1 | 1 | 1 | 4 |
| 5. | Control Room | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6. | Cable Spreading Room | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7. | Switchgear Room | 0 | 0 | 1 | 1 | 1 | 0 | 3 |
| 8. | Diesel Gen. Bldg | 1 | 1 | 1 | 0 | 1 | 1 | 5 |
| 9. | Battery Room | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10. | Other Bldgs | 1 | 0 | 1 | 1 | 0 | 0 | 3 |
| 11. | Service Water Pumphse | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. | Switch Yard | 1 | 1 | 0 | 0 | 0 | 1 | 3 |
| | Totals: | 5 | 5 | 5 | 5 | 5 | 5 | 30 |

Note: Extrapolated data was developed from unreported fire events from EPRI reconciled data over 1979-1988 period, with average of five fire events per year during power operations and five fire events per year during shutdown. The location apportionment was determined at approximately the same apportionment of fire events from Appendix A - Tables I and II for the 1979-1988 period.

## APPENDIX E - TABLE V
## POWER OPERATIONS FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1986-1994

| ITEM NO. | LOCATION | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | PERIOD TOTAL | PERCENTAGE TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Containment | | | | | | | | | | | |
| | No. Fire Events | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 5 | 4 |
| | Plt React-Yrs | 61.24 | 65.65 | 73.57 | 73.84 | 78.07 | 81.55 | 82.13 | 83.03 | 86.22 | 586.10 | |
| | Pwr Oper. Fire Freq. | 0.016 | 0.015 | 0.000 | 0.014 | 0.000 | 0.012 | 0.000 | 0.012 | 0.000 | 0.008 | |
| 2 | Reactor Building (BWR) | | | | | | | | | | | |
| | No. Fire Events | 2 | 2 | 1 | 0 | 2 | 1 | 1 | 1 | 2 | 12 | 8 |
| | Plt React-Yrs | 20.56 | 21.84 | 24.85 | 24.66 | 26.31 | 27.23 | 27.60 | 28.34 | 29.27 | 230.12 | |
| | Pwr Oper. Fire Freq. | 0.097 | 0.092 | 0.040 | 0.000 | 0.076 | 0.037 | 0.036 | 0.035 | 0.068 | 0.052 | |
| 3 | Auxiliary Building (PWR) | | | | | | | | | | | |
| | No. Fire Events | 2 | 3 | 1 | 1 | 2 | 1 | 3 | 2 | 1 | 16 | 11 |
| | Plt React-Yrs | 40.68 | 43.81 | 48.72 | 49.18 | 51.76 | 54.32 | 54.45 | 54.69 | 56.95 | 355.98 | |
| | Pwr Oper. Fire Freq. | 0.049 | 0.068 | 0.020 | 0.020 | 0.039 | 0.018 | 0.055 | 0.036 | 0.018 | 0.045 | |
| 4 | Turbine Building | | | | | | | | | | | |
| | No. Fire Events | 1 | 7 | 7 | 6 | 3 | 5 | 3 | 4 | 4 | 40 | 28 |
| | Plt React-Yrs | 61.24 | 65.65 | 73.57 | 73.84 | 78.07 | 81.55 | 82.13 | 83.03 | 86.22 | 586.10 | |
| | Pwr Oper. Fire Freq. | 0.016 | 0.107 | 0.095 | 0.081 | 0.038 | 0.061 | 0.036 | 0.048 | 0.046 | 0.068 | |
| 5 | Control Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | Plt React-Yrs | 61.24 | 65.65 | 73.57 | 73.84 | 78.07 | 81.55 | 82.13 | 83.03 | 86.22 | 586.10 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.014 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | |
| 6 | Cable Spreading Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| | Plt React-Yrs | 61.24 | 65.65 | 73.57 | 73.84 | 78.07 | 81.55 | 82.13 | 83.03 | 86.22 | 586.10 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.027 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | |
| 7 | Switchgear Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 1 | 0 | 2 | 1 | 1 | 1 | 1 | 0 | 7 | 12 |
| | Plt React-Yrs | 61.24 | 65.65 | 73.57 | 73.84 | 78.07 | 81.55 | 82.13 | 83.03 | 86.22 | 586.10 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.015 | 0.000 | 0.027 | 0.013 | 0.012 | 0.012 | 0.012 | 0.000 | 0.012 | |
| 8 | Diesel Gen. Bldg | | | | | | | | | | | |
| | No. Fire Events | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 4 | 16 | 11 |
| | Plt React-Yrs | 61.24 | 65.65 | 73.57 | 73.84 | 78.07 | 81.55 | 82.13 | 83.03 | 86.22 | 586.10 | |
| | Pwr Oper. Fire Freq. | 0.033 | 0.015 | 0.014 | 0.027 | 0.013 | 0.012 | 0.024 | 0.024 | 0.046 | 0.027 | |

APPENDIX E - TABLE V (CONTINUED)
POWER OPERATIONS FIRE FREQUENCY BY TOTAL PLANT AND PLANT LOCATION - 1986-1994

| ITEM NO. | LOCATION | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | PERIOD TOTAL | PERCENTAGE TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Service Water Pumphse | | | | | | | | | | | |
| | No. Fire Events | 1 | 0 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 6 | 4 |
| | Plt React-Yrs | 61.24 | 65.65 | 73.57 | 73.84 | 78.07 | 81.55 | 82.13 | 83.03 | 86.22 | 586.10 | |
| | Pwr Oper. Fire Freq. | 0.016 | 0.000 | 0.027 | 0.027 | 0.000 | 0.000 | 0.012 | 0.000 | 0.000 | 0.010 | |
| 10 | Switch Yard | | | | | | | | | | | |
| | No. Fire Events | 1 | 2 | 3 | 1 | 3 | 3 | 3 | 0 | 1 | 17 | 12 |
| | Plt React-Yrs | 61.24 | 65.65 | 73.57 | 73.84 | 78.07 | 81.55 | 82.13 | 83.03 | 86.22 | 586.10 | |
| | Pwr Oper. Fire Freq. | 0.016 | 0.030 | 0.041 | 0.014 | 0.038 | 0.037 | 0.036 | 0.000 | 0.012 | 0.029 | |
| 11 | Battery Room | | | | | | | | | | | |
| | No. Fire Events | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Plt React-Yrs | 61.24 | 65.65 | 73.57 | 73.04 | 78.07 | 81.55 | 82.13 | 83.03 | 86.22 | 586.10 | |
| | Pwr Oper. Fire Freq. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | |
| 12 | Other Building | | | | | | | | | | | |
| | No. Fire Events | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 0 | 0 | 10 | 7 |
| | Plt React-Yrs | 61.24 | 65.65 | 73.57 | 73.04 | 78.07 | 81.55 | 82.13 | 83.03 | 86.22 | 586.10 | |
| | Pwr Oper. Fire Freq. | 0.016 | 0.030 | 0.027 | 0.014 | 0.013 | 0.012 | 0.024 | 0.000 | 0.000 | 0.017 | |
| 13 | Offsite | | | | | | | | | | | |
| | No. Fire Events | 1 | 0 | 1 | 1 | 4 | 0 | 1 | 0 | 2 | 10 | 7 |
| | Plt React-Yrs | 61.24 | 65.65 | 73.57 | 73.04 | 78.07 | 81.55 | 82.13 | 83.03 | 86.22 | 586.10 | |
| | Pwr Oper. Fire Freq. | 0.016 | 0.000 | 0.014 | 0.014 | 0.051 | 0.000 | 0.012 | 0.000 | 0.023 | 0.017 | |
| **Yearly Total No. Fire Events:** | | **12** | **19** | **20** | **18** | **17** | **14** | **17** | **11** | **14** | **142** | **100%** |
| **Plant Reactor-Years:** | | **61.24** | **65.65** | **73.57** | **73.04** | **78.07** | **81.55** | **82.13** | **83.03** | **86.22** | **586.10** | |
| **Yearly Ave. Pwr Oper. Fire Freq.:** | | **0.196** | **0.289** | **0.272** | **0.246** | **0.218** | **0.172** | **0.207** | **0.132** | **0.162** | **0.242** | |

**NOTES:**

1. See Figures 19, 20, and 21.
2. Plant Reactor-Years for a specific year = plant operating-years for a specfic year times the Unit Availability factor for that year (see Appendix E - Table II).
3. Totals include 30 (5/year, 1989-1994) extrapolated fire events. Apportionment of extrapolated data was by plant location, based on the 1979-1988 data (See Appendix E - Table IV).

APPENDIX E - TABLE VI
POWER OPERATIONS FIRE FREQUENCY BY PLANT LOCATION - BAYES 90% INTERVALS

| ITEM NO. | LOCATION | 1965-1985 PERIOD LOWER BOUND | MEAN | UPPER BOUND | 1986-1994 PERIOD LOWER BOUND | MEAN | UPPER BOUND | 1965-1994 COMBINED PERIOD LOWER BOUND | MEAN | UPPER BOUND |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Containment | 5.0E-3 | 1.1E-2 | 1.9E-2 | 3.9E-3 | 9.4E-3 | 1.7E-2 | 5.6E-3 | 9.8E-3 | 3.0E-2 |
| 2 | Reactor Building (BWR) | 6.8E-2 | 7.7E-2 | 1.1E-1 | 3.2E-2 | 5.4E-2 | 8.2E-2 | 4.6E-2 | 6.5E-2 | 8.5E-2 |
| 3 | Auxiliary Building (PWR) | 8.5E-2 | 1.1E-1 | 1.4E-1 | 3.0E-2 | 4.6E-2 | 6.7E-2 | 6.2E-2 | 7.9E-2 | 9.7E-2 |
| 4 | Turbine Building | 3.9E-2 | 5.4E-2 | 7.1E-2 | 5.2E-2 | 6.9E-2 | 8.8E-2 | 4.5E-2 | 6.1E-2 | 7.8E-2 |
| 5 | Control Room | 1.8E-3 | 6.0E-3 | 1.2E-2 | 3.0E-4 | 2.6E-3 | 6.7E-3 | 1.4E-3 | 3.8E-3 | 7.2E-3 |
| 6 | Cable Spreading Rm | 1.8E-3 | 6.0E-3 | 1.2E-2 | 9.8E-4 | 4.3E-3 | 9.5E-3 | 2.0E-3 | 4.7E-3 | 8.4E-3 |
| 7 | Switchgear Room | 8.6E-3 | 1.6E-2 | 2.6E-2 | 6.2E-3 | 1.3E-2 | 2.1E-2 | 8.9E-3 | 1.4E-2 | 2.0E-2 |
| 8 | Diesel Gen. Building | 4.8E-2 | 6.4E-2 | 8.2E-2 | 1.8E-2 | 2.8E-2 | 4.0E-2 | 3.2E-2 | 4.6E-2 | 6.1E-2 |
| 9 | Service Water Pumphse | 9.8E-4 | 4.2E-3 | 9.5E-3 | 5.0E-3 | 1.1E-2 | 1.9E-2 | 3.7E-3 | 7.2E-3 | 1.2E-2 |
| 10 | Switch Yard | 1.6E-2 | 2.6E-2 | 3.8E-2 | 1.9E-2 | 3.0E-2 | 4.2E-2 | 2.0E-2 | 2.8E-2 | 3.6E-2 |
| 11 | Battery Room | 1.8E-3 | 6.0E-3 | 1.2E-2 | 3.4E-6 | 8.5E-4 | 3.3E-3 | 9.3E-4 | 3.0E-3 | 6.0E-3 |
| 12 | Other Bldgs | 3.0E-2 | 4.4E-2 | 5.9E-2 | 1.0E-2 | 1.8E-2 | 2.8E-2 | 2.2E-2 | 3.0E-2 | 3.9E-2 |
| 13 | Offsite | 2.8E-3 | 7.7E-3 | 1.4E-2 | 1.0E-2 | 1.8E-2 | 2.8E-2 | 7.6E-3 | 1.2E-2 | 1.8E-2 |

**Note:** Jeffreys noninformative prior (i.e., 0.5 fire events) was used in the development of Bayesian 90% intervals.

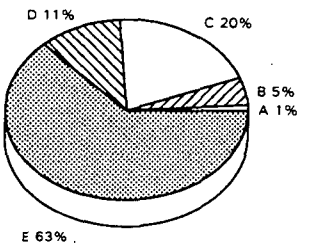
# APPENDIX F

# RISK INSIGHTS - SEVERITY GROUPING OF POWER OPERATIONS FIRE EVENTS

# AND

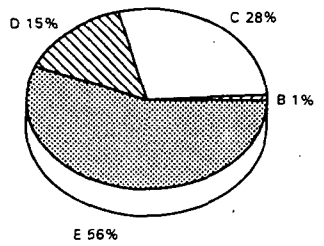
# COMPARISON OF POWER OPERATIONS FIRE FREQUENCIES WITH SELECTED PLANT PRA DATA BY PLANT LOCATION

RISK INSIGHTS - SEVERITY GROUPING
POWER OPERATIONS FIRE EVENTS- 1965-1985



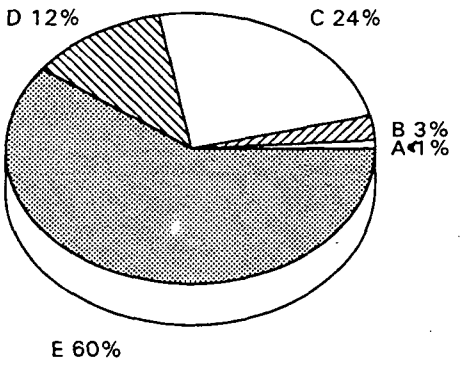

No. Fire Events at power: 199
Category A: 1; Category B: 10;
Category C: 41; Category D: 22

RISK INSIGHTS - SEVERITY GROUPING
POWER OPERATIONS FIRE EVENTS- 1986-1994




No. Fire Events at power: 142
Category A: 0; Category B: 2;
Category C: 40; Category D: 21

## RISK INSIGHTS - SEVERITY GROUPING
## POWER OPERATIONS FIRE EVENTS- 1965-1994




No. Fire Events at power: 341
Category A: 1; Category B: 12;
Category C: 81; Category D: 43

**FIGURE 22**

APPENDIX F - TABLE I

RISK INSIGHTS - SEVERITY GROUPING OF POWER OPERATIONS FIRE EVENTS - 1965-1985

| LOCATION | ITEM NO. | DKT | PLANT NAME | DUR. | SAFETY SYS TRAIN EFF | POWER EFFECT | SEVERITY CATEGORY |
|---|---|---|---|---|---|---|---|
| Switchgear Rm: | 4 | 1 | ++ | 1Hr-45min. | 1 train (Evaluated) | SCRAM | B |
| Auxiliary Bldg: | 5 | 206 | San Onofre 1 | 1Hr-45min. | 1 train (Evaluated) | SCRAM | B |
| | 19 | 409 | LaCrosse | 20min. | 1 train (Evaluated) | SCRAM | B |
| Reactor Bldg: | 20 | 265 | Quad Cities 2 | 2Hrs | 1 train (Evaluated) | SCRAM | B |
| | 45 | 249 | Dresden 3 | <5min. (Expl) | 1 train (Evaluated) | SCRAM | B |
| D. G. Bldg: | 49 | 333 | FitzPatrick | 45min. | 1 EDG train | SCRAM | B |
| Cable Sprd Rm: | 51 | 259 | Browns Ferry 1 | 7Hrs-30min. | Multiple Systems | SCRAM | A |
| | 99 | 278 | Peach Bottom 3 | 45min. | 1 train (Evaluated) | SCRAM | B |
| Other Bldgs: | 66 | 325 | Brunswick 2 | <5min. (Expl) | 1 train (Evaluated) | SCRAM | B |
| | 74 | 249 | Dresden 3 | <5min. (Expl) | 1 train (Evaluated) | SCRAM | B |
| Switch Yard: | 265 | 3 | ++ | 3Hrs-45min. | Plt AC Pwr (all) | SCRAM/ LOOP | B |

NOTES:

1. Power Operations fire events data (i.e., at power operations) is from Appendix A, Table I (1965-1985).

2. Severity Group Category A: Fire events at power operations that caused loss of more thant one train of a safety-related system or loss of multiple single-train safety-related systems.

3. Severity Group Category B: Fire events at power operations that resulted in a SCRAM and LOOP or resulted in a SCRAM and a loss of one train and had a duration of 5 minutes or longer, or resulted in a SCRAM and a loss of one train and had an explosion, regardless of the fire's duration.

4. Severity Group Category C: Fire events at power operations that reulted in a SCRAM, regardless of duration, but no loss of a safety-related train occurred (41 fire events - not shown in this table. See Appendix A - Tables I and II).

5. Severity Group Category D: Fire events at power operations that resulted in a loss of one train of fire safe shutdown equipment, regardless of the fire's duration, but without a SCRAM or Reactor Trip (22 fire events - not shown in this table. See Appendix A - Tables I and II)..

6. Where "1 train (Evaluated)" is listed, the specific safety-related train was not identified in the initial SANDIA database or other industry database.

7. See Figure 22.

APPENDIX F - TABLE II
RISK INSIGHTS - SEVERITY GROUPING OF POWER OPERATIONS FIRE EVENTS - 1986-1994

| LOCATION | ITEM NO. | DKT | PLANT NAME | DUR. | SAFETY SYS TRAIN EFF | POWER EFFECT | SEVERITY CATEGORY |
|---|---|---|---|---|---|---|---|
| Reactor Bldg: | 17 | 341 | Fermi 2 | >10min. | HPCI Sys | SCRAM (Manual) | B |
| Offsite: | 139 | 219 | Oyster Creek | 17Hrs | Plt AC Pwr (all) | SCRAM/ LOOP | B |

NOTES:

1. Power Operations fire events data from Appendix A, Table II (1986-1994).

2. Severity Group Category B: Fire events at power operations that resulted in a SCRAM and LOOP or resulted in a SCRAM and a loss of one train and had a duration of 5 minutes or longer, or resulted in a SCRAM and a loss of one train and had an explosion, regardless of the fire's duration.

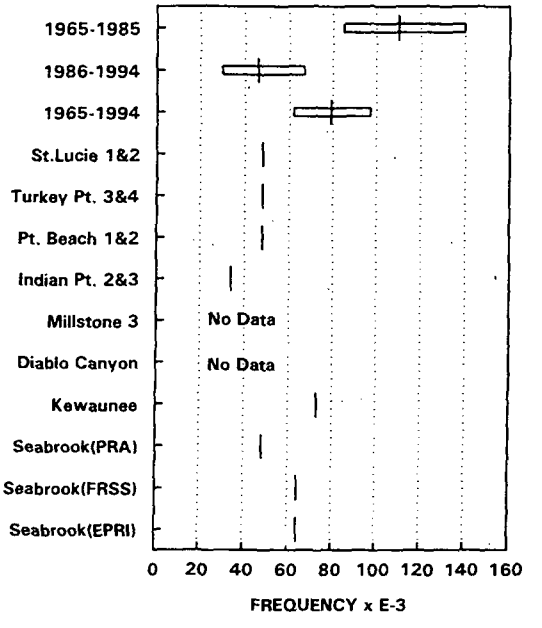
3. Severity Group Category C: Fire events at power operations that resulted in a SCRAM, regardless of duration, but no loss of a safety-related train occurred (40 fire events - not shown in this table. See Appendix A - Tables I and II).

4. Severity Group Category D: Fire events at power operations that resulted in a loss of one train of fire safe shutdown equipment, regardless of the fire's duration, but without a SCRAM or Reactor Trip (21 fire events - not shown in this table. See Appendix A - Tables I and II).

5. See Figure 22.

## AUXILIARY BLDG (PWR) POWER OPERATIONS
## FIRE FREQUENCY COMPARISON

### DATA SOURCE




## TURBINE BLDG POWER OPERATIONS
## FIRE FREQUENCY COMPARISON

### DATA SOURCE

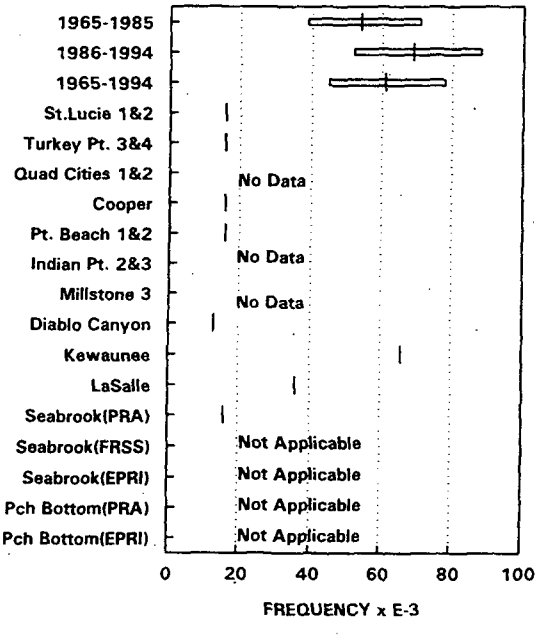
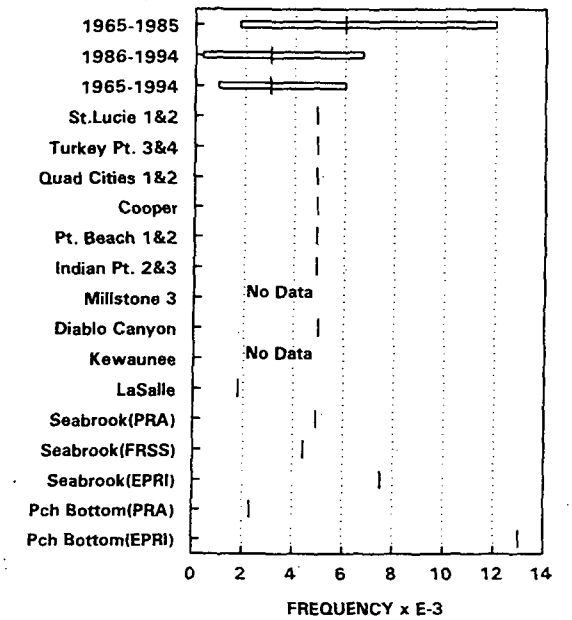



**FIGURE 25**

## CONTROL ROOM POWER OPERATIONS
## FIRE FREQUENCY COMPARISON

### DATA SOURCE




## CABLE SPRD ROOM POWER OPERATIONS
## FIRE FREQUENCY COMPARISON

### DATA SOURCE

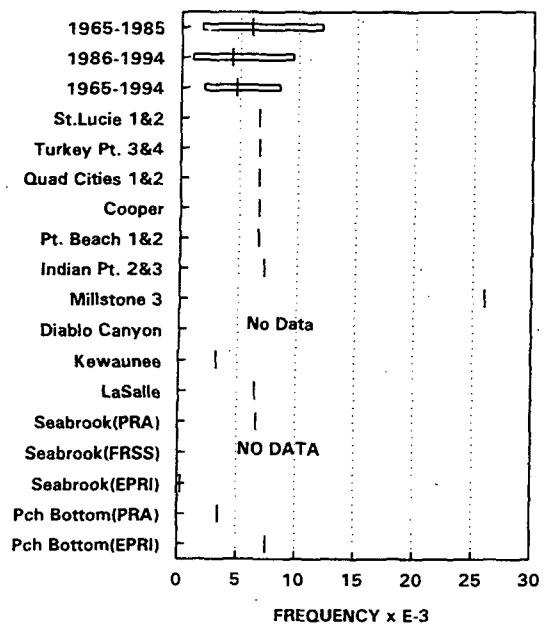
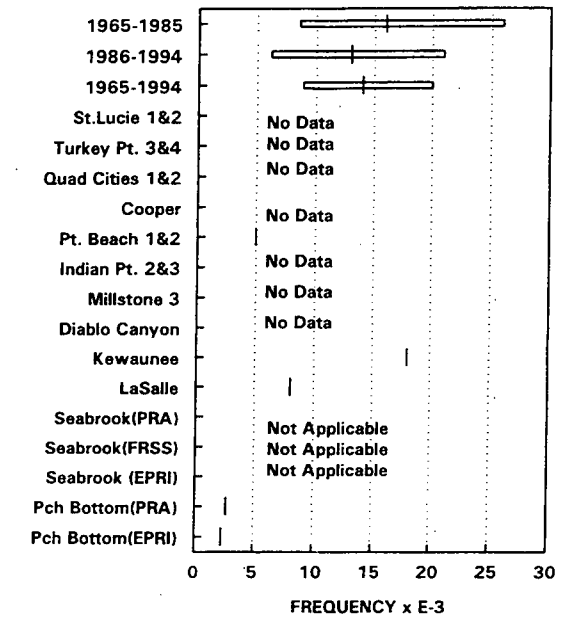



**FIGURE 23**

## SWITCHGEAR ROOM POWER OPERATIONS
## FIRE FREQUENCY COMPARISON

### DATA SOURCE




## REACTOR BLDG (BWR) POWER OPERATIONS
## FIRE FREQUENCY COMPARISON

### DATA SOURCE

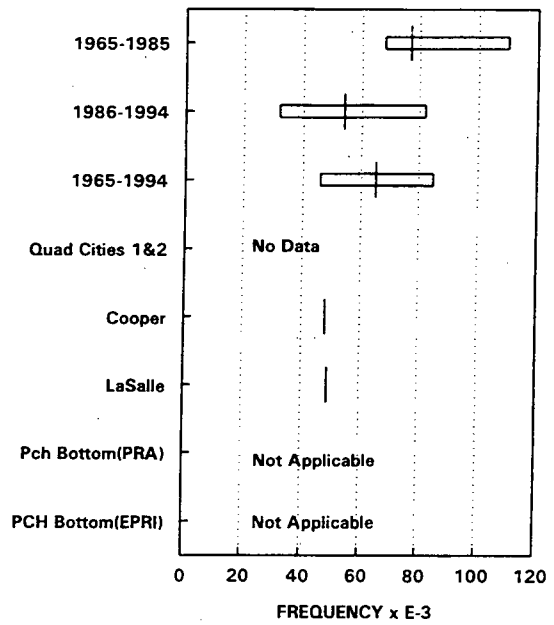



**FIGURE 24**

APPENDIX F - TABLE III

RISK INSIGHTS - COMPARISON OF POWER OPERATIONS FIRE FREQUENCIES WITH SELECTED PLANTS PRA DATA - BY PLANT LOCATION

| LOCATION CONTROL ROOM: | Mean Fire Freq. | Diff. Mult. w/1965-1985 | Diff. Mult. w/1986-1994 | Diff. Mult. w/1965-1994 | Present Pt. Est. Fire CDF | Comparison Significance with 1986-1994 Data |
|---|---|---|---|---|---|---|
| 1. This Study: | | | | | | |
| a. 1965-1985 | 6.0E-3 | -- | -- | -- | -- | -- |
| b. 1986-1994 | 8.5E-4 | -- | -- | -- | -- | -- |
| c. 1965-1994(combined) | 3.0E-3 | -- | -- | -- | -- | -- |
| 2. St. Lucie 1&2: | 4.9E-3 | 1.22 | 0.17 | 0.61 | -- | Lower, but CDF not quantified in PRA. |
| 3. Turkey Pt. 3&4: | 4.9E-3 | 1.22 | 0.17 | 0.61 | -- | Lower, but CDF not quantified in PRA. |
| 4. Quad Cities1&2: | 4.9E-3 | 1.22 | 0.17 | 0.61 | 6.7E-6 | Lower, but CDF still in E-6 range. |
| 5. Cooper | 4.9E-3 | 1.22 | 0.17 | 0.61 | -- | Lower, but CDF not quantified in PRA. |
| 6. Point Beach 1&2: | 4.9E-3 | 1.22 | 0.17 | 0.61 | -- | Lower, but CDF not quantified in PRA. |
| 7. Indian Pt. 2&3: | 4.9E-3 | 1.22 | 0.17 | 0.61 | -- | Lower, but CDF not quantified in PRA. |
| 8. Millstone 3: | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 9. Diablo Canyon | 5.0E-3 | 1.20 | 0.17 | 0.60 | 3.0E-6 | Significantly lower CDF (E-7 range). |
| 10. Kewaunee (IPEEE): | -- | NA | NA | NA | -- | Fire freq. & CDF not quantified in IPEEE. |
| 11. LaSalle | 1.8E-3 | 3.33 | 0.47 | 1.67 | 1.4E-5 | Lower, but CDF still in E-6 range. |
| 12. Seabrook: | | | | | | |
| a. PRA(PLG): | 4.9E-3 | 1.22 | 0.17 | 0.61 | 1.3E-5 | Lower, but CDF still in E-6 range. |
| b. FRSS (SNL): | 4.4E-3 | 1.36 | 0.19 | 0.68 | 9.7E-6 | Lower, but CDF still in E-6 range. |
| c. EPRI Requantif.: | 7.5E-3 | 0.80 | 0.11 | 0.40 | 1.0E-5 | Lower, but CDF still in E-6 range. |
| 13. Peach Bottom: | | | | | | |
| a. PRA(1150): | 2.3E-3 | 2.61 | 0.37 | 1.30 | 6.2E-6 | Lower, but CDF still in E-6 range. |
| b. EPRI Requantif.: | 1.3E-2 | 0.46 | 0.07 | 0.23 | 1.9E-7 | Lower, not significant (still <E-6 range). |

NOTE: See Figure 23.

APPENDIX F - TABLE III (CONTINUED)

RISK INSIGHTS - COMPARISON OF POWER OPERATIONS FIRE FREQUENCIES WITH SELECTED PLANTS PRA DATA - BY PLANT LOCATION

| LOCATION<br>CABLE SPREADING ROOM: | Mean Fire Freq. | Diff. Mult. w/1965-1985 | Diff. Mult. w/1986-1994 | Diff. Mult. w/1965-1994 | Present Pt. Est. Fire CDF | Comparison Significance with 1986-1994 Data |
|---|---|---|---|---|---|---|
| 1. This Study: | | | | | | |
| a. 1965-1985 | 6.0E-3 | -- | -- | -- | -- | -- |
| b. 1986-1994 | 4.3E-3 | -- | -- | -- | -- | -- |
| c. 1965-1994(combined) | 4.7E-3 | -- | -- | -- | -- | -- |
| 2. St. Lucie 1&2: | 6.7E-3 | 0.90 | 0.64 | 0.70 | 1.5E-5 | Lower, but CDF still in E-6 range. |
| 3. Turkey Pt. 3&4: | 6.7E-3 | 0.90 | 0.64 | 0.70 | 3.0E-6 | Lower, but CDF still in E-6 range. |
| 4. Quad Cities1&2: | 6.7E-3 | 0.90 | 0.64 | 0.70 | 5.8E-6 | Lower, but CDF still in E-6 range. |
| 5. Cooper | 6.7E-3 | 0.90 | 0.64 | 0.70 | 5.8E-7 | Lower, not significant (still <E-6 range). |
| 6. Point Beach 1&2: | 6.7E-3 | 0.90 | 0.64 | 0.70 | -- | Lower, but CDF not quantified in PRA. |
| 7. Indian Pt. 2&3: | 7.2E-3 | 0.93 | 0.64 | 0.65 | 1.9E-6 | Lower, but CDF still in E-6 range. |
| 8. Millstone 3: | 2.6E-2 | 0.23 | 0.16 | 0.18 | -- | Lower, but CDF not quantified in PRA. |
| 9. Diablo Canyon | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 10. Kewaunee (IPEEE): | 3.2E-3 | 1.88 | 1.34 | 1.47 | -- | Higher, but CDF not quantified in IPEEE. |
| 11. LaSalle | 6.5E-3 | 0.92 | 0.66 | 0.72 | 1.6E-7 | Lower, not significant (still <E-6 range). |
| 12. Seabrook: | | | | | | |
| a. PRA(PLG): | 6.7E-3 | 0.90 | 0.64 | 0.70 | 4.1E-6 | Lower, but CDF still in E-6 range. |
| b. FRSS (SNL): | 2.7E-3 | 2.22 | 1.59 | 1.74 | 2.3E-6 | Higher, but CDF still in E-6 range. |
| c. EPRI Requantif.: | 2.8E-4 | 21.4 | 15.4 | 16.8 | 5.3E-9 | Higher, not significant (still <E-6 range). |
| 13. Peach Bottom: | | | | | | |
| a. PRA(1150): | 3.5E-3 | 1.71 | 1.23 | 1.34 | 6.7E-7 | Higher, not significant (still <E-6 range). |
| b. EPRI Requantif.: | 7.5E-3 | 0.80 | 0.57 | 0.62 | 2.2E-8 | Lower, not significant (still <E-6 range). |

NOTE: See Figure 23.

APPENDIX F - TABLE III (CONTINUED)

RISK INSIGHTS - COMPARISON OF POWER OPERATIONS FIRE FREQUENCIES WITH SELECTED PLANTS PRA DATA - BY PLANT LOCATION

| LOCATION SWITCHGEAR ROOM: | Mean Fire Freq. | Diff. Mult. w/1965-1985 | Diff. Mult. w/1986-1994 | Diff. Mult. w/1965-1994 | Present Pt. Est. Fire CDF | Comparison Significance with 1986-1994 Data |
|---|---|---|---|---|---|---|
| 1. This Study: | | | | | | |
| a. 1965-1985 | 1.6E-2 | -- | -- | -- | -- | -- |
| b. 1986-1994 | 1.3E-2 | -- | -- | -- | -- | -- |
| c. 1965-1994(combined) | 1.4E-2 | -- | -- | -- | -- | -- |
| 2. St. Lucie 1&2: | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 3. Turkey Pt. 3&4: | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 4. Quad Cities1&2: | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 5. Cooper | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 6. Point Beach 1&2: | 5.0E-3 | 3.20 | 2.60 | 2.80 | 2.0E-5 | Higher, but CDF still in E-5 range. |
| 7. Indian Pt. 2&3: | -- | NA | NA | NA | 5.6E-5 | Fire freq. not quantified in PRA. |
| 8. Millstone 3: | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 9. Diablo Canyon | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 10. Kewaunee (IPEEE): | 1.8E-2 | 0.89 | 0.72 | 0.78 | -- | Lower, but CDF not quantified in IPEEE. |
| 11. LaSalle | 8.0E-3 | 2.00 | 1.62 | 1.75 | 1.4E-5 | Higher, but CDF still in E-5 range. |
| 12. Seabrook: | | | | | | |
| a. PRA(PLG): | -- | NA | NA | NA | -- | -- |
| b. FRSS (SNL): | -- | NA | NA | NA | -- | -- |
| c. EPRI Requantif.: | -- | NA | NA | NA | -- | -- |
| 13. Peach Bottom: | | | | | | |
| a. PRA(1150): | 2.7E-3 | 5.92 | 4.81 | 5.18 | 1.3E-5 | Higher, CDF still in E-5 range. |
| b. EPRI Requantif.: | 2.3E-3 | 6.96 | 5.65 | 6.09 | 1.3E-5 | Higher, CDF still in E-5 range. |

NOTE: See Figure 24.

APPENDIX F - TABLE III (CONTINUED)
PRA INSIGHTS - COMPARISON OF POWER OPERATIONS FIRE FREQUENCIES WITH SELECTED PLANTS PRA DATA - BY PLANT LOCATION

| LOCATION<br>REACTOR BUILDING (BWR): | Mean Fire Freq. | Diff. Mult. w/1965-1985 | Diff. Mult. w/1986-1994 | Diff. Mult. w/1965-1994 | Present Pt. Est. Fire CDF | Comparison Significance with 1986-1994 Data |
|---|---|---|---|---|---|---|
| 1. This Study: | | | | | | |
| a. 1965-1985 | 7.7E-2 | -- | -- | -- | -- | -- |
| b. 1986-1994 | 5.4E-2 | -- | -- | -- | -- | -- |
| c. 1965-1994(combined) | 6.5E-2 | -- | -- | -- | -- | -- |
| 2. Quad Cities1&2: | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 3. Cooper | 4.8E-2 | 1.60 | 1.12 | 1.35 | -- | Approx. same, but CDF not quantified in PRA. |
| 4. LaSalle | 4.9E-2 | 1.57 | 1.10 | 1.33 | 3.8E-6 | Approx. same. |
| 5. Peach Bottom: | | | | | | |
| a. PRA(1150): | -- | NA | NA | NA | -- | -- |
| b. EPRI Requantif.: | -- | NA | NA | NA | -- | -- |

**NOTES:**

1. The Reactor Building is identified for BWRs plants only in this study.
2. See Figure 24.

APPENDIX F - TABLE III (CONTINUED)

PRA INSIGHTS - COMPARISON OF POWER OPERATIONS FIRE FREQUENCIES WITH SELECTED PLANTS PRA DATA - BY PLANT LOCATION

| LOCATION<br>AUXILIARY BUILDING (PWR): | Mean Fire Freq. | Diff. Mult. w/1965-1985 | Diff. Mult. w/1986-1994 | Diff. Mult. w/1965-1994 | Present Pt. Est. Fire CDF | Comparison Significance with 1986-1994 Data |
|---|---|---|---|---|---|---|
| 1. This Study: | | | | | | |
| a. 1965-1985 | 1.1E-1 | -- | -- | -- | -- | -- |
| b. 1986-1994 | 4.9E-2 | -- | -- | -- | -- | -- |
| c. 1965-1994(combined) | 8.0E-2 | -- | -- | -- | -- | -- |
| 2. St. Lucie 1&2: | 4.8E-2 | 2.29 | 1.02 | 1.67 | -- | Same, but CDF not quantified in PRA. |
| 3. Turkey Pt. 3&4: | 4.8E-2 | 2.29 | 1.02 | 1.67 | -- | Same, but CDF not quantified in PRA. |
| 4. Point Beach 1&2: | 4.8E-2 | 2.29 | 1.02 | 1.67 | -- | Same, but CDF not quantified in PRA. |
| 5. Indian Pt. 2&3: | 3.4E-2 | 3.24 | 1.44 | 2.35 | -- | Higher, but CDF not quantified in PRA. |
| 6. Millstone 3: | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 7. Diablo Canyon | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 8. Kewaunee (IPEEE): | 7.3E-2 | 1.51 | 0.67 | 1.10 | -- | Lower, but CDF not quantified in IPEEE. |
| 9. Seabrook: | | | | | | |
| a. PRA(PLG): | 4.8E-2 | 2.29 | 1.02 | 1.67 | -- | Same, but CDF not quantified in PRA. |
| b. FRSS (SNL): | 6.4E-2 | 1.72 | 0.76 | 1.25 | 2.9E-5 | Lower, but CDF still in E-5 range. |
| c. EPRI Requantif.: | 6.4E-2 | 1.72 | 0.76 | 1.25 | 4.3E-9 | Lower, but not significant (still <E-6 range. |

**NOTES:**

1. The Auxiliary Building is used for PWRs only in this study.
2. See Figure 25.

APPENDIX F - TABLE III (CONTINUED)

PRA INSIGHTS - COMPARISON OF Power Operations FIRE FREQUENCIES WITH SELECTED PLANTS PRA DATA - BY PLANT LOCATION

| LOCATION<br>TURBINE BUILDING: | Mean Fire Freq. | Diff. Mult. w/1965-1985 | Diff. Mult. w/1986-1994 | Present Diff. Mult. w/1965-1994 | Pt. Est. Fire CDF | Comparison Significance with 1986-1994 Data |
|---|---|---|---|---|---|---|
| 1. This Study: | | | | | | |
| a. 1965-1985 | 5.4E-2 | -- | -- | -- | -- | -- |
| b. 1986-1994 | 6.9E-2 | -- | -- | -- | -- | -- |
| c. 1965-1994(combined) | 6.1E-2 | -- | -- | -- | -- | -- |
| 2. St. Lucie 1&2: | 1.6E-2 | 3.38 | 4.31 | 3.81 | -- | Higher, but CDF not quantified in PRA. |
| 3. Turkey Pt. 3&4: | 1.6E-2 | 3.38 | 4.31 | 3.81 | -- | Higher, but CDF not quantified in PRA. |
| 4. Quad Cities1&2: | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 5. Cooper | 1.6E-2 | 3.38 | 4.31 | 3.81 | -- | Higher, but CDF not quantified in PRA. |
| 6. Point Beach 1&2: | 1.6E-2 | 3.38 | 4.31 | 3.81 | -- | Higher, but CDF not quantified in PRA. |
| 7. Indian Pt. 2&3: | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 8. Millstone 3: | -- | NA | NA | NA | -- | Fire freq. and CDF not quantified in PRA. |
| 9. Diablo Canyon | 1.3E-2 | 4.15 | 5.31 | 4.69 | -- | Higher, but CDF not quantified in PRA. |
| 10. Kewaunee (IPEEE): | 6.6E-2 | 0.82 | 1.04 | 0.92 | -- | Same, but CDF not quantified in IPEEE. |
| 11. LaSalle | 3.6E-2 | 1.50 | 1.92 | 1.69 | 6.2E-7 | Higher, CDF now in E-6 range. |
| 12. Seabrook: | | | | | | |
| a. PRA(PLG): | 1.6E-2 | 3.38 | 4.31 | 3.81 | -- | Higher, but CDF not quantified in PRA. |
| b. FRSS (SNL): | 6.4E-2 | 0.84 | 1.08 | 0.95 | 4.1E-5 | Approximately the same. |
| c. EPRI Requantif.: | -- | NA | NA | NA | -- | -- |
| 13. Peach Bottom: | | | | | | |
| a. PRA(1150): | -- | NA | NA | NA | -- | -- |
| b. EPRI Requantif.: | -- | NA | NA | NA | -- | -- |

NOTE: See Figure 25.

APPENDIX F - TABLE IV
RISK INSIGHTS - COMPARISON OF SELECTED PLANT FIRE PRA DATA WITH 1986-1994 PLANT OPERATING EXPERIENCE

| PLANT NAME<br>LaSalle 2 | STUDY FIRE FREQUENCY | PRA FIRE FREQ.($\lambda$) | AREA RATIO TO BLDG | AREA RATIO TO ROOM | SEVERITY RATIO | PROB. NONSUP. | PROB. OTHER | PRA FIRE CDF | FIRE CDF USING STUDY FREQUENCY SENSITIVITY ANAL. |
|---|---|---|---|---|---|---|---|---|---|
| **Control Room** | 2.6E-3 | 2.17E-3 | NA | NA | NA | 1.0E-1 | Note 3 | 1.39E-5 | 1.66E-5 |
| **Cable Spreading Room** | 4.3E-3 | 6.48E-3 | NA | 1.5E-1 | 3.0E-1 | 9.9E-1 | Note 3 | 1.63E-7 | 1.08E-7 |
| **Switchgear Room:** | | | | | | | | | |
| Fire Area W (Scenario 1) | 1.3E-2 | 7.97E-3 | NA | NA | NA | 9.8E-1 | Note 3 | 1.80E-6 | |
| Fire Area W (Scenario 2) | 1.3E-2 | 7.97E-3 | NA | 1.8E-1 | 3.0E-1 | 9.8E-1 | Note 3 | 6.71E-6 | |
| Fire Area Y (Scenario 1) | 1.3E-2 | 7.97E-3 | NA | NA | NA | 9.5E-1 | Note 3 | 1.76E-6 | |
| Fire Area Y (Scenario 2) | 1.3E-2 | 7.97E-3 | NA | 1.3E-1 | 3.0E-1 | 9.5E-1 | Note 3 | 3.39E-6 | |
| **Subtotal:** | | | | | | | | 1.37E-5 | 2.23E-5 |
| **Reactor Bldg:** | | | | | | | | | |
| Fire Area P | 5.4E-2 | 4.9E-2 | 6.0E-2 | 8.4E-1 | 3.0E-1 | 8.2E-1 | Note 3 | 5.73E-7 | |
| Fire Area Z | 5.4E-2 | 4.9E-2 | 8.2E-2 | 5.0E-3 | 3.0E-1 | 9.1E-1 | Note 3 | 3.58E-8 | |
| Fire Area AA | 5.4E-2 | 4.9E-2 | 6.4E-2 | 8.0E-2 | 3.0E-1 | 9.3E-1 | Note 3 | 7.31E-9 | |
| Fire Area AC | 5.4E-2 | 4.9E-2 | 1.6E-3 | NA | NA | 9.9E-1 | Note 3 | 5.42E-7 | |
| Fire Area S (Scenario 1) | 5.4E-2 | 4.9E-2 | 2.8E-2 | 1.1E-1 | 3.0E-1 | 9.7E-1 | Note 3 | 5.94E-9 | |
| Fire Area S (Scenario 2) | 5.4E-2 | 4.9E-2 | 2.8E-2 | 1.1E-1 | 3.0E-1 | 9.7E-1 | Note 3 | 3.52E-7 | |
| Fire Area T | 5.4E-2 | 4.9E-2 | 6.8E-2 | 8.4E-1 | 3.0E-1 | 8.2E-1 | Note 3 | 2.27E-6 | |
| **Subtotal:** | | | | | | | | 3.79E-6 | 4.18E-6 |
| **Turbine Bldg:** | | | | | | | | | |
| Fire Area E-S2 | 6.9E-2 | 3.6E-2 | 3.8E-3 | 3.0E-1 | 1.7E-1 | 8.3E-1 | Note 3 | 1.14E-7 | |
| Fire Area E-S3 | 6.9E-2 | 3.6E-2 | 3.8E-3 | 3.0E-1 | 1.7E-1 | 8.3E-1 | Note 3 | 5.06E-7 | |
| **Subtotal:** | | | | | | | | 6.20E-7 | 1.19E-6 |
| **Totals:** | | | | | | | | 3.2E-5 | 4.4E-5 |

**NOTES:**
1. Number of Severity Group A and B fire events, 1986-1994: 1 Category B fire event @ 586.1 reactor years.
2. Data for ratios and nonsuppression probability are based on large fires.
3. Data for random failures and other attributes are not included in this table.

APPENDIX F - TABLE IV (CONTINUED)
RISK INSIGHTS - COMPARISON OF SELECTED PLANT FIRE PRA DATA WITH 1986-1994 PLANT OPERATING EXPERIENCE

| PLANT NAME | STUDY FIRE FREQUENCY | PRA FIRE FREQ.($\lambda$) | AREA RATIO TO BLDG | AREA RATIO TO ROOM | SEVERITY RATIO | PROB. NONSUP. | PROB. OTHER | PRA FIRE CDF | FIRE CDF USING STUDY FREQUENCY SENSITIVITY ANAL. |
|---|---|---|---|---|---|---|---|---|---|
| **Peachbottom PRA (NUREG 1150)** | | | | | | | | | |
| **Control Room:** | | | | | | | | | |
| (Scenario 1) | 2.6E-3 | 2.3E-3 | NA | 2.0E-2 | NA | NA | Note 3 | 1.8E-6 | |
| (Scenario 2) | 2.6E-3 | 2.3E-3 | NA | 9.8E-1 | NA | NA | Note 3 | 4.4E-6 | |
| **Subtotal:** | | | | | | | | 6.2E-6 | 7.0E-6 |
| **Cable Spreading Room** | 4.3E-3 | 3.5E-3 | NA | 6.2E-2 | 3.0E-1 | 8.7E-1 | Note 3 | 6.7E-7 | 8.2E-7 |
| **Switchgear Room:** | | | | | | | | | |
| Swtchgr Rm 2A | 1.3E-2 | 2.7E-3 | NA | 9.0E-1 | NA | 7.7E-1 | Note 3 | 7.4E-7 | |
| Swtchgr Rm 2B | 1.3E-2 | 2.7E-3 | NA | 9.0E-1 | NA | 7.7E-1 | Note 3 | 3.6E-6 | |
| Swtchgr Rm 2C | 1.3E-2 | 2.7E-3 | NA | 9.0E-1 | NA | 7.7E-1 | Note 3 | 4.7E-7 | |
| Swtchgr Rm 2D | 1.3E-2 | 2.7E-3 | NA | 9.0E-1 | NA | 7.7E-1 | Note 3 | 7.4E-7 | |
| Swtchgr Rm 3A | 1.3E-2 | 2.7E-3 | NA | 9.0E-1 | NA | 7.7E-1 | Note 3 | 7.4E-7 | |
| Swtchgr Rm 3B | 1.3E-2 | 2.7E-3 | NA | 9.0E-1 | NA | 7.7E-1 | Note 3 | 7.4E-7 | |
| Swtchgr Rm 3C | 1.3E-2 | 2.7E-3 | NA | 9.0E-1 | NA | 7.7E-1 | Note 3 | 7.4E-7 | |
| Swtchgr Rm 3D | 1.3E-2 | 2.7E-3 | NA | 9.0E-1 | NA | 7.7E-1 | Note 3 | 8.1E-7 | |
| **Subtotal:** | | | | | | | | 1.3E-5 | 6.2E-5 |
| **Reactor Bldg:** | **NA (Not Significant to the Fire PRA)** | | | | | | | -- | -- |
| **Turbine Bldg:** | **NA (Not Significant to the Fire PRA)** | | | | | | | -- | -- |
| **Totals:** | | | | | | | | 2.0E-5 | 7.0E-5 |

**NOTES:**
1. Number of Severity Group A and B fire events, 1986-1994: 1 Category B fire event @ 586.1 reactor years.
2. Data for ratios and nonsuppression probability are based on large fires.
3. Data for random failures and other attributes are not included in this table.

APPENDIX F - TABLE IV (CONTINUED)
RISK INSIGHTS - COMPARISON OF SELECTED PLANT FIRE PRA DATA WITH 1986-1994 PLANT OPERATING EXPERIENCE

| PLANT NAME | STUDY FIRE FREQUENCY | PRA FIRE FREQ.($\lambda$) | AREA RATIO TO BLDG | AREA RATIO TO ROOM | SEVERITY RATIO | PROB. NONSUP. | PROB. OTHER | EPRI FIRE CDF | FIRE CDF USING STUDY FREQUENCY SENSITIVITY ANAL. |
|---|---|---|---|---|---|---|---|---|---|
| **Peachbottom EPRI Requantification** | | | | | | | | | |
| Control Room: | | | | | | | | | |
| (Scenario 1) | 2.6E-3 | 1.32E-2 | NA | 1.45E-2 | NA | NA | Note 4 | 4.4E-8 | |
| (Scenario 2) | 2.6E-3 | 1.32E-2 | NA | 9.86E-1 | NA | NA | Note 4 | 1.5E-7 | |
| Subtotal: | | | | | | | | 1.9E-7 | 3.7E-8 |
| Cable Spreading Room | 4.3E-3 | 7.5E-3 | NA | 1.3E-2 | 1.54-1 | 1 | Note 4 | 2.2E-8 | 1.3E-8 |
| Switchgear Room: | | | | | | | | | |
| Swtchgr Rm 2A | 1.3E-2 | 2.5E-3 | NA | - No Requantification Performed - (See Note 3) | | | | | |
| Swtchgr Rm 2B | 1.3E-2 | 2.3E-3 | NA | | | | | | |
| Swtchgr Rm 2C | 1.3E-2 | 2.2E-3 | NA | | | | | | |
| Swtchgr Rm 2D | 1.3E-2 | 2.2E-3 | NA | | | | | | |
| Swtchgr Rm 3A | 1.3E-2 | 2.4E-3 | NA | | | | | | |
| Swtchgr Rm 3B | 1.3E-2 | 2.3E-3 | NA | | | | | | |
| Swtchgr Rm 3C | 1.3E-2 | 2.2E-3 | NA | | | | | | |
| Swtchgr Rm 3D | 1.3E-2 | 2.0E-3 | NA | | | | | | |
| Subtotal: | 1.3E-2 | 2.3E-3(Ave.) | | | | | Note 4 | 1.3E-5 | 7.3E-5 |
| Reactor Bldg: | | - NA (Not Significant to the Fire PRA) - | | | | | | -- | -- |
| Turbine Bldg: | | - NA (Not Significant to the Fire PRA) - | | | | | | -- | -- |
| Totals: | | | | | | | | 1.3E-5 | 7.3E-5 |

NOTES:
1. Number of Severity Group A and B fire events, 1986-1994: 1 Category B fire event @ 586.1 reactor years.
2. Subtotals for Switchgear Room are estimated same as NUREG 1150 PRA. The use is intended for estimating total Fire CDF only.
3. Data for ratios and nonsuppression probability are based on large fires.
4. Data for random failures and other attributes are not included in this table.

APPENDIX F - TABLE IV (CONTINUED)
RISK INSIGHTS - COMPARISON OF SELECTED PLANT FIRE PRA DATA WITH 1986-1994 PLANT OPERATING EXPERIENCE

| PLANT NAME | STUDY FIRE FREQUENCY | PRA FIRE FREQ.(/) | AREA RATIO TO BLDG | AREA RATIO TO ROOM | SEVERITY RATIO | PROB. NONSUP. | PROB. OTHER | PRA FIRE CDF | FIRE CDF USING STUDY FREQUENCY SENSITIVITY ANAL. |
|---|---|---|---|---|---|---|---|---|---|
| Seabrook PRA | | | | | | | | | |
| Control Room: | | | | | | | | | |
| Zone C | 2.6E-3 | 4.9E-3 | NA | 8.1E-3 | NA | NA | Note 3 | 9.0E-6 | |
| Zone G | 2.6E-3 | 4.9E-3 | NA | 8.1E-3 | NA | NA | Note 3 | 2.1E-6 | |
| Zone H | 2.6E-3 | 4.9E-3 | NA | 8.1E-3 | NA | NA | Note 3 | 2.1E-6 | |
| Subtotal: | | | | | | | | 1.3E-5 | 6.9E-6 |
| Cable Spreading Room | | | | | | | | | |
| Seq. 2 | 4.3E-3 | 6.7E-3 | NA | 9.7E-2 | 2.7E-2 | 1.3E-1 | Note 3 | 3.6E-6 | |
| Seq. 4 | 4.3E-3 | 6.7E-3 | NA | 4.85E-2 | 2.7E-2 | 1.3E-1 | Note 3 | 3.9E-7 | |
| Seq. 6 | 4.3E-3 | 6.7E-3 | NA | 4.85E-2 | 2.7E-2 | 1.3E-1 | Note 3 | 8.4E-8 | |
| Seq. 8 | 4.3E-3 | 6.7E-3 | NA | 4.85E-2 | 2.7E-2 | 1.3E-1 | Note 3 | 4.5E-8 | |
| Subtotal: | | | | | | | | 4.1E-6 | 2.6E-6 |
| Switchgear Room: | NA (Not Significant to the Fire PRA) | | | | | | | -- | -- |
| Auxiliary Bldg: | NA (Not Significant to the Fire PRA) | | | | | | | -- | -- |
| Turbine Bldg: | NA (Not Significant to the Fire PRA) | | | | | | | -- | -- |
| Totals: | | | | | | | | 1.7E-5 | 9.5E-6 |

NOTES:
1. Number of Severity Group A and B fire events, 1986-1994: 1 Category B fire event @ 586.1 reactor years.
2. Data for ratios and nonsuppression probability are based on large fires.
3. Data for random failures and other attributes are not included in this table.

APPENDIX F - TABLE IV (CONTINUED)
RISK INSIGHTS - COMPARISON OF SELECTED PLANT FIRE PRA DATA WITH 1986-1994 PLANT OPERATING EXPERIENCE

| PLANT NAME | STUDY FIRE FREQUENCY | PRA FIRE FREQ.($\lambda$) | AREA RATIO TO BLDG | AREA RATIO TO ROOM | SEVERITY RATIO | PROB. NONSUP. | PROB. OTHER | FRSS FIRE CDF | FIRE CDF USING STUDY FREQUENCY SENSITIVITY ANAL. |
|---|---|---|---|---|---|---|---|---|---|
| **Seabrook** | | | | | | | | | |
| **SNL Requantification(FRSS)** | | | | | | | | | |
| Control Room: | | | | | | | | | |
| Zone C | 2.6E-3 | 4.4E-3 | NA | 8.1E-3 | NA | NA | Note 3 | 6.9E-6 | |
| Zone G | 2.6E-3 | 4.4E-3 | NA | 8.1E-3 | NA | NA | Note 3 | 1.4E-6 | |
| Zone H | 2.6E-3 | 4.4E-3 | NA | 8.1E-3 | NA | NA | Note 3 | 1.4E-6 | |
| Subtotal: | | | | | | | | 9.7E-6 | 5.7E-6 |
| Cable Spreading Room: | | | | | | | | | |
| Seq. 2 | 4.3E-3 | 2.7E-3 | NA | 9.7E-2 | 2.7E-2 | 8.3E-1 | Note 3 | 2.2E-6 | |
| Seq. 4 | 4.3E-3 | 2.7E-3 | NA | 4.8E-2 | 2.7E-2 | 8.3E-1 | Note 3 | 1.0E-7 | |
| Seq. 6 | 4.3E-3 | 2.7E-3 | NA | 4.8E-2 | 2.7E-2 | 8.3E-1 | Note 3 | 4.2E-8 | |
| Seq. 8 | 4.3E-3 | 2.7E-3 | NA | 4.8E-2 | 2.7E-2 | 8.3E-1 | Note 3 | 3.1E-8 | |
| Subtotal: | | | | | | | | 2.4E-6 | 3.8E-6 |
| Switchgear Room: | NA (Not Significant to the Fire PRA Requantification - FRSS) | | | | | | | -- | -- |
| Auxiliary Bldg: | | | | | | | | | |
| PCC Pump Area | 4.6E-2 | 6.4E-2 | 1.6E-1 | 1.3E-1 | 2.6E-2 | 8.3E-1 | NA | 2.9E-5 | 2.1E-5 |
| Turbine Bldg: | NA (Not significant to the Fire PRA Requantification - FRSS) | | | | | | | -- | -- |
| Totals: | | | | | | | | 4.1E-5 | 3.1E-5 |

NOTES:
1. Number of Severity Group A and B fire events, 1986-1994: 1 Category B fire events @ 586.1 reactor years.
2. Data for ratios and nonsuppression probability are based on large fires.
3. Data for random failures and other attributes are not included in this table.

APPENDIX F - TABLE IV (CONTINUED)
RISK INSIGHTS - COMPARISON OF SELECTED PLANT FIRE PRA DATA WITH 1986-1994 PLANT OPERATING EXPERIENCE

| PLANT NAME | STUDY FIRE FREQUENCY | PRA FIRE FREQ.(1) | AREA RATIO TO BLDG | AREA RATIO TO ROOM | SEVERITY RATIO | PROB. NONSUP. | PROB. OTHER | EPRI FIRE CDF | FIRE CDF USING STUDY FREQUENCY SENSITIVITY ANAL. |
|---|---|---|---|---|---|---|---|---|---|
| Seabrook EPRI Requantification | | | | | | | | | |
| Control Room: | | | | | | | | | |
| Zone C | 2.6E-3 | 7.5E-3 | NA | 1.2E-2 | NA | NA | Note 4 | 1.2E-6 | |
| Zone G | 2.6E-3 | 7.5E-3 | NA | 1.2E-2 | 1 | NA | Note 4 | 4.6E-6 | |
| Zone H | 2.6E-3 | 7.5E-3 | NA | 1.2E-2 | NA | NA | Note 4 | 4.6E-6 | |
| Subtotal: | | | | | | | | 1.0E-5 | 3.5E-6 |
| Cable Spreading Room: | | | | | | | | | |
| Seq. 2 | 4.3E-3 | 2.8E-4 | NA | NA | NA | 3.0E-1 | Note 4 | 4.3E-9 | |
| Seq. 4 | 4.3E-3 | 2.8E-4 | NA | NA | NA | 2.9E-2 | Note 4 | 7.6E-10 | |
| Seq. 6 | 4.3E-3 | 2.8E-4 | NA | NA | NA | 2.9E-2 | Note 4 | 1.7E-10 | |
| Seq. 8 | 4.3E-3 | 2.8E-4 | NA | NA | NA | 2.9E-2 | Note 4 | 8.8E-11 | |
| Subtotal: | | | | | | | | 5.3E-9 | 8.1E-8 |
| Switchgear Room: | 1.3E-2 | NA (Not Significant to the Fire PRA EPRI Requantification) | | | | | | -- | -- |
| Auxiliary Bldg: | | | | | | | | | |
| PCC Pump Area | 4.9E-2 | 2.8E-4 | 1.45E-2 | NA | 1.54E-1 | 3.0E-2 | Note 4 | 4.3E-9 | 7.1E-9 |
| Turbine Bldg: | NA (Not Significant to the Fire PRA EPRI Requantification) | | | | | | | -- | -- |
| Totals: | | | | | | | | 1.0E-5 | 3.6E-6 |

NOTES:
1. Number of Severity Group A and B fire events, 1986-1994: 1 Category B fire event @ 586.1 reactor years.
2. Data from EPRI Fire Requantification Studies. The use is intended for estimating total Fire CDF only.
3. Data for ratios and nonsuppression probability are based on large fires.
4. Data for random failures and other attributes are not included in this table.

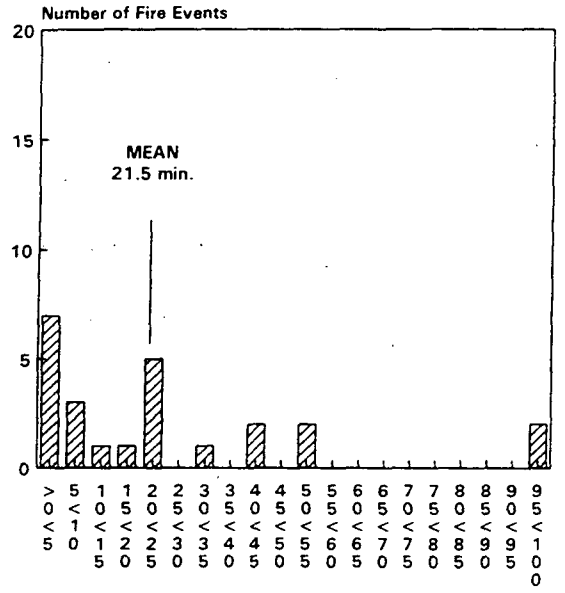
# APPENDIX G

# SHUTDOWN FIRE EVENTS - MEAN DURATION BY PLANT LOCATION

# AND

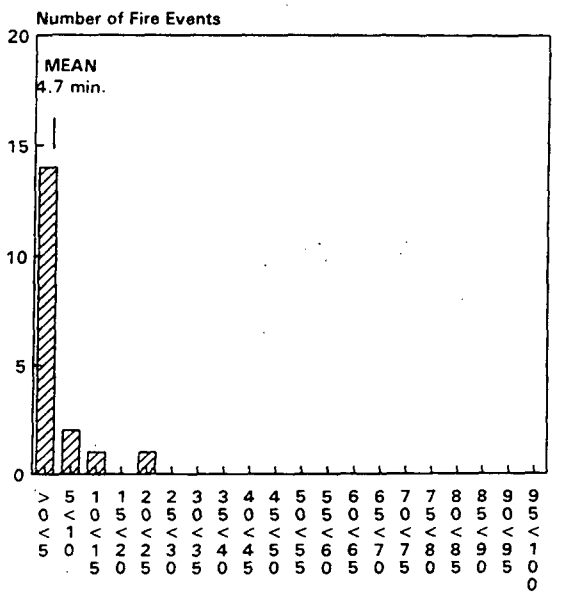
# COMPARISON WITH POWER OPERATIONS FIRE EVENTS DURATION

SHUTDOWN FIRE EVENTS DURATION
CONTAINMENT BUILDING - 1965-1985



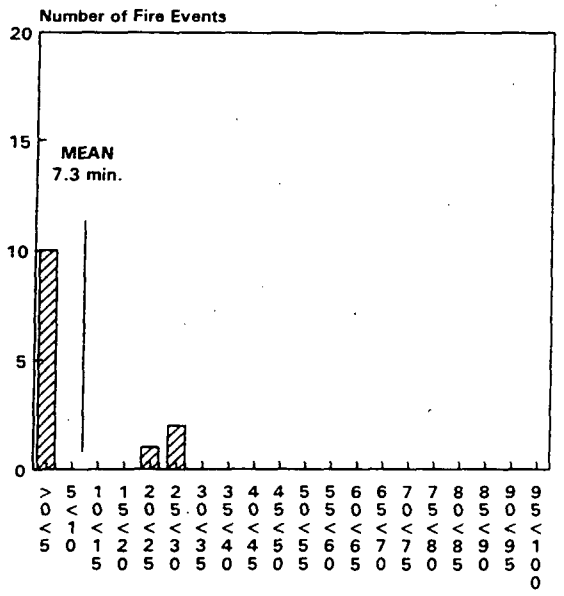

No. fire events during shutdown: 22.

SHUTDOWN FIRE EVENTS DURATION
REACTOR BLDG (BWR) - 1965-1985



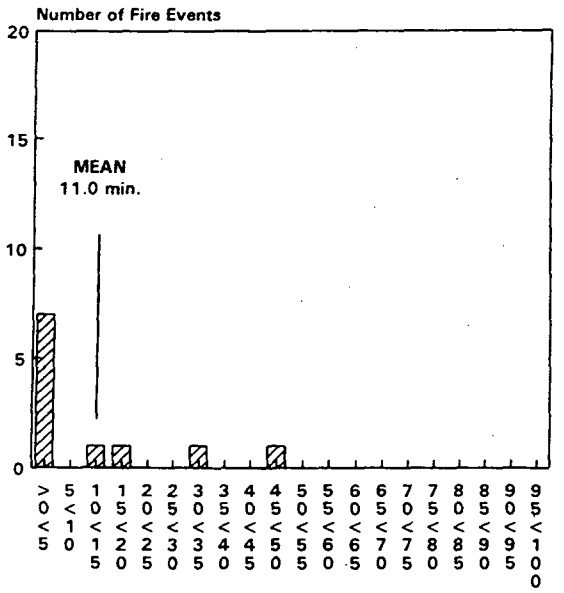

No. fire events during shutdown: 18.

SHUTDOWN FIRE EVENTS DURATION
AUXILIARY BLDG (PWR) - 1965-1985




No. fire events during shutdown: 13.

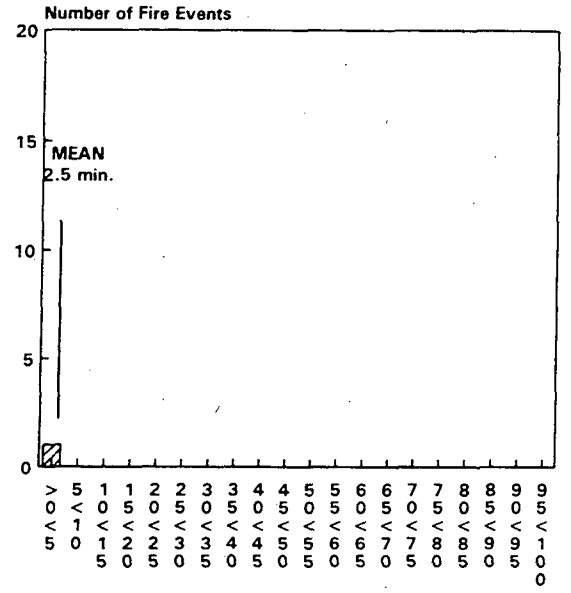
SHUTDOWN FIRE EVENTS DURATION
TURBINE BUILDING - 1965-1985




No. fire events during shutdown: 11.

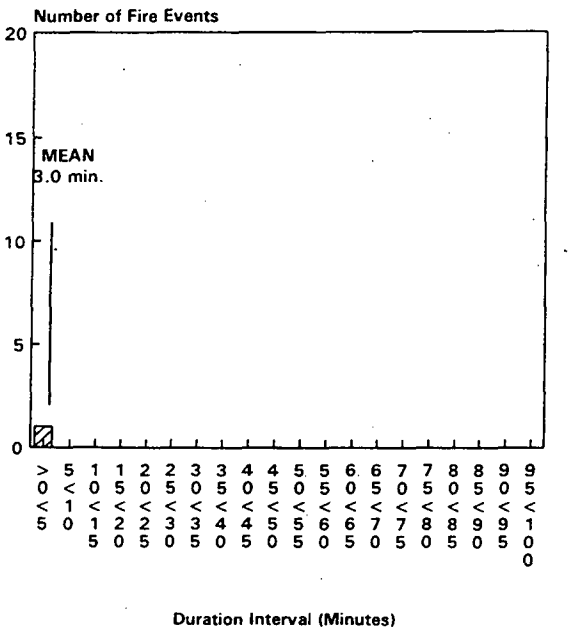
**FIGURE 26**

SHUTDOWN FIRE EVENTS DURATION
CONTROL ROOM - 1965-1989



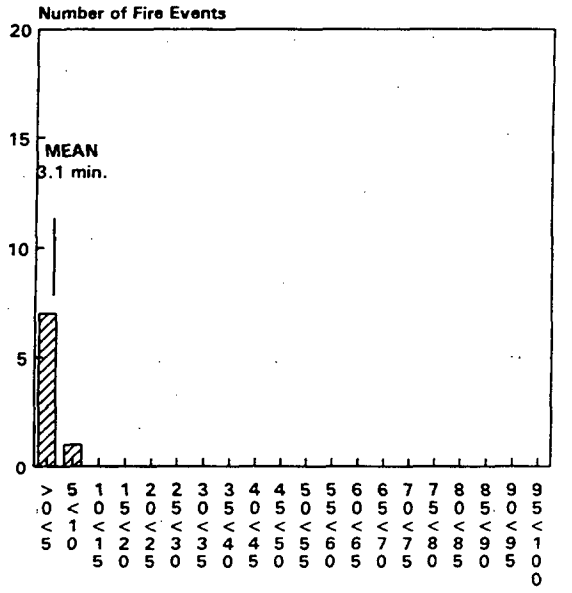

No. fire events during shutdown: 1

SHUTDOWN FIRE EVENTS DURATION
CABLE SPREADING ROOM - 1965-1985



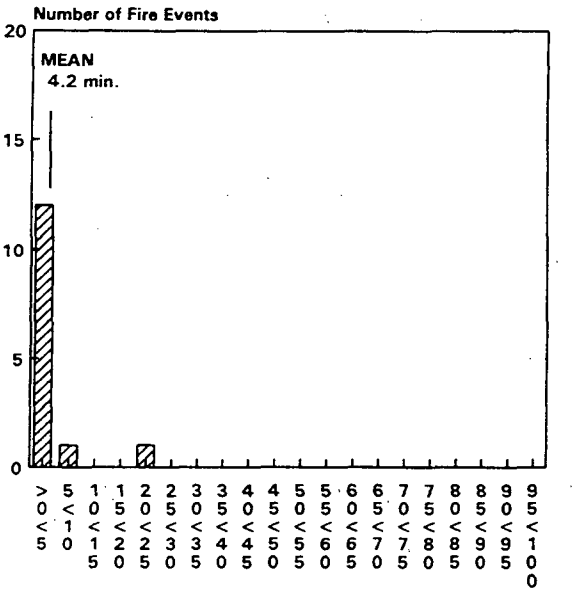

No. fire events during shutdown: 1.
Includes Browns Ferry Fire.

SHUTDOWN FIRE EVENTS DURATION
SWITCHGEAR ROOM - 1965-1985




No. fire events during shutdown: 8.

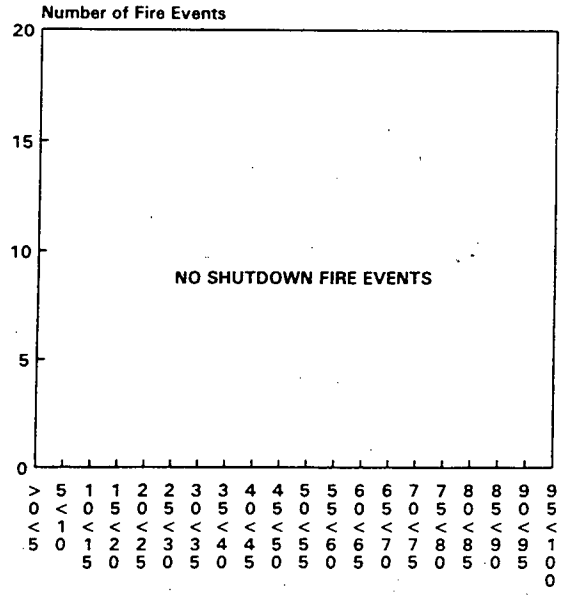
SHUTDOWN FIRE EVENTS DURATION
DIESEL GENERATOR BUILDING - 1965-1985




No. fire events during shutdown: 14.

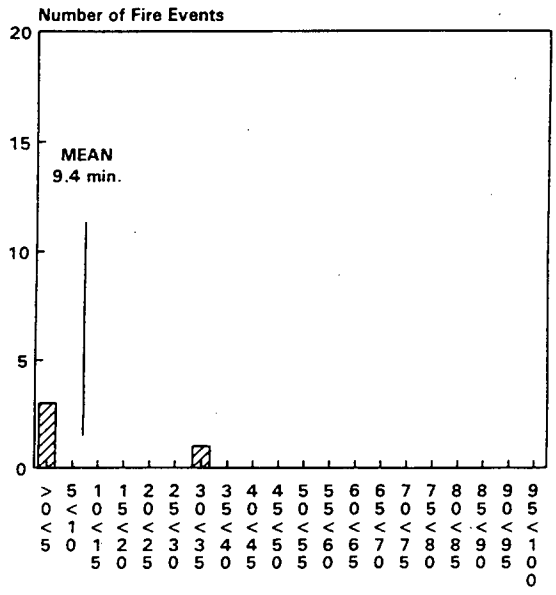
**FIGURE 27**

SHUTDOWN FIRE EVENTS DURATION
BATTERY ROOM - 1965-1985



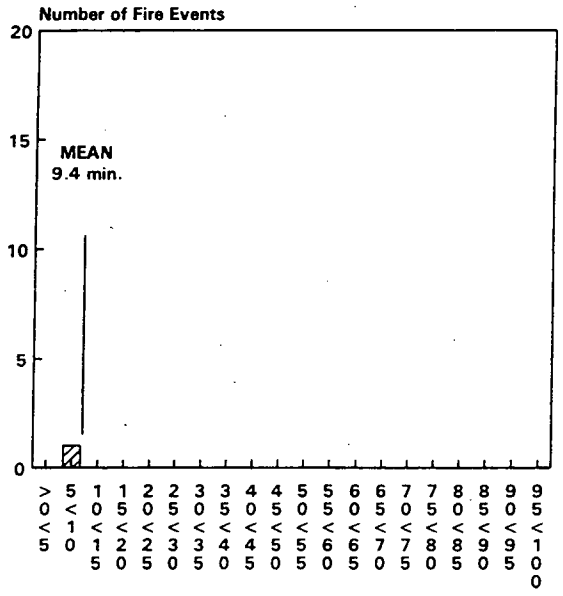

No. fire events during shutdown: 0.

SHUTDOWN FIRE EVENTS DURATION
OTHER BUILDINGS - 1965-1985



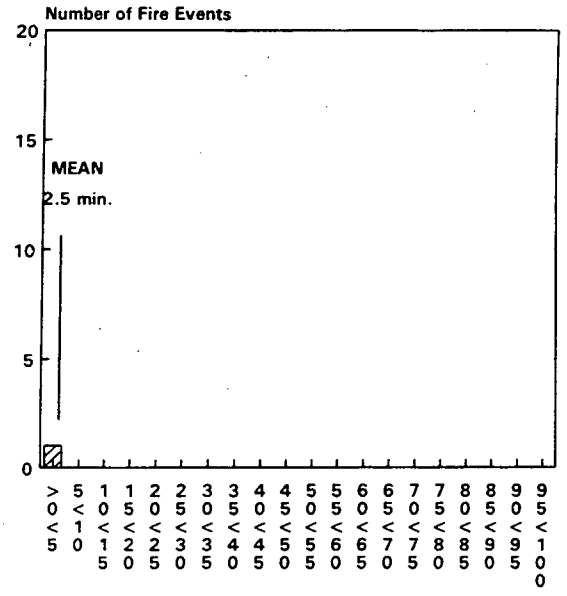

No. fire events during shutdown: 4.

SHUTDOWN FIRE EVENTS DURATION
SERVICE WATER PUMPHOUSE - 1965-1985




No. fire events during shutdown: 1.

SHUTDOWN FIRE EVENTS DURATION
SWITCH YARD - 1965-1985




No. fire events during shutdown: 1.

**FIGURE 28**

APPENDIX G - TABLE I
SHUTDOWN FIRE EVENTS DURATION BY PLANT LOCATION - 1965-1985

| LOCATION | DURATION (MINUTES) >0<5 | 5<10 | 10<15 | 15<20 | 20<25 | 25<30 | 30<35 | 35<40 | 40<45 | 45<50 | 50<55 | 55<60 | 75<80 | 95<100 | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Containment:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 7 | 3 | 1 | 1 | 5 | - | 1 | - | 2 | - | - | - | - | 2 | 22 |
| Percent of Fire Events: | 32 | 14 | 5 | 5 | 23 | - | 5 | - | 9 | - | - | - | - | 9 | 100 |
| No. Fire Event-Min.: | 17.5 | 15 | 10 | 15 | 106 | - | 30 | - | 80 | - | - | - | - | 200 | 473.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 21.5 |
| **REACTOR BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 14 | 2 | 1 | - | 1 | - | - | - | - | - | - | - | - | - | 18 |
| Percent of Fire Events: | 78 | 11 | 6 | - | 6 | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 35 | 14 | 12 | - | 23 | - | - | - | - | - | - | - | - | - | 84 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 4.7 |
| **AUXILIARY BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 10 | - | - | - | 1 | 2 | - | - | - | - | - | - | - | - | 13 |
| Percent of Fire Events: | 77 | - | - | - | 8 | 15 | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 23.5 | - | - | - | 22 | 50 | - | - | - | - | - | - | - | - | 95.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 7.3 |
| **TURBINE BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 7 | - | 1 | 1 | - | - | 1 | - | - | 1 | - | - | - | - | 11 |
| Percent of Fire Events: | 64 | - | 9 | 9 | - | - | 9 | - | - | 9 | - | - | - | - | 100 |
| No. Fire Event-Min.: | 17.5 | - | 10 | 15 | - | - | 33 | - | - | 45 | - | - | - | - | 120.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 11.0 |
| **Control Room:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Percent of Fire Events: | 100 | - | - | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 2.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | 2.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 2.5 |

APPENDIX G - TABLE I (CONTINUED)
SHUTDOWN FIRE EVENTS DURATION BY PLANT LOCATION - 1965-1985

| LOCATION | DURATION (MINUTES) >0<5 | 5<10 | 10<15 | 15<20 | 20<25 | 25<30 | 30<35 | 35<40 | 40<45 | 45<50 | 50<55 | 55<60 | 75<80 | 95<100 | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CABLE SPREADING ROOM:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Percent of Fire Events: | 100 | - | - | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **3.0** |
| **SWITCHGEAR ROOM:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 7 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 8 |
| Percent of Fire Events: | 88 | 12 | - | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 17.5 | 7.5 | - | - | - | - | - | - | - | - | - | - | - | - | 25 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **3.1** |
| **DIESEL GENERATOR BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 12 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | 14 |
| Percent of Fire Events: | 86 | 7 | - | - | 7 | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 30 | 7.5 | - | - | 22 | - | - | - | - | - | - | - | - | - | 59.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 4.2 |
| **Battery Room:** | | | | | | | | | | | | | | | |
| No. Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Percent of Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| No. Fire Event-Min.: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **0** |
| **OTHER BUILDINGS:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 3 | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 4 |
| Percent of Fire Events: | 75 | - | - | - | - | - | 25 | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 7.5 | - | - | - | - | - | 30 | - | - | - | - | - | - | - | 37.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **9.4** |
| **SERVICE WATER PUMPHOUSE:** | | | | | | | | | | | | | | | |
| No. Fire Events: | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Percent of Fire Events: | - | 100 | - | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - | 8 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **8.0** |

APPENDIX G - TABLE I (CONTINUED)
SHUTDOWN FIRE EVENTS DURATION BY PLANT LOCATION - 1965-1985

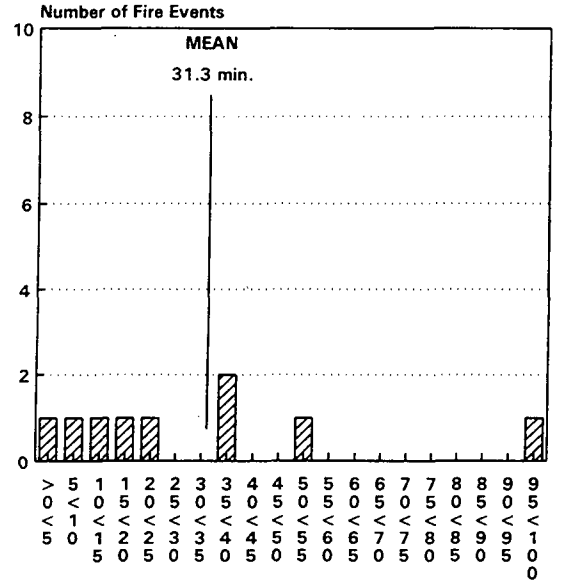
| LOCATION | DURATION (MINUTES) >0<5 | 5<10 | 10<15 | 15<20 | 20<25 | 25<30 | 30<35 | 35<40 | 40<45 | 45<50 | 50<55 | 55<60 | 75<80 | 95<100 | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SWITCH YARD:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Percent of Fire Events: | 100 | - | - | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 2.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | 2.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 2.5 |
| **TEMPORARY BLDGS:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 |
| Percent of Fire Events: | 100 | - | - | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 7.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 2.5 |

NOTES:

1. The maximum duration of all fires used in this study was 100 minutes.

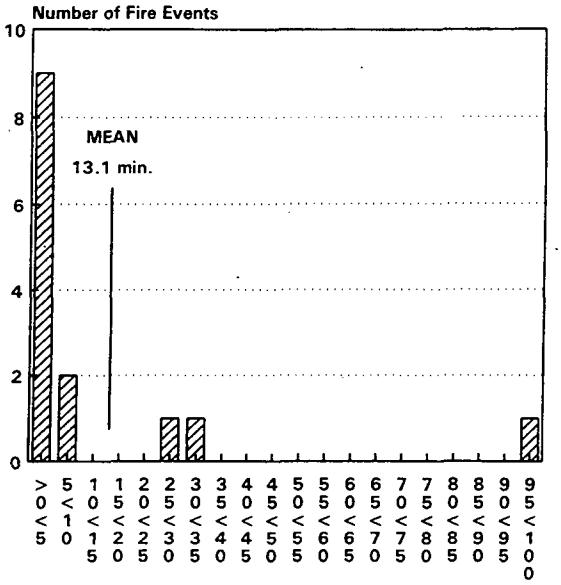
2. See Figures 26, 27, and 28 (Temporary Bldgs not shown on plots).

SHUTDOWN FIRE EVENTS DURATION
CONTAINMENT BUILDING - 1986-1994



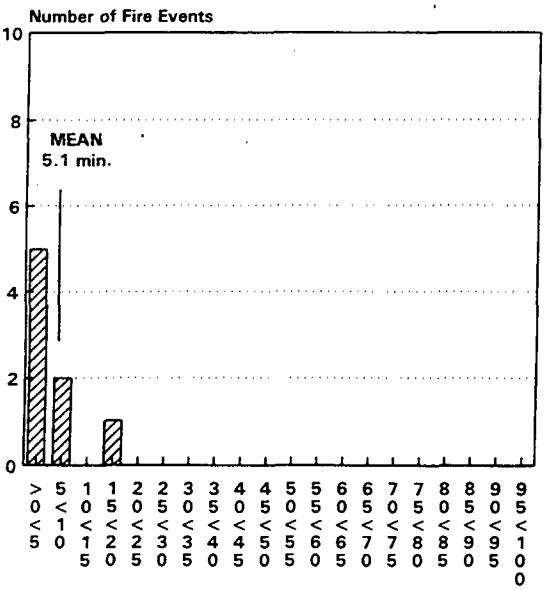

No. fire events during shutdown: 9.

SHUTDOWN FIRE EVENTS DURATION
REACTOR BUILDING - 1986-1994



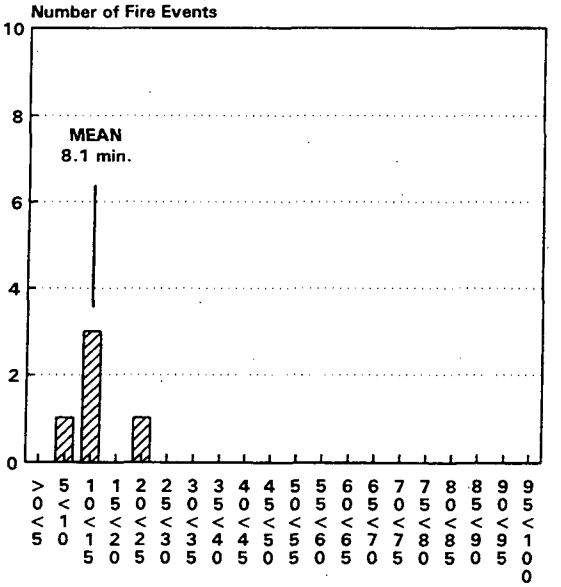

No. fire events during shutdown: 14

SHUTDOWN FIRE EVENTS DURATION
AUXILIARY BUILDING - 1986-1994




No. fire events during shutdown: 8

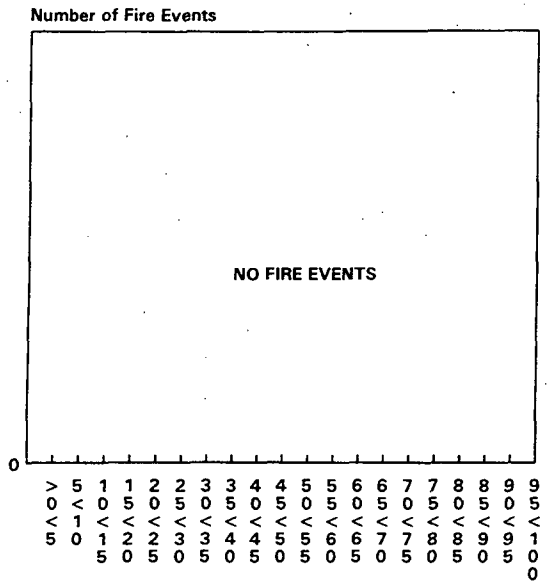
SHUTDOWN FIRE EVENTS DURATION
TURBINE BUILDING - 1986-1994




No. fire events during shutdown: 5

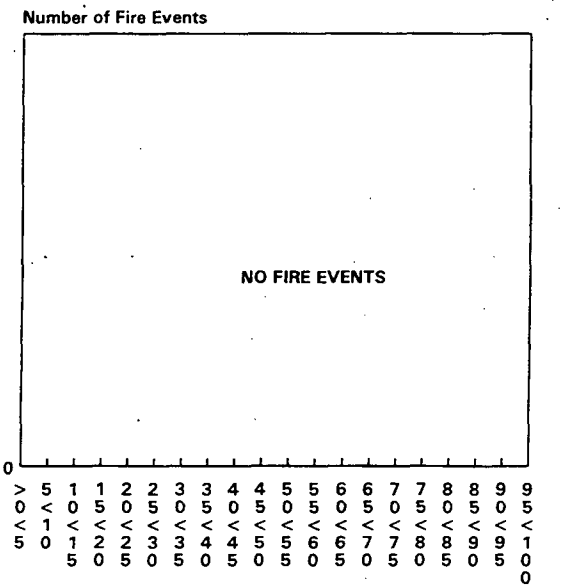
**FIGURE 29**

SHUTDOWN FIRE EVENTS DURATION
CONTROL ROOM - 1986-1994



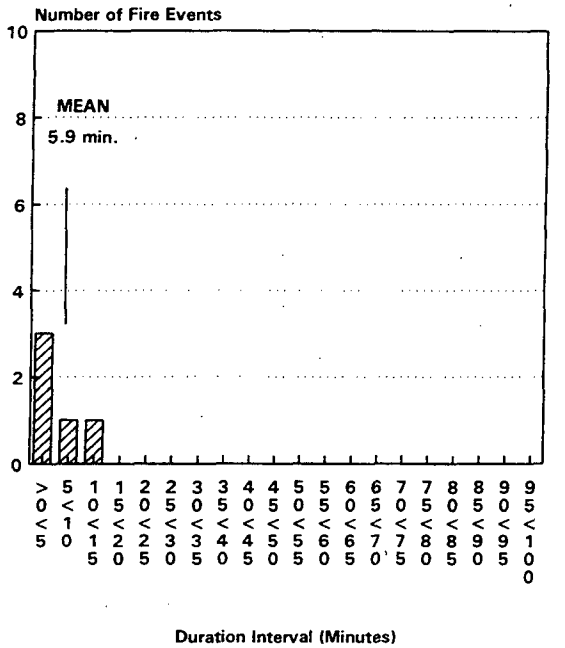

No. fire events during shutdown: 0.

SHUTDOWN FIRE EVENTS DURATION
CABLE SPREADING ROOM - 1986-1994



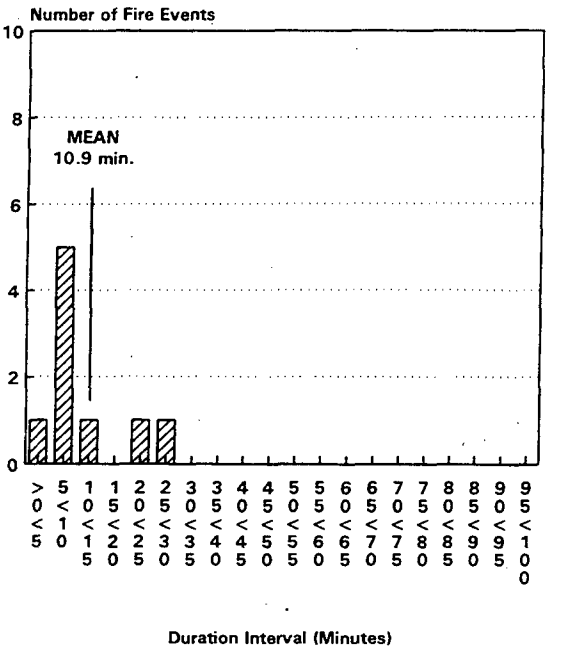

No. fire events during shutdown: 0

SHUTDOWN FIRE EVENTS DURATION
SWITCHGEAR ROOM - 1986-1994




No. fire events during shutdown: 5

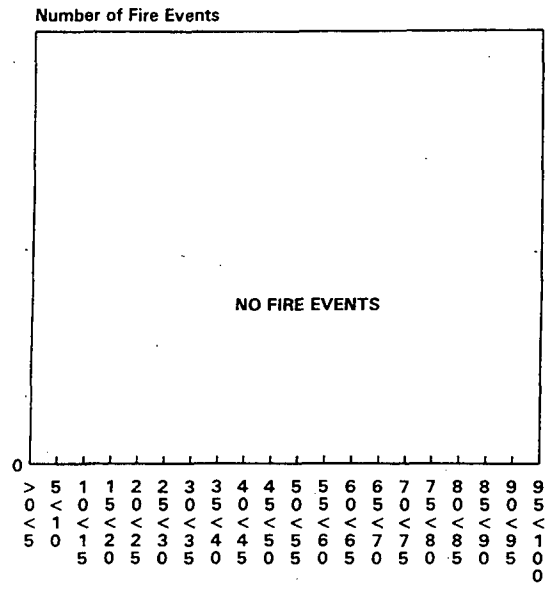
SHUTDOWN FIRE EVENTS DURATION
DIESEL GENERATOR BUILDING - 1986-1994




No. fire events during shutdown: 9

**FIGURE 30**

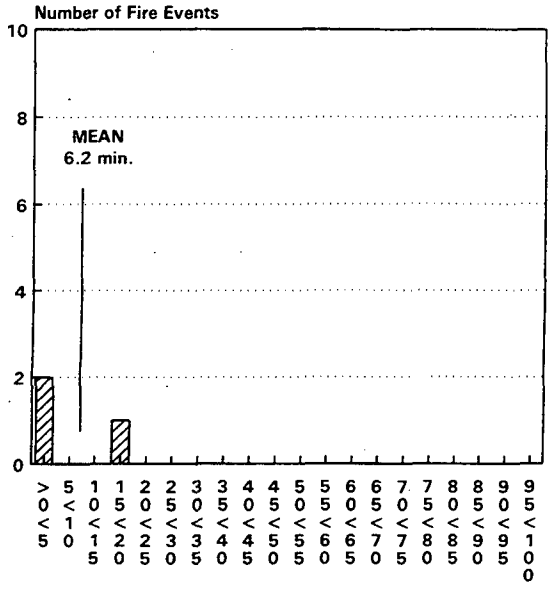
SHUTDOWN FIRE EVENTS DURATION
BATTERY ROOM - 1986-1994




Duration Interval (Minutes)

No. fire events during shutdown: 0.

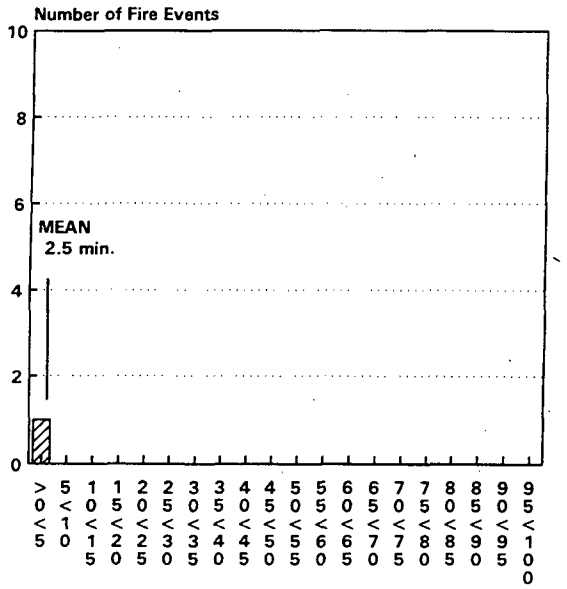
SHUTDOWN FIRE EVENTS DURATION
OTHER BUILDINGS - 1986-1994




Duration Interval (Minutes)

No. fire events during shutdown: 3

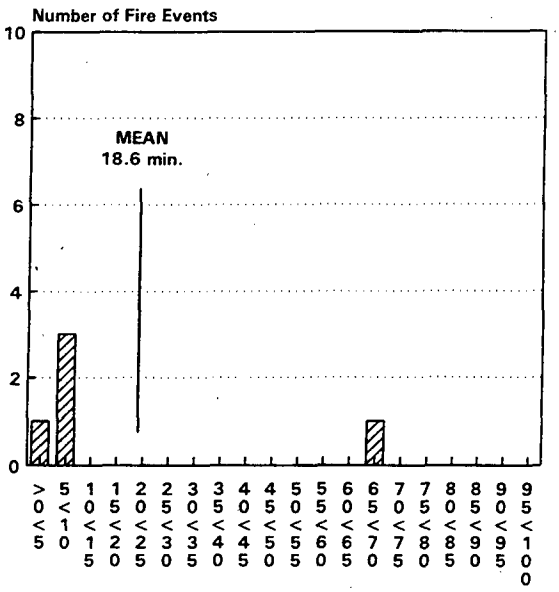
SHUTDOWN FIRE EVENTS DURATION
SERVICE WATER PUMPHOUSE - 1986-1994




Duration Interval (Minutes)

No. fire events during shutdown: 1.

SHUTDOWN FIRE EVENTS DURATION
SWITCH YARD - 1986-1994




Duration Interval (Minutes)

No. fire events during shutdown: 5.

**FIGURE 31**

APPENDIX G - TABLE II
SHUTDOWN FIRE EVENTS DURATION BY PLANT LOCATION - 1986-1994

| | DURATION (MINUTES) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LOCATION** | **>0<5** | **5<10** | **10<15** | **15<20** | **20<25** | **25<30** | **30<35** | **35<40** | **40<45** | **45<50** | **50<55** | **55<60** | **75<80** | **95<100** | **TOTALS** |
| **Containment:** | | | | | | | | | | | | | | | |
| No. Fire Events: | - | 2 | 1 | 1 | 1 | - | - | 2 | - | - | 1 | - | - | 1 | 9 |
| Percent of Fire Events: | - | 22 | 11 | 11 | 11 | - | - | 22 | - | - | 11 | - | - | 11 | 100 |
| No. Fire Event-Min.: | - | 15.5 | 13 | 17 | 20 | - | - | 71 | - | - | 50 | - | - | 100 | 286.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **31.8** |
| **REACTOR BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 8 | 2 | - | - | - | 1 | 1 | - | - | - | - | - | - | 1 | 14 |
| Percent of Fire Events: | 62 | 31 | - | - | - | 8 | 8 | - | - | - | - | - | - | 8 | 100 |
| No. Fire Event-Min.: | 20 | 15.5 | - | - | - | 25 | 30 | - | - | - | - | - | - | 97 | 187.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **14.4** |
| **AUXILIARY BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 5 | 2 | - | 1 | - | - | - | - | - | - | - | - | - | - | 8 |
| Percent of Fire Events: | 62 | 25 | - | 13 | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 11 | 14.5 | - | 15 | - | - | - | - | - | - | - | - | - | - | 40.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **5.1** |
| **TURBINE BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | - | 1 | 3 | - | 1 | - | - | - | - | - | - | - | - | - | 5 |
| Percent of Fire Events: | - | 20 | 60 | - | 20 | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | - | 7.5 | 37 | - | 20 | - | - | - | - | - | - | - | - | - | 64.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **8.1** |
| **Control Room:** | | | | | | | | | | | | | | | |
| No. Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Percent of Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| No. Fire Event-Min.: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mean Duration (Min.): | | | | | | | | | | | | | | | **0** |

APPENDIX G - TABLE II (CONTINUED)
SHUTDOWN FIRE EVENTS DURATION BY PLANT LOCATION - 1986-1994

| | DURATION (MINUTES) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOCATION | >0<5 | 5<10 | 10<15 | 15<20 | 20<25 | 25<30 | 30<35 | 35<40 | 40<45 | 45<50 | 50<55 | 55<60 | 75<80 | 95<100 | TOTALS |
| **CABLE SPREADING ROOM:** | | | | | | | | | | | | | | | |
| No. Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Percent of Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| No. Fire Event-Min.: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 0 |
| **SWITCHGEAR ROOM:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 3 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | 5 |
| Percent of Fire Events: | 60 | 20 | 20 | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 7.5 | 7 | 15 | - | - | - | - | - | - | - | - | - | - | - | 29.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 5.9 |
| **DIESEL GENERATOR BUILDING:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 1 | 5 | 1 | - | 1 | 1 | - | - | - | - | - | - | - | - | 9 |
| Percent of Fire Events: | 11 | 56 | 11 | - | 11 | 11 | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 2.5 | 37.5 | 10 | - | 21 | 27 | - | - | - | - | - | - | - | - | 98 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 10.9 |
| **Battery Room:** | | | | | | | | | | | | | | | |
| No. Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Percent of Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| No. Fire Event-Min.: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 0 |
| **OTHER BUILDINGS:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 2 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 3 |
| Percent of Fire Events: | 67 | - | - | 33 | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 3.5 | - | - | 15 | - | - | - | - | - | - | - | - | - | - | 18.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 6.2 |
| **SERVICE WATER PUMPHOUSE:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Percent of Fire Events: | 100 | - | - | - | - | - | - | - | - | - | - | - | - | - | 100 |
| No. Fire Event-Min.: | 2.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | 2.5 |
| Mean Duration (Min.): | | | | | | | | | | | | | | | 2.5 |

APPENDIX G - TABLE II (CONTINUED)
SHUTDOWN FIRE EVENTS DURATION BY PLANT LOCATION - 1986-1994

| | DURATION (MINUTES) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOCATION | >0<5 | 5<10 | 10<15 | 15<20 | 20<25 | 25<30 | 30<35 | 35<40 | 40<45 | 45<50 | 50<55 | 55<60 | 75<80 | 95<100 | TOTALS |
| **SWITCH YARD:** | | | | | | | | | | | | | | | |
| No. Fire Events: | 1 | 3 | - | - | - | - | - | - | - | - | - | - | 1 | - | 5 |
| Percent of Fire Events: | 20 | 60 | - | - | - | - | - | - | - | - | - | - | 20 | - | 100 |
| No. Fire Event-Min.: | 2.5 | 22.5 | - | - | - | - | - | - | - | - | - | - | 68 | - | 93 |
| Ave. Duration (Min.): | | | | | | | | | | | | | | | **18.6** |
| **OFFSITE:** | | | | | | | | | | | | | | | |
| No. Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 2 |
| Percent of Fire Events: | - | - | - | - | - | - | - | - | - | - | - | - | 50 | 50 | 100 |
| No. Fire Event-Min.: | - | - | - | - | - | - | - | - | - | - | - | - | 64 | 100 | 164 |
| Ave. Duration (Min.): | | | | | | | | | | | | | | | **82.0** |

**NOTES:**

1. The maximum duration of all fires used in this study was 100 minutes.

2. See Figures 29, 30, and 31.

APPENDIX G - TABLE III
MEAN DURATION COMPARISON BETWEEN SHUTDOWN AND POWER OPERATIONS FIRE EVENTS
BY PLANT LOCATION - 1965-1985

| PLANT LOCATION | SHUTDOWN MEAN DURATION (MIN.) | POWER OPER. MEAN DURATION (MIN.) | COMPARISON/W POWER OPER. |
|---|---|---|---|
| Containment | 21.5 | 5.6 | Higher* |
| Reactor Bldg (BWR) | 4.7 | 15.3 | Lower |
| Auxiliary Bldg(PWR) | 7.3 | 8.6 | Approx. same |
| Turbine Bldg | 11.0 | 18.3 | Lower |
| Control Room | 2.5 | 2.5 | Same |
| Cbl Spreading Rm | 3.0 | 52.7** | Lower |
| Switchgear Room | 3.1 | 17.4 | Lower |
| Diesel Gen. Bldg | 4.2 | 6.4 | Approx. same |
| Battery Room | 0 | 2.5 | Approx. same |
| Other Bldgs | 9.4 | 12.6 | Approx. same |
| Serv Wtr Pumphse | 9.4 | 2.5 | Approx. same |
| Switch Yard | 2.5 | 19.3 | Lower |

NOTES:

1. *Denotes the predominant cause was welding sparks/arcing during shutdown operations.
2. **Includes Browns Ferry fire, but duration limited to 100 minutes for this duration evaluation.
3. See Figures 13, 14, and 15 for Power Operations durations and Figures 26, 27, and 28 for Shutdown durations.

APPENDIX G - TABLE IV
MEAN DURATION COMPARISON BETWEEN SHUTDOWN AND POWER OPERATIONS
BY PLANT LOCATION - 1986-1994

| PLANT LOCATION | SHUTDOWN MEAN DURATION (MIN.) | POWER OPER. MEAN DURATION (MIN.) | COMPARISON/W POWER OPER. |
|---|---|---|---|
| Containment | 31.3 | 18.2 | Higher* |
| Reactor Bldg (BWR) | 13.1 | 14.8 | Approx. same |
| Auxiliary Bldg (PWR) | 5.1 | 9.2 | Approx. same |
| Turbine Bldg | 8.1 | 22.1 | Lower |
| Control Room | 0 | 2.0 | Approx. same (no shutdown events) |
| Cbl Spreading Rm | 0 | 13.8 | Lower (no shutdown events) |
| Switchgear Room | 5.9 | 28.2 | Lower |
| Diesel Gen. Bldg | 10.9 | 6.6 | Approx. same |
| Battery Room | 0 | 0 | Same (no events) |
| Other Bldgs | 6.2 | 50.9 | Lower |
| Serv Wtr Pumphse | 2.5 | 4.8 | Approx. same |
| Switch Yard | 18.6 | 23.3 | Lower |

NOTES:

1. * Denotes the predominant cause was welding sparks/arcing during shutdown operations.

2. See Figures 16, 17, 1nd 18 for Power Operationsdurations and Figures 29, 30, and 31 for Shutdown durations.

# APPENDIX H

# SHUTDOWN FIRE EVENTS

# SHUTDOWN AVERAGE FIRE FREQUENCY BY LOCATION

# AND

# COMPARISON WITH POWER OPERATIONS AVERAGE FIRE FREQUENCIES

**APPENDIX H - TABLE I**
**SHUTDOWN FIRE EVENTS - AVERAGE FIRE FREQUENCIES BY PLANT LOCATION - 1965-1985**
**AND COMPARISON WITH POWER OPERATIONS AVERAGE FIRE FREQUENCIES**

| PLANT LOCATION | SHUTDN FIRE EVENTS NO. | SHUTDN FIRE EVENTS AVE. FREQ. | POWER OPERATIONS NO. | POWER OPERATIONS AVE. FREQ. | COMPARISON/W POWER OPER. |
|---|---|---|---|---|---|
| Containment | 22 | 8.5E-2 | 6 | 1.1E-2 | Higher* |
| Reactor Bldg (BWR) | 18 | 1.8E-1 | 17 | 7.7E-2 | Higher** |
| Auxiliary Bldg (PWR) | 13 | 8.3E-2 | 40 | 1.1E-1 | Lower |
| Turbine Bldg | 11 | 2.0E-2 | 31 | 5.4E-2 | Lower |
| Control Room | 1 | 2.6E-3 | 3 | 6.0E-3 | Lower |
| Cbl Spreading Rm | 1 | 2.6E-3 | 3 | 6.0E-3 | Lower |
| Switchgear Room | 8 | 1.4E-2 | 9 | 1.6E-2 | Approx. same |
| Diesel Gen. Bldg | 14 | 2.5E-2 | 37 | 6.4E-2 | Lower |
| Battery Room | 0 | 8.5E-4 | 3 | 6.0E-3 | Lower |
| Other Bldgs | 4 | 7.7E-3 | 25 | 4.4E-2 | Lower |
| Serv Wtr Pumphse | 1 | 2.6E-3 | 2 | 4.2E-3 | Lower |
| Switch Yard | 1 | 2.6E-3 | 15 | 2.6E-2 | Lower |
| Offsite | 0 | 8.5E-4 | 4 | 7.7E-3 | Lower |
| Temporary Bldgs | 3 | -- | 4 | -- | Not compared |

**NOTES:**

1. Preoperational Testing fire events were excluded.

2. Ave. Overall Plt Oper.-Yrs (850.4) - Ave. Plt Power Oper. React.-Yrs (585.1) = Ave. Plt Shtdn-Yrs (265.3).
   a. Reactor Bldg (BWR) Ave. Plt Shutdn-Yrs = 328.5-226.0 = 102.5.
   b. Auxiliary Bldg (PWR) Ave. Plt Shutdn-Yrs = 521.9-359.1 = 162.8.

3. Shutdn Fire Freq. = No. Shtdn Fire Events / Ave. Plt Shtdn-Yrs. Bayes mean is shown, with Jefferys noninformative prior used.

4. *Denotes predominant cause was welding sparks/arcing during shutdown.

5. **Denotes variety of causes, including welding sparks, electrical failure, and overheated material.

6. Number of Power Operations fire events, 1965-1985: 199.

7. Number of Shutdown fire events, 1986-1994: 97.

APPENDIX H - TABLE II
SHUTDOWN FIRE EVENTS - AVERAGE FIRE FREQUENCIES BY PLANT LOCATION - 1986-1994
AND COMPARISON WITH POWER OPERATIONS AVERAGE FIRE FREQUENCIES

| PLANT LOCATION | SHUTDN FIRE EVENTS NO. | AVE. FREQ. | POWER OPERATIONS NO. | AVE. FREQ. | COMPARISON/W POWER OPER. |
|---|---|---|---|---|---|
| Containment | 12 | 5.4E-2 | 5 | 9.4E-3 | Higher* |
| Reactor Bldg (BWR) | 16 | 1.8E-1 | 12 | 5.4E-2 | Higher** |
| Auxiliary Bldg (PWR) | 14 | 1.0E-1 | 16 | 4.6E-2 | Higher** |
| Turbine Bldg | 9 | 4.1E-2 | 40 | 6.9E-2 | Lower |
| Control Room | 0 | 2.2E-3 | 1 | 2.6E-3 | Approx. same (no shutdown events) |
| Cbl Spreading Rm | 0 | 2.2E-3 | 2 | 4.3E-3 | Lower |
| Switchgear Room | 8 | 3.7E-2 | 7 | 1.3E-2 | Higher** |
| Diesel Gen. Bldg | 14 | 6.3E-2 | 16 | 2.8E-2 | Higher*** |
| Battery Room | 0 | 2.2E-3 | 0 | 8.5E-4 | Approx. same (no events) |
| Other Bldgs | 6 | 2.8E-2 | 10 | 1.8E-2 | Approx. same |
| Serv Wtr Pumphse | 1 | 6.5E-3 | 6 | 1.1E-2 | Lower |
| Switch Yard | 8 | 3.7E-2 | 17 | 3.0E-2 | Approx. same |
| Offsite | 2 | 1.1E-2 | 10 | 1.8E-2 | Approx. same |

NOTES:

1. Ave. Overall Plt Oper.-Yrs (816.3) - Ave. Plt Power Oper. React.-Yrs (586.1) = Ave. Plt Shtdn-Yrs (230.2).
   a. Reactor Bldg (BWR) Ave. Plt Shutdn-Yrs = 320.5-230.1 = 90.4.
   b. Auxiliary Bldg (PWR) Ave. Plt Shutdn-Yrs = 495.8-356.0 = 139.8.
2. Shutdn Fire Freq. = No. Shtdn Fire Events / Ave. Plt Shtdn-Yrs. Bayes mean shown, with jefferys noninformative prior used.
3. *Denotes predominant cause was welding sparks/arcing during shutdown.
4. **Denotes predominant cause was electrical failure during shutdown.
5. ***Denotes predominant cause was overheating material during shutdown testing of the Emergency Diesel-Generator.
6. Number of Power Operations fire events, 1986-1994: 142 (includes 30 extrapolated fire events).
7. Number of Shutdown fire events, 1986-1994: 90 (includes 30 extrapolated fire events).

APPENDIX H - TABLE III
SHUTDOWN FIRE EVENTS - AVERAGE FIRE FREQUENCIES BY PLANT LOCATION - 1965-1994 (COMBINED)
AND COMPARISON WITH POWER OPERATIONS AVERAGE FIRE FREQUENCIES

| PLANT LOCATION | SHUTDN FIRE EVENTS NO. | AVE. FREQ. | POWER OPER. NO. | AVE. FREQ. | COMPARISON/W POWER OPER. |
|---|---|---|---|---|---|
| Containment | 34 | 7.0E-2 | 11 | 9.8E-3 | Higher* |
| Reactor Bldg (BWR) | 34 | 1.8E-1 | 29 | 6.5E-2 | Higher** |
| Auxiliary Bldg (PWR) | 27 | 9.1E-2 | 56 | 7.9E-2 | Approx. same |
| Turbine Bldg | 20 | 4.1E-2 | 71 | 6.1E-2 | Lower |
| Control Room | 1 | 3.0E-3 | 4 | 3.8E-3 | Approx. same |
| Cbl Spreading Rm | 1 | 3.0E-3 | 5 | 4.7E-3 | Approx. same |
| Switchgear Room | 16 | 3.3E-2 | 16 | 1.4E-2 | Higher** |
| Diesel Gen. Bldg | 28 | 5.8E-2 | 53 | 4.6E-2 | Approx. same |
| Battery Room | 0 | 1.0E-3 | 3 | 3.0E-3 | Lower |
| Other Bldgs | 10 | 2.1E-2 | 35 | 3.0E-2 | Approx. same |
| Serv Wtr Pumphse | 2 | 5.0E-3 | 8 | 7.2E-3 | Approx. same |
| Switch Yard | 9 | 1.9E-2 | 32 | 2.8E-2 | Approx. same |
| Offsite | 2 | 5.0E-3 | 14 | 1.2E-2 | Lower |
| Temporary Bldgs | 3 | -- | 4 | -- | Not compared |

NOTES:

1. Preoperational Testing fire events were excluded.

2. Ave. Overall Plt Oper.-Yrs (1666.7) - Ave. Plt Power Oper. React.-Yrs (1171.2) = Ave. Plt Shtdn-Yrs (495.5).
   a. Reactor Bldg (BWR) Ave. Plt Shtdn-yrs = 649-456.1 = 192.7.
   b. Auxiliary Bldg (PWR) Ave.Plt Shtdn-yrs = 1017.7-715.1 = 302.6.

3. Shutdn Fire Freq. = No. Shtdn Fire Events / Ave. Plt Shtdn-Yrs. Bayes mean shown, with Jefferys noninformative prior used.

4. *Denotes predominant cause was welding sparks/arcing during shutdown.

5. **Denotes predominant cause was electrical failure during shutdown.

6. Number of Power Operations fire events, 1965-1994: 341 (including 30 extrapoplated fire events for 1989-1994 period at 5 per year).

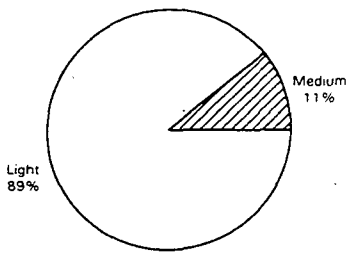
7. Number of Shutdown fire events, 1965-1994: 187 (including 30 extrapoplated fire events for 1989-1994 period at 5 per year)

# APPENDIX J

# REPORTED SMOKE EVENTS DATA

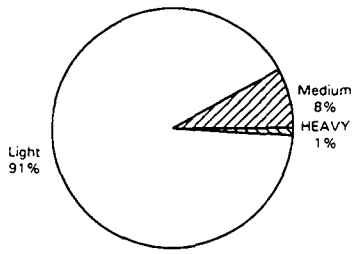
# FROM LERs AND COMPONENT FAILURE HISTORIES

SMOKE EVENTS DENSITY
1965-1985 Period



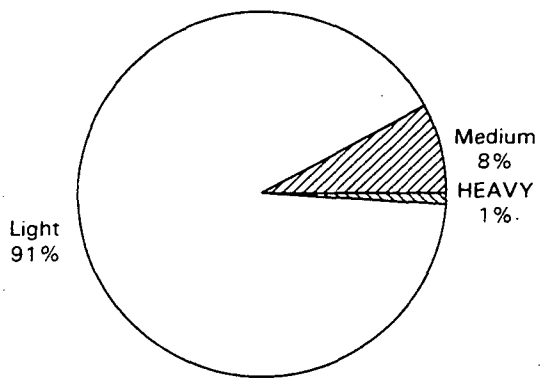

No. Smoke Events: 95
No Heavy Smoke Events during this period

SMOKE EVENTS DENSITY
1986-1994 Period




No. Smoke Events: 294

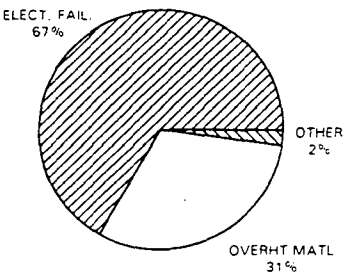
## SMOKE EVENTS DENSITY
## 1965-1994 Period




No. Total Smoke Events: 389

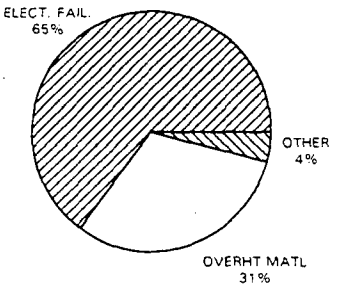
**FIGURE 32**

SMOKE EVENTS CAUSES
1965-1985 Period



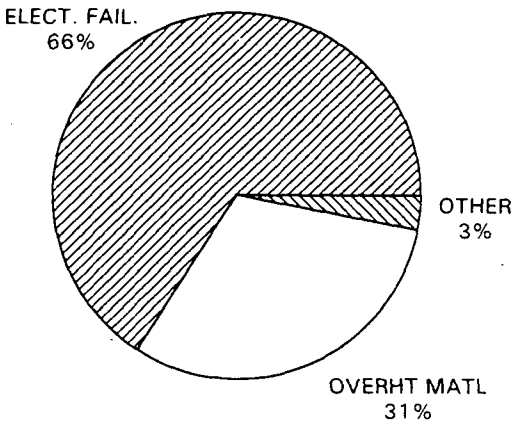

No. Smoke Events: 95

SMOKE EVENTS CAUSES
1986-1994 Period




No. Smoke Events: 294

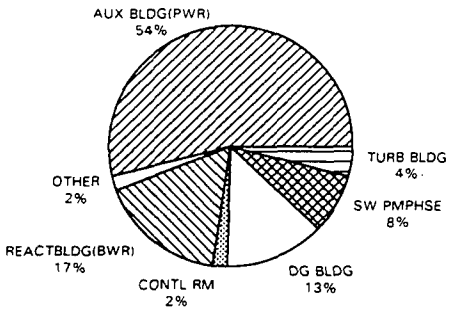
## SMOKE EVENTS CAUSES
## 1965-1994 Period




No. Total Smoke Events: 389

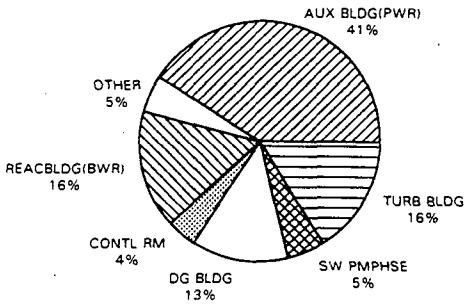
**FIGURE 33**

**SMOKE EVENTS LOCATION**
**1965-1985 Period**



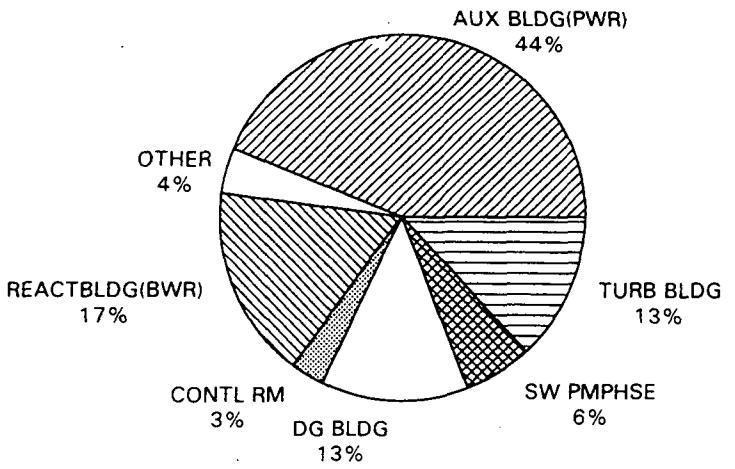

No. Smoke Events: 95
Aux Bldg includes: SwitchgrRm & CbleSpRm
Other includes: Offsite & Other Bldgs

**SMOKE EVENTS LOCATION**
**1986-1994 Period**




No. Smoke Events: 294
Aux Bldg includes: SwtchgrRm & CblSprdRm
Other includes: Containment & Switchyd

## SMOKE EVENTS LOCATION
## 1965-1994 Period




No. Smoke Events: 389

**FIGURE 34**

APPENDIX J - TABLE I
SMOKE EVENTS DATA - 01/01/65 - 12/31/85

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 22 | Comp. Fail. Hist. | 12/08/74 | -- | Reactor Building | Light | <20 min. | Power Oper. | LPCS | Elect. Fail. | Motor Overld Alarm | Cont. Isol Valve | Motor Oper. Intern. | Cont. Isol. Valve | LPCS | None |
| 2 | 10 | Comp. Fail. Hist. | 05/17/75 | -- | Auxiliary Building | Light | <20 min. | Power Oper. | DC Pwr Distr. | Elect. Fail. | Visual | Batt. Chgr Xformr | Xformr Windngs | Batt. Chgr | None | None |
| 3 | 53 | Comp. Fail. Hist. | 11/09/74 | -- | Reactor Building | Light | <5 min. | 0% Power | HPCI | Elect. Fail. | Visual | Turb. Steam Supply Valve | Motor Oper. Intern. | Turb. Steam Supply Valve | None | None-0% Pwr |
| 4 | 46 | Comp. Fail. Hist. | 04/06/78 | 0930 | Auxiliary Building | Light | <20 min. | 0% Power | AFW | Elect. Fail. | Visual | Flow Contl Valve | Motor Limit Switch | Flow Contl Valve | None | None-0% Pwr |
| 5 | 7 | Comp. Fail. Hist. | 10/24/78 | 1040 | Reactor Building | Light | <5 min. | Power Oper. | SLC | Overht Matl | Visual | SBLC Pump | Pump Packing | SBLC Pump | SCLC(1) | None |
| 6 | 60 | Comp. Fail. Hist. | 01/05/79 | 2315 | Auxiliary Building | Light | <20 min. | 0% Power | Instr AC Pwr Distr | Elect. Fail. | Visual | Power Supply Invertr | Capac. | Power Supply Invertr | None | None-0% Pwr |
| 7 | 60 | Comp. Fail. Hist. | 03/27/79 | 0815 | Auxiliary Building | Light | <20 min. | Power Oper. | Instr AC Pwr Distr | Elect. Fail. | Visual | Power Supply Invertr | Capac. | Power Supply Invertr | Instr AC Pwr Distr(1) | None |
| 8 | 19 | Comp. Fail. Hist. | 08/04/79 | -- | Auxiliary Building | Light | <20 min. | Power Oper. | Instr AC Pwr Distr | Elect. Fail. | Visual | Power Supply Invertr | Diode | Power Supply Invertr | Instr AC Pwr Distr(1) | None |
| 9 | 65 | Comp. Fail. Hist. | 12/07/79 | 1618 | Service Wtr Pumphouse | Medium | <30 min. | 0% Power | Plt AC Pwr Distr | Elect. Fail. | Visual | Strainr Circuit Breaker | Circuit Breaker Intern. | Strainr Circuit Breaker | None | None-0% Pwr |
| 10 | 31 | Comp. Fail. Hist. | 12/20/79 | 1800 | Auxiliary Building | Light | <20 min. | Power Oper. | Cont. Fan Cooling | Elect. Fail. | Visual | Cont. Fan Cooling Circ Brkr | Circuit Breaker Contac. | Cont. Fan Cooling Circ Brkr | Cont. Fan Cool(1) | None |

APPENDIX J - TABLE I
SMOKE EVENTS DATA - 01/01/65 - 12/31/85

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 42 | Comp. Fail. Hist. | 07/07/80 | -- | Auxiliary Building | Light | <10 min. | 100% Power | RPS | Elect. Fail. | Visual | Power Range Block Relay | Relay Coil | Power Range Block Relay | None | None |
| 12 | 49 | Comp. Fail. Hist. | 08/20/80 | 1530 | Auxiliary Building | Light | <20 min. | Power Oper. | CVCS | Elect. Fail. | Visual | Charg Pump Circuit Breaker | Circuit Breaker Close Coil | Charg Pump Circuit Breaker | CVCS(1) | None |
| 13 | 65 | Comp. Fail. Hist. | 10/02/80 | 0625 | Auxiliary Building | Light | <5 min. | 0% Power | Cont Isol. | Elect. Fail. | Visual | Cont. Isol. Valve | Motor Oper. Intern. | Cont. Isol. Valve | None | None-0% Pwr |
| 14 | 41 | Comp. Fail. Hist. | 10/29/80 | 0800 | Auxiliary Building | Light | <20 min. | 0% Power | CVCS | Overht Matl. | Visual | Charg Pump Vari-Drive | Vari-Drive Intern. | Charg Pump | None | None-0% Pwr |
| 15 | 60 | Comp. Fail. Hist. | 12/04/80 | 1400 | Service Wtr Pumphouse | Light | <10 min. | 0% Power | NSW | Elect. Fail. | Visual | Temp. Contl Valve | Motor Oper. LS | Temp. Contl Valve | None | None-0% Pwr |
| 16 | 60 | Comp. Fail. Hist. | 01/18/81 | 0100 | Auxiliary Building | Light | <10 min. | Power Oper. | Contl Rod Drive | Elect. Fail. | Visual | MG Set Circuit Breaker | Circuit Breaker Resistr | MG Set Circuit Breaker | CRD(1) | None |
| 17 | 16 | Comp. Fail. Hist. | 02/02/81 | 2207 | Auxiliary Building | Light | <20 min. | 0% Power | AFW | Elect. Fail. | Visual | Closing Xformr CB | Circuit Breaker Contac. | Closing Xformr Circ Brkr | None | None-0% Pwr |
| 18 | 65 | Comp. Fail. Hist. | 07/13/81 | -- | Auxiliary Building | Light | <10 min. | 0% Power | Contl Rod Drive | Elect. Fail. | Visual | Motor Contl Panel | Coil | Motor Contl Panel | None | None-0% Pwr |
| 19 | 8 | Comp. Fail. Hist. | 11/19/81 | 0200 | Auxiliary Building | Light | <5 min | 0% Power | HPSI | Elect. Fail. | Visual | HPSI Pump Motor | Motor Intern. | HPSI Pump Motor | None | None-Cold Shutdn |
| 20 | 16 | Comp. Fail. Hist. | 04/10/82 | 0630 | Service Wtr Pumphouse | Light | <5 min. | 0% Power | NSW | Elect. Fail. | Visual | ServWtr Booster Pump | Pump Packing | ServWtr Booster Pump | None | None-0% Pwr |

APPENDIX J - TABLE I
SMOKE EVENTS DATA - 01/01/65 - 12/31/85

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 12 | Comp. Fail. Hist. | 05/19/82 | 1905 | Diesel Gen. Building | Medium | <30 min. | Power Oper. | EDG | Overht Matl | Visual | DG Cool Wtr Pmp Motor | Motor Bearng Oil | DG Cool Wtr Pmp Motor | EDG(1) | None |
| 22 | 75 | Comp. Fail. Hist. | 06/21/82 | 1552 | Auxiliary Building | Light | <20 min. | Power Oper. | CCW | Overht Matl | Visual | CCW Pump Motor | Motor Bearng Oil | CCW Pump Motor | CCW(1) | None |
| 23 | 313 | 82-15 | 07/13/82 | -- | Diesel Gen. Building | Medium | <30 min. | Power Oper. | EDG | Overht Matl | Smoke Detect. | Day Tnk Limit Switch | Fuel Oil | Day Tank | EDG(1) | None |
| 24 | 52 | Comp. Fail. Hist. | 07/26/82 | 0830 | Diesel Gen. Building | Light | <5 min. | Power Oper. | EDG | Elect. Fail. | Visual | DG Contl Panel | Relay Switch | DG Contl Panel | EDG(1) | None |
| 25 | 416 | 82-70 | 09/07/82 | -- | Offsite (Burn Pit) | Medium | <30 min. | Power Oper. | NSW | Offsite Burn Pit | Smoke Detect. | -- | Offsite Combst Matl | -- | -- | None |
| 26 | 8 | Comp. Fail. Hist. | 11/02/82 | 1020 | Auxiliary Building | Light | <20 min. | 0% Power | RHR | Overht Matl | Fire Alarm | RHR Pump | Pump Bearng | RHR Pump | RHR(1) | None-- 0% Pwr |
| 27 | 31 | Comp. Fail. Hist. | 12/15/82 | 1500 | Auxiliary Building | Light (Smoke Residue) | <5 min. | 0% Power | RCS | Overht Matl | Visual | RCP Circuit Breaker | Circuit Breaker Intern. | RCP Circuit Breaker | None | None- 0% Pwr |
| 28 | 8 | Comp. Fail. Hist. | 03/08/83 | 1130 | Auxiliary Building | Light | <5 min. | Power Oper. | AFW | Overht Matl | Visual | Turbine Driven Pump | Pump Packing Matl | Turbine Driven Pump | AFW(1) | None |
| 29 | 29 | Comp. Fail. Hist. | 04/06/83 | 1941 | Auxiliary Building | Light | <20 min. | Power Oper. | Instr AC Pwr Distr | Elect. Fail. | Fire Alarm | Power Supply Invertr | Invertr Diodes | Power Supply Invertr | None | None |
| 30 | 66 | Comp. Fail. Hist. | 04/13/83 | 2000 | Auxiliary Building | Light (Smoke Smell) | <20 min. | 0% Power | RCS | Elect. Fail. | Visual | 600V Load Center CB | Circuit Breaker Close Coil | 600V Load Center CB | None | None- 0% Pwr |

APPENDIX J - TABLE I
SMOKE EVENTS DATA - 01/01/65 - 12/31/85

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 16 | Comp. Fail. Hist. | 04/24/83 | 0710 | Service Wtr Pumphouse | Light | <5 min. | Power Oper. | NSW | Overht Matl | Visual | ServWtr Booster Pump | Pump Bearing Oil | ServWtr Booster Pump | None | None- 0% Pwr |
| 32 | 52 | Comp. Fail. Hist. | 05/26/83 | 1120 | Reactor Building | Light | <5 min. | 0% Power | RHR | Elect. Fail. | Visual | RHR Flow Xmitr | Xmitr Intern. | RHR Flow Xmitr | RHR(1) | None- 0% Pwr |
| 33 | 53 | Comp. Fail. Hist. | 08/01/83 | -- | Reactor Building | Light | <5 min. | 0% Power | RCIC | Overht Matl | Visual | RCIC Pump | Pump Seals | CCW Pump | None | None- 0% Pwr |
| 34 | 25 | Comp. Fail. Hist. | 08/24/83 | -- | Reactor Building | Light | <20 min. | 0% Power | RPS | Elect. Fail. | Visual | Reactor LoLo Scram Relay | Relay Intern. | Reactor LoLo Scram Relay | None | None- 0% Pwr |
| 35 | 8 | Comp. Fail. Hist. | 09/14/83 | 1008 | Auxiliary Building | Light | <20 min. | 100% Power | Contl Rod Drive | Elect. Fail. | Visual | CRD MG Set | MG Set Bearing | CRD MG Set | CRD(1) | None |
| 36 | 3 | Comp. Fail. Hist. | 09/20/83 | -- | Reactor Building | Light | <20 min. | 0% Power | RPS | Elect. Fail. | Visual | High Drywell Press. Relay | Relay Intern. | High Drywell Press. Relay | None | None- 0% Pwr |
| 37 | 1 | Comp. Fail. Hist. | 09/25/83 | 1740 | Auxiliary Building | Light (Smoke Residue) | <5 min. | Power Oper. | ESFAS | Elect. Fail. | Visual | Seqncr Power Supply | Capac. | Seqncr Power Supply | ESFAS (1) | None |
| 38 | 30 | Comp. Fail. Hist. | 10/13/83 | 0745 | Auxiliary Building | Light | <20 min. | 100% Power | DC Power Distr | Elect. Fail. | Fire Alarm | Battery Charger Xformr | Xformr Intern. | Battery Charger Xformr | DC Pwr (1) | None |
| 39 | 80 | Comp. Fail. Hist. | 09/14/83 | 0545 | Diesel Gen. Building | Medium (Room Filled) | <20 min. | 0% Power | EDG | Overht Matl | Visual | DG Engine Cylndr | Eng Fuel Oil | DG Engine Cylndr | EDG(1) | None- 0% Pwr |
| 40 | 53 | Comp. Fail. Hist. | 01/16/84 | 0245 | Service Wtr Pumphouse | Light | <20 min. | 0% Power | ESW | Overht Matl | Visual | RHR SW Booster Pump | Pump Bearing Oil | RHR SW Booster Pump | None | None- 0% Pwr |

APPENDIX J - TABLE I
SMOKE EVENTS DATA - 01/01/65 - 12/31/85

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 41 | 8 | Comp. Fail. Hist. | 01/17/84 | 0300 | Service Wtr Pumphouse | Light (Smoke Smell) | <20 min. | Power Oper. | NSW | Elect. Fail. | Visual | ServWtr Pump Motor | Motor Intern. | ServWtr Pump Motor | NSW(1) | None |
| 42 | 13 | Comp. Fail. Hist. | 01/31/84 | 0536 | Auxiliary Building | Light | <20 min. | 0% Power | RPS | Elect. Fail. | Cont Hi Press. Alarm | Cont Hi Press. Relay | Relay Coil | Cont Hi Press. Relay | None | None-0% Pwr |
| 43 | 73 | Comp. Fail. Hist. | 01/31/84 | -- | Reactor Building | Light | <5 min. | 0% Power | ESW | Elect. Fail. | Visual | DG SW Isol Valve | Motor Oper. Intern. | DG SW Isol Valve | None | None-0% Pwr |
| 44 | 10 | Comp. Fail. Hist. | 02/21/84 | 0930 | Auxiliary Building | Light | <5 min. | 0% Power | AFW | Elect. Fail. | Visual | Trip Throtl Valve | Sol. Coil | Trip Throtl Valve | None | None-Cold Shutdn |
| 45 | 34 | Comp. Fail. Hist. | 03/18/84 | 1530 | Reactor Building | Light | <20 min. | 0% Power | RPS | Elect. Fail. | Visual | Neutron Monit. Relay | Relay Coil | Neutron Monit. Relay | None | None-Refuel. |
| 46 | 8 | Comp. Fail. Hist. | 04/11/84 | 1000 | Diesel Gen. Building | Medium | <30 min. | Power Oper. | EDG | Overht Matl | Visual | DG Engine | Fuel Oil. | DG Engine | EDG(1) | None |
| 47 | 75 | Comp. Fail. Hist. | 04/15/84 | -- | Auxiliary Building | Light | <5 min. | 0% Power | Ice Cond. | Elect. Fail. | Visual | Glycol Chiller Motor | Motor Intern. | Glycol Chiller Motor | None | None-0% Pwr |
| 48 | 10 | Comp. Fail. Hist. | 04/27/84 | 0455 | Auxiliary Building | Light | <5 min. | 0% Power | RHR | Elect. Fail. | Visual | Recirc Pump Isol. Valve | Motor Oper. Windng | Recirc Pump Isol. Valve | None | None-Cold Shutdn |
| 49 | 30 | Comp. Fail. Hist. | 04/30/84 | 0900 | Auxiliary Building | Light | <10 min. | 0% Power | ESFAS | Elect. Fail. | Fire Alarm | Vent Isol. Lockout Relay | Relay Coil | Vent Isol. Lockout Relay | None | None-Cold Shutdn |
| 50 | 52 | Comp. Fail. Hist. | 05/04/84 | 1320 | Service Wtr Pumphouse | Light | <20 min. | 100% Power | NSW | Elect. Fail. | Visual | ServWtr Pump Motor | Motor Winding | ServWtr Pump Motor | NSW(1) | None |

APPENDIX J - TABLE I
SMOKE EVENTS DATA - 01/01/65 - 12/31/85

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 51 | 57 | Comp. Fail. Hist. | 06/08/84 | -- | Reactor Building | Light | <20 min. | 0% Power | Cont. Atmos Cooling | Elect. Fail. | Visual | Drywell Cooling TempRec | Voltage Regul. | Drywell Cooling TempRec | None | None-0% Pwr |
| 52 | 80 | Comp. Fail. Hist. | 06/08/84 | -- | Reactor Building | Light | <5 min. | 100% Power | Contl Rod Drive | Overht Matl | Visual | CRD Pump | Pump Bearing | CRD Pump | CRD(1) | None |
| 53 | 54 | Comp. Fail. Hist. | 07/05/84 | 0700 | Auxiliary Building | Light | <20 min. | Power Oper. | Plant AC Pwr Distr | Elect. Fail. | Visual | 480V Reactor Vent CB | CB Trip Coil | 480VW Reactor Vent CB | None | None |
| 54 | 40 | Comp. Fail. Hist. | 07/11/84 | 1130 | Turbine Building | Light | <5 min. | 0% Power | MS | Elect. Fail. | Visual | MSIV Circuit Breaker | Circuit Breaker Intern. | MSIV Circuit Breaker | None | None-0% Pwr |
| 55 | 16 | Comp. Fail. Hist. | 07/17/84 | 1830 | Diesel Gen. Building | Light | <5 min. | 0% Power | EDG | Elect. Fail. | Visual | JaktWtr Cooling PumpMtr | Motor Intern. | JaktWtr Cooling PumpMtr | None | None-0% Pwr. |
| 56 | 45 | Comp. Fail. Hist. | 07/18/84 | 1800 | Diesel Gen. Building | Medium (Filled Room) | <30 min. | 90% Power | EDG | Overht Matl | Trouble Alarm | DG Air Compr. | Lube Oil | DG Air Compr. | EDG(1) | None |
| 57 | 53 | Comp. Fail. Hist. | 07/27/84 | 1729 | Reactor Building | Light | <10 min. | Power Oper. | React. Recirc. | Elect. Fail. | Visual | RRPump MG Set CB | Circuit Breaker Intern. | RRPump Chiller Motor | RR(1) | Reduced Power |
| 58 | 245 | 84-18 | 08/03/84 | 0156 | Auxiliary Building | Light | <5 min. | 0% Power | RHR | Overht Matl | Visual | Valve Circuit Breaker | Circuit Breaker Intern. | Valve Circuit Breaker | RHR(1) | None-0% Pwr |
| 59 | 53 | Comp. Fail. Hist. | 08/10/84 | 1500 | Reactor Building | Light | <20 min. | 0% Power | RCIC | Elect. Fail. | Motor Overld Annunc. | CST Isol. ValveCB | Circuit Breaker Intern. | CST Isol. ValveCB | None | None-0% Pwr |
| 60 | 397 | 84-96 | 09/01/84 | -- | Other Bdg (Water Filtration) | Medium | <30 min. | 65% Power | Fire Protec | Overht Matl | Fire Alarm | Diesel Fire Pump | Lack of Cooling Water | Diesel Fire. Pump | -- | Manual Turbine Trip |

APPENDIX J - TABLE I
SMOKE EVENTS DATA - 01/01/65 - 12/31/85

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 61 | 18 | Comp. Fail. Hist. | 09/04/84 | 0305 | Reactor Building | Light | <10 min. | 78% Power | RPS | Elect. Fail. | Visual | Neutron Monit. Relay | Relay Coil | Neutron Monit. Relay | None | None |
| 62 | 2 | Comp. Fail. Hist. | 09/13/84 | 1000 | Control Room | Light | <10 min. | 0% Power | DC Power Distr. | Elect. Fail. | Visual | 480V UndrVlt Lockout Relay | Relay Coil | 480V UndrVlt Lockout Relay | None | None-Refuel. |
| 63 | 16 | Comp. Fail. Hist. | 10/15/84 | 1450 | Diesel Gen. Building | Light | <10 min. | 0% Power | EDG | Overht Matl | Visual | DG Turbo-Charger | Fuel Oil . | DG Turbo-Charger | EDG(1) | None |
| 64 | 33 | Comp. Fail. Hist. | 11/19/84 | 1500 | Diesel Gen. Building | Light | <20 min. | 0% Power | EDG | Elect. Fail. | Visual | Auxil. FO Pump Motor | Motor Intern. | Auxil. FO Pump Motor | None | None-0% Pwr |
| 65 | 47 | Comp. Fail. Hist. | 11/19/84 | 0925 | Auxiliary Building | Light | <10 min. | 0% Power | Contl Rod Drive | Elect. Fail. | Visual | Reactor Trip Breaker | Trip Breaker Intern. | Reactor Trip Breaker | None | None-0% Pwr |
| 66 | 46 | Comp. Fail. Hist. | 12/24/84 | 1207 | Auxiliary Building | Light | <20 min. | Power Oper. | CVCS | Overht Matl | Visual | ChrgPmp Speed Incrsr | Speed Incrsr LubeOil | ChrgPmp Speed Increaser | None | None |
| 67 | 55 | Comp. Fail. Hist. | 12/26/84 | 1300 | Auxiliary Building | Medium (Filled Room) | <30 min. | 100% Power | AFW | Overht Matl | Visual | Motor Driven Pump | Bearing Lube Oil | Motor Driven Pump | AFW(1) | None |
| 68 | 47 | Comp. Fail. Hist. | 01/07/85 | 0835 | Auxiliary Building | Light | <20 min. | 0% Power | CVCS | Overht Matl | Visual | Chargng Pump Motor | Motor Bearing | Chargng Pump Motor | None | None-0% Pwr |
| 69 | 45 | Comp. Fail. Hist. | 01/11/85 | 1030 | Auxiliary Building | Medium (in Area) | <30 min. | 0% Power | Instr AC Pwr Distr. | Elect. Fail. | Trouble Alarm | Instr AC Pwr Invertr | Invertr Xformr | Instr AC Pwrt Invertr | None | None-0% Pwr |
| 70 | 33 | Comp. Fail. Hist. | 01/14/85 | 1230 | Auxiliary Building | Light | <10 min. | 0% Power | AFW | Overht Matl | Visual | Motor Driven Pump | Pump Bearing | Motor Driven Pump | AFW(1) | None-0% Pwr |

APPENDIX J - TABLE I
SMOKE EVENTS DATA - 01/01/65 - 12/31/85

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71 | 71 | Comp. Fail. Hist. | 03/06/85 | 0747 | Auxiliary Building | Light | <10 min. | 0% Power | RHR | Elect. Fail. | Visual | LPSI Minflow Valve | Motor Oper. Intern. | LPSI Minflow Valve | None | None-0% Pwr |
| 72 | 1 | Comp. Fail. Hist. | 03/07/85 | 2247 | Auxiliary Building | Light | <20 min. | 93% Power | CCW | Elect. Fail. | Visual | CCW Pump CB Relay | CB Cntl Relay Coil | CCW Pump CB Relay | None | None |
| 73 | 41 | Comp. Fail. Hist. | 03/16/85 | 2200 | Auxiliary Building | Light | <10 min. | Power Oper. | CCW | Overht Matl | Visual | CCW Pump | Pump Wear Ring | CCW Pump | CCW(1) | None |
| 74 | 36 | Comp. Fail. Hist. | 03/20/85 | 2215 | Reactor Building | Light | <10 min. | 0% Power | RHR | Elect. Fail. | Fire Alarm | RHR Pump Motor | Motor Intern. | RHR Pump Motor | RHR(1) | None-0% Pwr |
| 75 | 58 | Comp. Fail. Hist. | 04/30/85 | -- | Auxiliary Building | Light | <20 min. | 0% Power | Instr AC Pwr Distr. | Elect. Fail. | Visual | Instr AC Pwr Invertr | Invertr Oil Capac. | Instr AC Pwr Invertr | None | None-0% Pwr |
| 76 | 8 | Comp. Fail. Hist. | 05/15/85 | 1422 | Auxiliary Building | Light | <10 min. | Power Oper. | Combust Gas Control | Elect. Fail. | Visual | Recombr Block Valve | Sol. Coil | Recombr Block Valve | None | None |
| 77 | 39 | Comp. Fail. Hist. | 05/31/85 | -- | Auxiliary Building | Light | <5 min. | 0% Power | Instr AC Pwr Distr. | Elect. Fail. | Visual | Instr AC Pwr Invertr | Invertr Leads | Instr AC Pwr Invertr | None | None-Refuel. |
| 78 | 60 | Comp. Fail. Hist. | 06/12/85 | 1630 | Auxiliary Building | Light | <20 min. | Power Oper. | Instr AC Pwr Distr. | Elect. Fail. | Visual | Instr AC Pwr Invertr | Invertr Capac. | Instr AC Pwr Invertr | Instr AC Pwr Distr(1) | None |
| 79 | 22 | Comp. Fail. Hist. | 06/28/85 | -- | Diesel Gen. Building | Light | <20 min. | 100% Power | EDG | Overht Matl | Visual | DG Air Compr | Compr Intern. | DG Air Compr | None | None |
| 80 | 483 | 85-32 | 07/15/85 | 2123 | Control Room (Pantry) | Light | <10 min. | 100% Power | -- | Food Cooking | Smoke Detect. | -- | Food | -- | -- | None |

APPENDIX J - TABLE I
SMOKE EVENTS DATA - 01/01/65 - 12/31/85

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81 | 30 | Comp. Fail. Hist. | 07/25/85 | 1600 | Auxiliary Building | Light (Smoke Smell) | <20 min. | 100% Power | ESFAS | Elect. Fail. | Visual | Vent Isol. Lockout Relay | Relay Coil | Vent Isol. Lockout Relay | None | None |
| 82 | 10 | Comp. Fail. Hist. | 07/31/85 | 0722 | Auxiliary Building | Light | <20 min. | 0% Power | RPS | Elect. Fail. | Visual | Undrvlt Bus Relay | Relay Coily | Undrvlt Busp Relay | None | None-0% Pwr |
| 83 | 17 | Comp. Fail. Hist. | 07/31/85 | -- | Reactor Building | Light | <20 min. | 100% Power | RCIC | Elect. Fail. | Visual Alarm | Suppr Pool Isol. Vlv CB | Circuit Breaker Coil | Suppr Pool Isol. Vlv CB | None | None |
| 84 | 331 | 85-31 | 08/02/85 | 1108 | Auxiliary Building | Light | <5 min. | 93% Power | RCIC | Overht Matl | Smoke Detect. | RCIC Static Invertr | Invertr Capac. Oil | RCIC Static Invertr | RCIC | None |
| 85 | 39 | Comp. Fail. Hist. | 08/08/85 | -- | Auxiliary Building | Light | <5 min. | 0% Power | Contl Rod Drive | Elect. Fail. | Visual | Reactor Trip Breaker | Trip Breaker Contact | Reactor Trip Breaker | None | None-0% Pwr |
| 86 | 47 | Comp. Fail. Hist. | 08/20/85 | 1529 | Auxiliary Building | Light | <5 min. | 0% Power | Contl Rod Drive | Elect. Fail. | Visual | Reactor Trip Breaker | Closing Coil | Reactor Trip Breaker | None 0% Pwr | None- |
| 87 | 58 | Comp. Fail. Hist. | 09/04/85 | 0800 | Service Wtr Pumphouse | Light | <5 min. | Power Oper. | NSW | Overht Matl | Visual | SW Pump Dischg Valve | Motor Oper. Seal | SW Pump Dischg Valve | None | None |
| 88 | 53 | Comp. Fail. Hist. | 09/11/85 | 1500 | Reactor Building | Light | <5 min. | 0% Power | HPCI | Elect. Fail. | Visual | Booster Pump Suction Valve | Motor Oper. Inter... | Booster Pump Suction Valve | None | None-0% Pwr |
| 89 | 49 | Comp. Fail. Hist. | 10/22/85 | -- | Turbine Building | Light | <10 min. | 0% Power | Cond. | Elect. Fail. | Visual | Cond. Booster Pmp CB | CB Trip Coil | Cond. Booster Pmp CB | None | None-Refuel. |
| 90 | 61 | Comp. Fail. Hist. | 10/24/85 | 0330 | Auxiliary Building | Light | <10 min. | 87% Power | Plant AC Pwr Distr. | Elect. Fail. | Visual | Plant AC Pwr Distr. | Bus Bar Insul | Plant AC Pwr Distr. | Plant AC Pwr Dist(1) | Manual Shutdown |

APPENDIX J - TABLE I
SMOKE EVENTS DATA - 01/01/65 - 12/31/85

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91 | 34 | Comp. Fail. Hist. | 10/30/85 | -- | Turbine Building | Light | <20 min. | 100% Power | Cond. | Overht Matl | Bearing Temp. Alarm | Cond. Pump Motor | Motor Bearing | Cond. Pump Motor | Cond(1) | Reduced Power (to 60%) |
| 92 | 63 | Comp. Fail. Hist. | 11/23/85 | 0627 | Reactor Building | Light | <20 min. | 0% Power | RHR | Elect. Fail. | Fire Alarm | RHR Pump Motor | Motor Winding | RHR Pump Motor | None | None-0% Pwr |
| 93 | 41 | Comp. Fail. Hist. | 12/12/85 | 0230 | Auxiliary Building | Light | <20 min. | 100% Power | Instr AC Pwr Distr. | Elect. Fail. | Visual | Instr AC Pwr Invertr | Invertr Xformr | Instr AC Pwr Invertr | None | None |
| 94 | 1 | Comp. Fail. Hist. | 12/13/85 | 1408 | Turbine Building | Light | <5 min. | 0% Power | FW | Overht Matl | Visual | First Heater Block Valve | Motor Oper. Frict. | First Heater Block Valve | None | None-Refuel. |
| 95 | 39 | Comp. Fail. Hist. | 12/14/85 | -- | Auxiliary Building | Light | <20 min. | 93% Power | CCW | Overht Matl. | Visual | CCW Pump | Gearbx Breaker Contact | CCW Pump | CCW(1) | None |

**NOTES:**

1. The Auxiliary Building is For PWR only. For this table, PWR Reactor Building, Control Building, Cable Spreading Room, and Switchgear Room are included with Auxiiary Building.

2. The Reactor Building is for BWR use only. For this table, BWR Control Building, Waste Treatment Building, Cable Spreading Room, and Switchgear Room are included with the Reactor Building.

3. Smoke events listed do not include Fire Events for this period (see Appendix A - Table I).

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 259 | 86-03 | 01/14/86 | 1430 | Turbine Building | Light | <1 Hr. | 0% Power | Plant AC Pwr Distr. | Elect. Fail. | Visual | Elect. Feeder Cable | Cable Matl | Elect. Feeder Cable | -- | None-0% Pwr |
| 2 | 325 | 86-07 | 02/24/86 | 1615 | Control Room | Light | <10 min. | 100% Power | -- | Food Cooking | Fire Detect. | -- | Food Cooking | -- | -- | None |
| 3 | 47 | Comp. Fail. Hist. | 05/11/86 | 1025 | Cable Spreading Room | Light | <10 min. | 2% Power | Aux Bldg HVAC | Unknown | Visual | Fan Motor Cable | Cable Insul | Fan Motor Cable | Aux Bldg HVAC(1) | None |
| 4 | 47 | Comp. Fail. Hist. | 05/20/86 | 0920 | Other Bldgs (Hydrogen Recombiner) | Light | <10 min. | 0% Power | Hydrgn Recombr | Overht Matl | Smoke Detect. | Recombr Control Xformr | Xformr Intern. | Recombr Control Xformr | None | None-0% Pwr |
| 5 | 61 | Comp. Fail. Hist. | 06/24/86 | 0503 | Diesel Gen. Building | Light | <10 min | Power Oper. | EDG | Overht Matl | Visual | Engine LubeOil Strainr | Lube Oil | EDG | EDG(1) | None |
| 6 | 8 | Comp. Fail. Hist. | 01/30/87 | -- | Auxiliary Building | Light | <5 min. | Power Oper. | Cont. Cool. HVAC | Elect. Fail. | Visual | FanCool CB Cntl Relay | Relay Closing Coil | Fan Cooler Unit | None | None |
| 7 | 11 | Comp. Fail. Hist. | 02/05/87 | 2016 | Service Water Pumphouse | Light | <5 min. | 100% Power | NSW | Elect. Fail. | Visual | NSW Pump Motor | Motor Intern. | NSW Pump Motor | NSW(1) | Power Reduced |
| 8 | 11 | Comp. Fail. Hist. | 02/06/87 | 1837 | Service Water Pumphouse | Light | <5 min. | 100% Power | NSW | Elect. Fail. | Visual | NSW Pump Motor | Motor Intern. | NSW Pump Motor | NSW(1) | Power Reduced |
| 9 | 79 | Comp. Fail. Hist. | 02/08/87 | 0400 | Control Room | Light | <5 min. | Power Oper. | RPS | Elect. Fail. | Visual | Power Supply Xformr | Elect. Intern. | RPS Power Supply | None | None |
| 10 | 44 | Comp. Fail. Hist. | 02/28/87 | 1600 | Service Water Pumphouse | Light | <30 min. | Power Oper. | NSW | Elect. Fail. | Visual | SW Pump Motor | Motor Winding | SW Pump Motor | NSW(1) | None |
| 11 | 71 | Comp. Fail. Hist. | 02/28/87 | -- | Diesel Gen. Building | Medium | <30 min. | 0% Power | EDG | Overht Matl | Visual | DG Engine | Fuel Oil | DG Engine | EDG(1) | None-Refuel. |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 9 | Comp. Fail. Hist. | 03/01/87 | 0940 | Service Water Pumphouse | Light | <1 Hr. | 0% Power | NSW | Elect. Fail. | Visual | ServWtr Fan CB | Breaker Xformr Intern. | ServWtr Fan CB | None | None-0% Pwr |
| 13 | 37 | Comp. Fail. Hist. | 03/02/87 | -- | Service Water Pumphouse | Medium | <30 min. | Power Oper. | ESW | Elect. Fail. | Visual | ESW Pump Motor | Motor Intern. | ESW Pump Motor | None | None |
| 14 | 59 | Comp. Fail. Hist. | 03/04/87 | 1250 | Service Water Pumphouse | Light | <1 Hr. | 0% Power | NSW | Overht Matl | Visual | NSW Pump | Pump Bearing | NSW Pump | NSW(1) | None-Refuel. |
| 15 | 24 | Comp. Fail. Hist. | 03/04/87 | -- | Diesel Gen. Building | Light | <30 min. | 100% Power | EDG | Overht Matl | Visual | DG Turbo-Charger | AirCool Manifld Crack | DG Engine | EDG(1) | None |
| 16 | 12 | Comp. Fail. Hist. | 03/06/87 | 1355 | Reactor Building | Light | <1 Hr. | 0% Power | RWCU | Elect. Fail. | Visual | RWCU Pump Relay | Relay Coil | RWCU Pump | RWCU(1) | None-0% Pwr |
| 17 | 101 | Comp. Fail. Hist. | 03/09/87 | 2020 | Reactor Building | Light | <5 min. | 100% Power | SGBS | Elect. Fail. | Visual | Fan Contrl Breaker | Breaker Relay Coil | SGBS Fan | SGBS(1) | None |
| 18 | 39 | Comp. Fail. Hist. | 04/08/87 | 2259 | Turbine Building | Light | <5 min. | 96% Power | Cond. | Overht Matl | Visual | Cond. Pump Motor | Motor Bearing Lube | Cond. Pump Motor | Cond(1) | Reduced Power |
| 19 | 61 | Comp. Fail. Hist. | 05/18/87 | -- | Auxiliary Building | Light | <5 min. | 0% Power | RHR | Elect. Fail. | Visual | RHR Pump Motor | Motor Leads | RHR Pump Motor | RHR(1) | None-0% Pwr |
| 20 | 20 | Comp. Fail. Hist. | 05/19/87 | 0100 | Auxiliary Building | Light | <5 min. | Power Oper. | DC Pwr Distr. | Elect. Fail. | Visual | Standby Battery Charger | Charger Intern. | Standby Battery Charger | None | None |
| 21 | 37 | Comp. Fail. Hist. | 05/20/87 | -- | Turbine Building | Light | <5 min. | 0% Power | Cond. | Elect. Fail. | Visual | Booster Pump DschVlv | Motor Intern. | Booster Pump DschVlv | None | None-0% Pwr |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 | 50 | Comp. Fail. Hist. | 06/16/87 | -- | Turbine Building | Light | <20 min. | 0% Power | Cond. | Overht Matl | Visual | RHR Crossti Valve | Motor Oper. Winding | RHR Crosstie Valve | RHR(1) | None-Refuel. |
| 23 | 370 | 87-09 | 07/02/87 | 2341 | Switchgear Room | Light | <10 min. | 0% Power | RPS | Unknown | Visual | Reactor Trip Breaker | Elect. Intern. | Reactor Trip Breaker | RPS(1) | None-0% Pwr |
| 24 | 424 | 87-45 | 07/02/87 | 1110 | Auxiliary Building | Light | 2Hrs | 100% Power | CVCS | Overht Matl | Visual | CVCS Pump | Pump Intern. | CVCS(1) | None | None |
| 25 | 25 | Comp. Fail. Hist. | 07/09/87 | -- | Reactor Building | Light | <5 min. | 0% Power | LPCS | Elect. Fail. | Visual | LPCS Test Vlv CB | CB Xformr | LPCS Test Vlv CB | LPCS(1) | None-Refuel. |
| 26 | 3 | Comp. Fail. Hist. | 08/01/87 | -- | Reactor Building | Light | <20 min. | 0% Power | Reactor Recirc. | Elect. Fail. | Visual | Dischg Bypass Vlv CB | Breaker Intern. | Dischg Bypass Vlv CB | RR(1) | None-0% Pwr |
| 27 | 87 | Comp. Fail. Hist. | 09/26/87 | -- | Turbine Building | Light | <10 min. | 0% Power | Cond. | Elect. Fail. | Visual | Cond. Pump Motor | Motor Bearing Lube | Cond. Pump Motor | None | None |
| 28 | 27 | Comp. Fail. Hist. | 09/27/87 | -- | Service Water Pumphouse | Medium | <30 min. | 100% Power | NSW | Overht Matl | Visual | NSW Pump | Packing Matls | NSW Pump | None | None |
| 29 | 483 | 87-28 | 10/03/87 | 1027 | Control Room (Pantry) | Light | <10 min. | 0% Power | -- | Food Cooking | Smoke Detect. | -- | Food Cooking | -- | -- | None-0% Pwr |
| 30 | 10 | Comp. Fail. Hist. | 10/21/87 | 1800 | Auxiliary Building | Light | <5 min. | 0% Power | DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger FiltMod | Charger Intern. | Battery Charger | DC Pwr Dist(1) | None-0% Pwr |
| 31 | 8 | Comp. Fail. Hist. | 11/16/87 | 1830 | Auxiliary Building | Light | <1 Hr. | 0% Power | CCW | Elect. Fail. | Visual | CCW Pump Motor | Motor Leads | CCW Pump Motor | CCW(1) | None-Refuel. |
| 32 | 39 | Comp. Fail. Hist. | 11/18/87 | 1950 | Auxiliary Building | Light | <5 min. | 0% Power | DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger Xformr | Xformr Intern. | Battery Charger | DC Pwr(1) | None-0% Pwr |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 33 | 101 | Comp. Fail. Hist. | 12/05/87 | -- | Reactor Building | Light | <5 min. | 0% Power | MS | Elect. Fail. | Visual | MS Isol Valve | Motor Oper. Intern. | MS Isol Valve | MS(1) | None-0% Pwr |
| 34 | 35 | Comp. Fail. Hist. | 12/17/87 | -- | Auxiliary Building | Medium | <1 Hr. | 100% Power | Contl Rod Drive | Overht Matl | Visual | CRD MG Set Bearing | Bearing Lube | CRD MG Set | CRD(1) | None |
| 35 | 40 | Comp. Fail. Hist. | 01/06/88 | -- | Diesel Gen. Building | Light | <5 min. | 100% Power | EDG | Overht Matl | Visual | Engine Turbo-Charger | Bearing Lube | DG Eng Turbo-Charger | EDG(1) | None |
| 36 | 73 | Comp. Fail. Hist. | 01/08/88 | -- | Reactor Building | Light | <10 min. | Power Oper. | HPCI | Elect. Fail. | Visual | Torus Isol Valve | Motor Oper. Intern. | Torus Isol Valve | HPCI | None |
| 37 | 11 | Comp. Fail. Hist. | 01/14/88 | 0001 | Switch Yard | Light | <1 Hr. | 100% Power | Plant AC Pwr Distr. | Elect. Fail. | Visual | Xformr Fan Motor | Fan Motor Insul | Unit Aux Xformr | Plant AC Pwr Dist(1) | None |
| 38 | 30 | Comp. Fail. Hist. | 01/21/88 | -- | Auxiliary Building | Light | <10 min. | 100% Power | ESFAS | Elect. Fail. | Visual Motor | SI Lockout Relay | Relay Coil | SI Lockout Relay | None | None |
| 39 | 13 | Comp. Fail. Hist. | 01/24/88 | 0110 | Switchgear Room | Light (Smoke Residue) | <1 Hr. | 0% Power | RCS | Elect. Fail. | Visual | Preszr Heater CB | Circuit Breaker Intern. | Preszr Heater CB | RCS(1) | None-Plant Startup |
| 40 | 58 | Comp. Fail. Hist. | 02/04/88 | 2050 | Auxiliary Building | Light | <5 min. | 0% Power | AFW | Overht Matl | Visual | Pump Motor Bearing | Bearing Oil | AFW Mot Driven Pump | AFW(1) | None-Refuel. |
| 41 | 10 | Comp. Fail. Hist. | 02/06/88 | 1015 | Auxiliary Building | Light | <5 min. | 100% Power | DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger FiltMod | Charger Intern. | Battery Charger | DC Pwr Dist(1) | Unit Shutdn (Manual) |
| 42 | 10 | Comp. Fail. Hist. | 02/07/88 | 1410 | Auxiliary Building | Light | <5 min. | 98% Power | DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger FiltMod | Charger Intern. | Battery Charger | DC Pwr Dist(1) | Unit Shutdn (Manual) |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 43 | 328 | 88-05 | 02/12/88 | 1133 | Auxiliary Building | Light | <10 min. | 0% Pwr | CVCS | Overht Matl | Visual | Pump Speed Incrsr | Lube Oil | CVCS Pump | CVCS(1) | None-0% Pwr |
| 44 | 55 | Comp. Fail. Hist. | 02/12/88 | 0700 | Auxiliary Building | Light | <30 min. | 0% Power | CVCS | Overht Matl | Visual | Chg Pump Speed Incrsr | Lube Oil | Charging Pump | None | None-0% Pwr |
| 45 | 40 | Comp. Fail. Hist. | 02/18/88 | -- | Auxiliary Building | Light | <1 Hr. | 99% Power | Cont. Spray | Overht Matl | Visual | Cont. Spray Pump | Pump Packing | Cont. Spray Pump | CS(1) | None |
| 46 | 74 | Comp. Fail. Hist. | 03/01/88 | 1430 | Auxiliary Building | Light | <1 Hr. | 0% Power | NSW | Elect. Fail. | Visual | Circuit Breaker Heater | Elect. Intern. | Valve Oper. CB | None | None-Refuel. |
| 47 | 61 | Comp. Fail. Hist. | 03/20/88 | 1445 | Auxiliary Building | Light | <10 min. | 0% Power | Penetr. Room Ventil. | Elect. Fail. | Visual | Exhaust Fan CB | Circuit Breaker Intern. | Exhaust Fan CB | Penetr. Room Vent(1) | None-Hot Stdby |
| 48 | 1 | Comp. Fail. Hist. | 03/30/88 | -- | Containment | Light | <1 Hr. | 0% Power | Cont. HVAC | Overht Matl | Visual | Cont. Air Cooler | Cooler Fan Intern. | Cont. Air Cooler | Cont. HVAC(1) | None-0% Pwr |
| 49 | 74 | Comp. Fail. Hist. | 04/02/88 | 1700 | Auxiliary Building | Light | <5 min. | 0% Power | DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger Motor | Charger Intern. | Battery Charger Motor | None | None-Refuel. |
| 50 | 13 | Comp. Fail. Hist. | 04/16/88 | 1714 | Diesel Gen. Building | Medium | <30 min. | 100% Power | EDG | Overht Matl | Visual | DG Genr Rotor Assy | Rotor Insul | DG Genr Rotor Assy | EDG(1) | None |
| 51 | 57 | Comp. Fail. Hist. | 04/18/88 | 0500 | Reactor Building | Light (Smoke Odor) | <10 min. | Power Oper. | RPS | Elect. Fail. | Visual | RPS MG Set Relay | Relay Coil | RPS MG Set | RPS(1) | None |
| 52 | 69 | Comp. Fail. Hist. | 04/30/88 | -- | Turbine Building | Light | <10 min. | 5% Power | MS | Elect. Fail. | Visual | MS Isol Valve | Motor Oper. Intern. | MS Isol Valve | MS(1) | None |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 53 | 98 | Comp. Fail. Hist. | 05/10/88 | -- | Auxiliary Building | Light | <1 Hr. | Power Oper. | Cont. Spray | Elect. Fail. | Visual | CS Pmp Circuit Breaker | Breaker Closing Coil | CS Pump CB | CS(1) | None |
| 54 | 27 | Comp. Fail. Hist. | 05/28/88 | -- | Auxiliary Building | Light | <5 min. | 0% Power | RHR | Elect. Fail. | Visual | LPCI Pump Minifl | Motor Oper. Intern. | LPCI Pump Minifl | None | None- Refuel |
| 55 | 424 | 88-16 | 06/03/88 | -- | Cable Spreading Room | Light | <20 min. | 100% Pwr | Plant AC Pwr Distr. | Overht Matl | Smoke Detect. | Elect. Duct Heater | Unknown | RCS Valves | None | None- 0% Pwr |
| 56 | 10 | Comp. Fail. Hist. | 06/03/88 | 1015 | Auxiliary Building | Light | <10 min. | 100% Power | RPS | Elect. Fail. | Visual | RPS Relay | Relay Matl | RPS Relay | RPS(1) | None |
| 57 | 8 | Comp. Fail. Hist. | 06/04/88 | -- | Diesel Gen. Building | Light | <5 min. | 100% Power | EDG | Elect. Fail. | Visual | DG Air Compr Motor | Motor Intern. | DG Air Compr | EDG(1) | None |
| 58 | 19 | Comp. Fail. Hist. | 06/13/88 | 0100 | Auxiliary Building | Light | <20 min. | Power Oper. | Instr AC Pwr Distr. | Elect. Fail. | Visual | Instr Invertr Xformr | Xformr Intern. | Instr Invertr | None | None |
| 59 | 69 | Comp. Fail. Hist. | 06/24/88 | 1245 | Reactor Building | Light | <20 min. | 100% Power | RPS | Elect. Fail. | RPS Alarm | Power Supply Xformr | Xformr CB Intern. | RPS Power Supply | RPS(1) | None |
| 60 | 32 | Comp. Fail. Hist. | 06/15/88 | 0639 | Auxiliary Building | Light | <5 min. | Power Oper. | DC Pwr Distr. | Elect. Fail. | Visual | Standby Battery Charger | Charger Intern. | Standby Battery Charger | DC Pwr(1) | None |
| 61 | 440 | 88-28 | 06/23/88 | 1227 | Other Bldgs (Aux Boiler) | Light | <20 min | 0% Power | -- | Aux. Boiler Exhaust | Toxic Gas Detect. | Aux Boiler | Boiler Exhaust Smoke | -- | -- | None- 0% Pwr |
| 62 | 69 | Comp. Fail. Hist. | 06/24/88 | -- | Reactor Building | Light | <10 min. | 100% Power | RPS | Elect. Fail. | Visual | RPS MG Set CB | Circuit Breaker Intern. | RPS MG Set CB | RPS(1) | None |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 63 | 64 | Comp. Fail. Hist. | 06/27/88 | 0800 | Auxiliary Building | Light | <30 min. | 0% Power | Instr AC Pwr Distr. | Elect. Fail. | Visual | Power Supply Invertr | Resistr | Power Supply Invertr | None | None-Cold Shutdn |
| 64 | 2 | Comp. Fail. Hist. | 07/14/28 | -- | Switch Yard | Light | <1 Hr. | 0% Power | Plant AC Pwr Distr. | Elect. Fail. | Visual | Station Service Xformr | Xformr Intern. | Station Service Xformr | Plant AC Pwr Dist(1) | None-0% Pwr |
| 65 | 97 | Comp. Fail. Hist. | 08/10/88 | -- | Diesel Gen. Building | Light | <1 Hr. | Power Oper. | EDG | Elect. Fail. | Visual | DG Air Compr Motor | Motor Intern. | DG Air Compr | EDG(1) | None |
| 66 | 12 | Comp. Fail. Hist. | 08/11/88 | 1405 | Diesel Gen. Building | Light | <1 Hr. | Power Oper. | EDG | Overht Matl | Visual | Control Xformr | Xformr Coil | DG FO Supply Pump | None | None |
| 67 | 51 | Comp. Fail. Hist. | 08/12/88 | 1704 | Turbine Building | Light | <20 min. | 94% Power | Cond. | Elect. Fail. | Ground Alarm | Booster Pump Motor | Motor Leads | Cond. Booster Pump | None | None |
| 68 | 1 | Comp. Fail. Hist. | 08/15/88 | -- | Auxiliary Building | Light | <10 min. | 92% Power | Cont. Fan Coolng | Elect. Fail. | Visual | VentStk Dilutn Fan | Fan Motor Insul | VentStk Dilutn Fan | Cont. Fan Coolng(1) | None |
| 69 | 4 | Comp. Fail. Hist. | 09/02/88 | -- | Reactor Building | Light | <5 min. | 0% Power | SLC | Overht Matl | Visual | SBLC Pump | Pump Packing Matl | SLC Pump | SLC(1) | None-Cold Shutdn |
| 70 | 69 | Comp. Fail. Hist. | 09/03/88 | -- | Reactor Building | Light | <5 min. | 100% Power | HPCI | Overht Matl | Visual | Pump Gear Reducer | Gear Reducer Lube | HPCI Pump | HPCI | None |
| 71 | 440 | 88-37 | 09/18/88 | 1715 | Other Bldgs (Aux Boiler) | Light | <20 min. | 0% Power | -- | Aux. Boiler | Toxic Gas | Aux Boiler | Boiler Exhaust | -- | -- | None-0% Pwr |
| 72 | 48 | Comp. Fail. Hist. | 10/30/88 | -- | Switch Yard | Light | <5 min. | Power Oper. | Plant AC Pwr Distr. | Elect. Fail. | Visual | ServBus Tie Breaker | Breaker Closure Coil | ServBus Tie Breaker | Plant AC Pwr Dist(1) | None |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73 | 86 | Comp. Fail. Hist. | 11/01/88 | 0911 | Diesel Gen. Building | Light | <10 min. | 0% Power | EDG | Elect. Fail. | Fire Alarm | Jacket WtrCool TS | Temp Switch Intern. | DG Jakt Water Cooler | None | None-0% Pwr |
| 74 | 51 | Comp. Fail. Hist. | 11/02/88 | 0818 | Auxiliary Building | Medium | <30 min. | 0% Power | RHR | Overht Matl | Visual | RHR Pmp Motor Bearing | Bearing Lube Oil | RHR Pump Motor | RHR(1) | None-Cold Shutdn |
| 75 | 56 | Comp. Fail. Hist. | 11/28/88 | -- | Reactor Building | Light (Smoke Residue) | <1 Hr. | Power Oper. | Plant DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger Relay | Relay Intern. | Battery Charger | Plant DC Pwr Dist(1) | None |
| 76 | 50 | Comp. Fail. Hist. | 11/30/88 | -- | Turbine Building | Light | <20 min. | 0% Power | FW | Elect. Fail. | Visual | FW Xformr Power | Elect. Insul | FW Xformr Power | FW(1) | None-Refuel. |
| 77 | 60 | Comp. Fail. Hist. | 12/22/88 | 0830 | Auxiliary Building | Light (Smoke Smell) | <20 min. | Power Oper. | Instr AC Pwr Distr. | Elect. Fail. | Visual | Instr Power Invertr | Invertr Elect. Leads | Instr Power Invertr | None | None |
| 78 | 28 | Comp. Fail. Hist. | 01/06/89 | -- | Auxiliary Building | Light | <10 min. | 0% Power | CVCS | Elect. Fail. | Visual | Chargng Pump Dischg Valve | Motor Oper. Intern. | Chargng Pump Dischg Valve | None | None-Cold Shutdn |
| 79 | 5 | Comp. Fail. Hist. | 01/17/89 | -- | Reactor Building | Light | <1 Hr. | 0% Power | Contl Rod Drive | Overht Matl | Visual | CRD Supply Pump | Bearing Lube Oil | CRD Supply Pump | CRD(1) | None-Refuel. |
| 80 | 45 | Comp. Fail. Hist. | 01/21/89 | 1500 | Auxiliary Building | Light | <1 Hr. | 0% Power | HPSI | Overht Matl | Fire Alarm | HPSI Check Valve | Pipe Insul | HPSI Check Valve | None | None-0% Pwr |
| 81 | 400 | 89-03 | 02/06/89 | 0008 | Turbine Building | Light | <10 min. | 100% Power | Turb.-Gen. | Elect. Fail. | Visual | Gener. XctrFld Breaker | Breaker Trip Coil | Gener. XctrFld Breaker | -- | None-(Prior Trip) |
| 82 | 80 | Comp. Fail. Hist. | 02/07/89 | 1305 | Turbine Building | Light | <5 min. | 5% Power | Cond. | Elect. Fail. | Visual | Cond. Pump Motor | Motor Surge Capac. | Cond. Pump Motor | Cond(1) | Reactor Trip |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83 | 94 | Comp. Fail. Hist. | 02/21/89 | 2245 | Turbine Building | Light | <10 min. | 90% Power | FW | Elect. Fail. | Visual | FWDisch Valve MotOper | Motor Oper. Intern. | FWTurb Driven Pump | FW(1) | None-Shutdn inProc. |
| 84 | 65 | Comp. Fail. Hist. | 03/31/89 | 1712 | Auxiliary Building | Medium | <30 min. | 100% Power | Contl Rod Drive | Elect. Fail. | Fire Alarm | CRD MG Set | MG Set Motor Winding | CRD MG Set | CRD(1) | None |
| 85 | 72 | Comp. Fail. Hist. | 04/12/89 | 1201 | Auxiliary Building | Light | <5 min. | 0% Power | Plant AC Pwr Distr. | Elect. Fail. | Visual | Battery Charger SCR | Charger Elect. Intern. | Battery Charger | None | None-0% Pwr |
| 86 | 41 | Comp. Fail. Hist. | 04/13/89 | 1000 | Turbine Building | Light | <5 min. | >5% Power Distr. | FW | Overht Matl | Temp Alarm | FW Pump Bearing | Bearing Lube Oil | FW Pump | FW(1) | None |
| 87 | 8 | Comp. Fail. Hist. | 04/23/89 | -- | Auxiliary Building | Light | <10 min. | 0% Power | RHR | Elect. Fail. | Visual | RHR Dischg Valve | Motor Oper. Intern. | RHR Dischg Valve | RHR(1) | None-0% Pwr |
| 88 | 54 | Comp. Fail. Hist. | 04/24/89 | 1700 | Auxiliary Building | Light | <20 min. | Power Oper. | Ice Cond. | Elect. Fail. | Visual | IceCond Glycol Circul. Pump CB | Circuit Breaker Intern. | IceCond Glycol Circul. Pump Cb | Ice Cond(1) | None |
| 89 | 92 | Comp. Fail. Hist. | 04/29/89 | 1527 | Auxiliary Building | Light | <1 Hr. | Power Oper. | CVCS | Overht Matl | Visual | Positiv Displac Pmp Mot | Motor Intern. | Positiv Displac Pmp Mot | CVCS(1) | None |
| 90 | 27 | Comp. Fail. Hist. | 05/02/89 | -- | Containment | Light | <5 min. | 0% Power | Reactor Power Penetr | Elect. Bldg | Visual Fail. | RAM | Motor Motor | React. Winding Penetr | None Bldg | None-Cold Shutdn |
| 91 | 37 | Comp. Fail. Hist. | 05/16/89 | -- | Reactor Building | Light | <5 min. | 0% Power | RPS | Elect. Fail. | Visual | APRM Power Supply | Power Supplyr Potent. | APRM Power Supply | None | None-0% Pwr |
| 92 | 84 | Comp. Fail. Hist. | 05/16/89 | -- | Reactor Building | Light | <10 min. | 0% Power | RCIC | Elect. Fail. | Visual | Turb. Trip Valve | Motor Oper. TrpSol | Turb. Trip Valve | None | None-0% Pwr |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93 | 92 | Comp. Fail. Hist. | 05/23/89 | 1318 | Auxiliary Building | Light (Smoke In Room) | <30 min. | Power Oper. | Plant AC Pwr Distr. | Elect. Fail. | Audio Alarm | 3KV Xformr | Xformr Insul | 3KV Xformr | Plant AC Pwr Dist(1) | None |
| 94 | 46 | Comp. Fail. Hist. | 05/26/89 | -- | Auxiliary Building | Light | <1 Hr. | 100% Power | Ice Cond. | Elect. Fail. | Visual | Ice Cond. Compr | Compr Elect. Coil | Ice Cond. Compr | Ice Cond(1) | None |
| 95 | 90 | Comp. Fail. Hist. | 05/26/89 | -- | Diesel Gen. Building | Light | <5 min. | 0% Power | EDG Distr. | Overht Matl | Visual | DG Air Compr | Compr Intern. | DG Air Compr | EDG(1) | None-Refuel. |
| 96 | 80 | Comp. Fail. Hist. | 06/02/89 | 1900 | Reactor Building | Light | <10 min. | 0% Power | HPCI | Elect. Fail. | Visual | Fdwtr IsolVlv CB | CB Heater Relay | Fdwtr IsolVlv CB | HPCI | None-0% Pwr |
| 97 | 84 | Comp. Fail. Hist. | 06/05/89 | 0600 | Service Water Pumphouse | Light | <5 min. | 0% Power | ESW | Elect. Fail. | Visual | ServWtr Supply Vlv Mot | Motor Leads | ServWtr Supply Valve | ESW(1) | None-0% Pwr |
| 98 | 89 | Comp. Fail. Hist. | 06/13/89 | -- | Turbine Building | Light | <10 min. | Power Oper. | Cond. | Elect. Fail. | Visual | Cond. Booster Pmp Mot | Motor Insul | Cond. Booster Pmp Mot | Cond(1) | None |
| 99 | 80 | Comp. Fail. Hist. | 06/19/89 | 0950 | Diesel Gen. Building | Heavy (Room Evacu.) | >1 Hr. | 100% Power | EDG | Overht Matl | Visual | DG Engine | Crank-Case LubeOil | DG Engine | EDG(1) | None |
| 100 | 8 | Comp. Fail. Hist. | 06/21/89 | -- | Service Water Pumphouse | Light | <5 min. | 0% Power | NSW | Elect. Fail. | Visual | SWPump CB Cntl Relay | Relay Closing Coil | ServWtr Pump CB | NSW(1) | None-0% Pwr |
| 101 | 89 | Comp. Fail. Hist. | 06/27/89 | 0130 | Turbine Building | Light (Smoke Residue) | <1 Hr. | Power Oper. | FW | Elect. Fail. | Visual | FW Isol Valve CB | Circuit Breaker Intern. | FW Isol Valve CB | None | None |
| 102 | 73 | Comp. Fail. Hist. | 07/04/89 | -- | Reactor Building | Light | <1 Hr. | Power Oper. | Plant DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger Capactr | Elect. Intern. | Battery Charger | Plant DC Pwr Dist(1) | None |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 103 | 27 | Comp. Fail. Hist. | 07/07/89 | -- | Auxiliary Building | Light | <20 min. | 100% Power | Plant DC Pwr Distr. | Elect. Fail. | Visual | Power Supply Xformr | Xformr Intern. | Power Supply Xformr | Plant DC Pwr Dist(1) | None |
| 104 | 1 | Comp. Fail. Hist. | 07/11/89 | -- | Auxiliary Building | Light | <20 min. | 0% Power | ESFAS | Elect. Fail. | Troubl Alarm | Sequncr Power Supply | Elect. Intern. | Sequncr Power Supply | ESFAS (1) | None |
| 105 | 76 | Comp. Fail. Hist. | 07/12/89 | -- | Turbine Building | Light | <5 min. | Power Oper. | Plant AC Pwr Distr. | Elect. Fail. | Visual | Alt. Feed CB | Breaker Intern. | Alt. Feed CB | None | None |
| 106 | 91 | Comp. Fail. Hist. | 07/18/89 | -- | Auxiliary Building | Light (Smoke Smell) | <10 min. | Power Oper. | Plant DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger Xformr | Xformr Relay Intern. | Battery Charger | None | None |
| 107 | 28 | Comp. Fail. Hist. | 07/19/89 | -- | Auxiliary Building | Light | <10 min. | 0% Power | HPSI Distr. | Elect. Fail. | Visual | HPSI Isol Valve | Motor Oper. Intern. | HPSI Isol Valve | None | None-Cold Shutdn |
| 108 | 260 | 89-23 | 07/23/89 | 0920 | Diesel Gen. Building | Light | <5 min. | 0% Power | EDG | Overht Matl | Visual | Engine Contl Panel | Elect. Intern. | Engine Contl Panel | EDG(1) | None-0% Pwr |
| 109 | 18 | Comp. Fail. Hist. | 08/26/89 | -- | Reactor Building | Light | <10 min. | 0% Power | Reactor Recirc. | Elect. Fail. | Visual | Pump MG Set Relay | Relay Coil | Pump MG Set | Reactor Recirc. (1) | None-0% Pwr |
| 110 | 80 | Comp. Fail. Hist. | 10/07/89 | 2303 | Diesel Gen. Building | Medium | <30 min. | 100% Power | EDG | Overht Matl | Fire Detect. Alarm | DG Engine | Crank-Case LubeOil | DG Engine | EDG(1) | None |
| 111 | 35 | Comp. Fail. Hist. | 10/23/89 | -- | Auxiliary Building | Light (Burnng Odor) | <10 min. | 0% Power | CVCS | Overht Matl | Visual | Chargng Pump Motor | Motor Bearing Lube | Chargng Pump Motor | CVCS(1) | None-0% Pwr |
| 112 | 73 | Comp. Fail. Hist. | 10/24/89 | -- | Reactor Building | Light | <10 min. | 0% Power | RHR | Elect. Fail. | Visual | RHR Crossti Valve | Motor Oper. Winding | RHR Crosstie Valve | RHR(1) | None-Refuel. |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 113 | 323 | 89-10 | 10/27/89 | 0655 | Turbine Building | Heavy (Evac.) | 90 min. | 100% Pwr | Turb-Gen. | Overht Matl. | Visual | Gener Xcitr Bearng | Bearing Lube | Gener Perm Magnet | -- | Turb/Trp ReactTrp |
| 114 | 74 | Comp. Fail. Hist. | 10/29/89 | 2130 | Auxiliary Building | Light | <1 Hr. | 0% Power | Instr AC Pwr Distr. | Elect. Fail. | Visual | Static Invertr SCR | Invertr Elect. Intern. | Static Invertr | Instr AC Pwr Dist(1) | None-Refuel. |
| 115 | 58 | Comp. Fail. Hist. | 11/11/89 | 1300 | Diesel Gen. Building | Light | <5 min. | 0% Power | EDG | Elect. Fail. | Visual | DG LO Supply CB | Breaker Contac. Coil | DG LO Supply CB | EDG(1) | None-Refuel. |
| 116 | 86 | Comp. Fail. Hist. | 11/19/89 | 1805 | Turbine Building | Light | <30 min. | Power Oper. | FW | Overht Matl | Visual | FW Pump Bearing | Bearing Lube Oil | FW Pump | FW(1) | Power Reduced |
| 117 | 12 | Comp. Fail. Hist. | 11/21/89 | -- | Reactor Building | Light | <10 min. | Power Oper. | HPCI | Elect. Fail. | Visual | Gland Steam Blower | Blower Motor Intern. | Gland Steam Blower | HPCI | None |
| 118 | 23 | Comp. Fail. Hist. | 11/28/89 | 1544 | Auxiliary Building | Light (Smoke Smell) | <10 min. | 100% Power | CVCS | Overht Matl | Visual | ChgPump Speed Incrsr | Speed Incrsr LubeOil | Chargng Pump | None | None |
| 119 | 272 | 89-33 | 12/01/89 | 1544 | Auxiliary Building | Light | <10 min. | 100% Power | CVCS | Overht Matl | Visual | Pump Speed Increasr | Lube Oil | CVCS Pump | CVCS(1) | Turbine Trip/ ReactTrp |
| 120 | 106 | Comp. Fail. Hist. | 12/03/89 | -- | Diesel Gen. Building | Light | <5 min. | 0% Power | EDG | Overht Matl | Visual | DG Engine | Fuel Oil | DG Engine | EDG(1) | None-0% Pwr |
| 121 | 106 | Comp. Fail. Hist. | 12/06/89 | -- | Turbine Building | Light | <1 Hr. | Power Oper. Distr. | Instr AC Pwr | Elect. Fail. | Visual | 10KVA Invertr Capactr | Capactr Intern. | 10KVA Invertr | Instr AC Pwr Dist(1) | None |
| 122 | 29 | Comp. Fail. Hist. | 12/09/89 | 0914 | Auxiliary Building | Medium | <30 min. | 100% Power | CVCS | Overht Matl | Fire Alarm | ChgPump Vari-Drive | Vari-Drive Belts | Chargng Pump | CVCS(1) | None |

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SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 123 | 58 | Comp. Fail. Hist. | 12/13/89 | 0940 | Diesel Gen. Building | Medium | <30 min. | 0% Power | EDG | Elect. Fail. | Visual | DG Eng Control Cabinet | Latch Relay Intern. | DG Eng Control Cabinet | EDG(1) | None-Refuel. |
| 124 | 54 | Comp. Fail. Hist. | 12/15/89 | -- | Auxiliary Building | Light | <10 min. | 100% Power | Ice Cond. | Elect. Fail. | Visual | IceCond CHiller CB | CB Current Limiter | IceCond Chiller CB | Ice Cond(1) | None |
| 125 | 38 | Comp. Fail. Hist. | 12/26/89 | 0800 | Auxiliary Building | Light | <10 min. | 100% Power | CVCS | Overht Matl | Visual | Chg Pmp Vari-Drive | Vari-Drive Belts | Chargng Pump | CVCS(1) | None |
| 126 | 66 | Comp. Fail. Hist. | 01/11/90 | 1428 | Service Water Pumphouse | Light | <1 Hr. | Power Oper. | NSW | Elect. Fail. | Visual | ServWtr Pump Motor | Motor Insul | ServWtr Pump Motor | None | None-0% Pwr |
| 127 | 91 | Comp. Fail. Hist. | 01/23/90 | 1200 | Diesel Gen. Building | Medium | <30 min. | 0% Power | EDG | Overht Matl | Visual | DG Engine | Fuel Oil | DG Engine | EDG(1) | None-0% Pwr |
| 128 | 11 | Comp. Fail. Hist. | 01/29/90 | 0231 | Auxiliary Building | Light | <30 min. | 100% Power | Rad. Monitr. Distr. | Elect. Fail. | Rad. Monitor | Filter Paper Drive | Motor Insul | RMS Air Particl Monitor | RMS(1) | None |
| 129 | 71 | Comp. Fail. Hist. | 03/02/90 | -- | Auxiliary Building | Light | <5 min. | 0% Power | RPS | Elect. Fail. | Visual | Reactor Trip Breaker | Breaker Trip Coil | Reactor Trip Breaker | RPS(1) | None-0% Pwr |
| 130 | 38 | Comp. Fail. Hist. | 03/03/90 | 0800 | Auxiliary Building | Light | <10 min. | 100% Power | CVCS | Overht Matl | Visual | Chg Pmp Vari-Drive | Vari-Drive Belts | Chargng Pump | CVCS(1) | None |
| 131 | 30 | Comp. Fail. Hist. | 03/14/90 | 1024 | Auxiliary Building | Light | <30 min. | 0% Power | ESFAS | Elect. Fail. | ESF Fire Detect. | Storage Tnk Lvl Relay | Relay Coil | Storage Tnk Lvl Relay | None | None-Refuel. |
| 132 | 8 | Comp. Fail. Hist. | 03/30/89 | -- | Auxiliary Building | Light | <10 min. | 0% Power | RHR | Elect. Fail. | Visual | HtXchgr Dischg Valve | Motor Oper. Intern. | HtXchgr Dischg Valve | RHR(1) | None-0% Pwr |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 133 | 77 | Comp. Fail. Hist. | 04/02/90 | -- | Turbine Building | Light | <1 Hr. | Power Oper. | FW | Elect. Fail. | Visual | Elect. Auto. Posit. | Diode | Elect. Auto. Posit. | FW(1) | None |
| 134 | 10 | Comp. Fail. Hist. | 04/09/90 | 1930 | Auxiliary Building | Light (Smolder) | <1 Hr. | 0% Power | RCS | Elect. Fail. | Visual | Therm. Barrier Valve | Motor Oper. Insul | Therm. Barrier Valve | RCS(1) | None-0% Pwr |
| 135 | 59 | Comp. Fail. Hist. | 04/12/90 | -- | Auxiliary Building | Light | <5 min. | Power Oper. | AFW | Elect. Fail. | Visual | FW Dsch Isol Valve | Motorer Oper. Insul | FW Dsch Isol Valve | AFW(1) | None |
| 136 | 51 | Comp. Fail. Hist. | 04/22/90 | 1210 | Auxiliary Building | Light | <30 min. | 0% Power | RCS | Elect. Fail. | Visual | Prszr Heater CB | Breaker Trip Coil | Prszr Heater CB | None | None-Cold Shutdn |
| 137 | 2 | Comp. Fail. Hist. | 04/24/90 | -- | Auxiliary Building | Light | <10 min. | Power Oper. | RHR | Overht Matl | Visual | RHR Pump Motor | Motor Bearing Lube | RHR Pump Motor | RHR(1) | None |
| 138 | 15 | Comp. Fail. Hist. | 04/24/90 | 0709 | Reactor Building | Light | <20 min. | 0% Power | RPS | Elect. Fail. | Visual | APRM Sensor Relay | Relay Coil | RPS APRM Sensor | RPS(1) | None-0% Pwr |
| 139 | 18 | Comp. Fail. Hist. | 04/25/90 | -- | Service Water Pumphouse | Light | <1 Hr. | 0% Power | ESW | Elect. Fail. | Visual | HtXchgr IsolVlv Xformr | Xformr Intern. | RHR HtXchgr IsolVlv | ESW(1) | None-0% Pwr |
| 140 | 54 | Comp. Fail. Hist. | 05/03/90 | 2200 | Auxiliary Building | Light | <30 min. | 0% Power | Cont. Spray | Overht Matl | Visual | CS Pump Motor | Motor Bearing Lube | CS Pump Motor | None | None-Refuel. |
| 141 | 86 | Comp. Fail. Hist. | 05/14/90 | 1456 | Reactor Building | Light | <5 min. | 100% Power | RHR | Elect. Fail. | Fire Alarm | Jockey Pump Motor | Motor Insul | RHR Jockey Pump | None | None |
| 142 | 60 | Comp. Fail. Hist. | 05/17/90 | -- | Auxiliary Building | Light (Smoke Smell) | <30 min. | Power Oper. | Instr AC Pwr Distr. | Elect. Fail. | Visual | Instr Power Invertr | Invertr Relay Intern. | Instr Power Invertr | None | None |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 143 | 41 | Comp. Fail. Hist. | 05/28/90 | 0745 | Auxiliary Building | Light | <10 min. | 100% Power | Contl Rod Drive | Elect. Fail. | Visual | CRD MG Set | Voltage Regul. Intern. | CRD MG Set | CRD(1) | None |
| 144 | 97 | Comp. Fail. Hist. | 05/29/90 | 1408 | Auxiliary Building | Light | <1 Hr. | Power Oper. | Penetr Room HVAC | Elect. Fail. | Visual | Penetr Room Fan CB | Circuit Breaker Coil | Penetr Room Fan | Penetr Room HVAC(1) | None |
| 145 | 53 | Comp. Fail. Hist. | 05/30/90 | -- | Reactor Building | Light | <1 Hr. | 0% Power | Instr AC Pwr Distr. | Elect. Fail. | Visual | UPS Xformr | Xformr Intern. | UPS Xformr | Instr AC Pwr Dist(1) | None-0% Pwr |
| 146 | 28 | Comp. Fail. Hist. | 06/02/90 | -- | Turbine Building | Light | <10 min. | 5% Power | Cond. | Overht Matl | Visual | Cond. Pump Motor | Motor Bearing Oil | Cond. Pump Motor | Cond(1) | None |
| 147 | 70 | Comp. Fail. Hist. | 06/05/90 | 1551 | Auxiliary Building | Light | <5 min. | 100% Power | CCW | Elect. Fail. | Visual | CCW Pump Motor | Motor Winding | CCW Pump Motor | CCW(1) | None |
| 148 | 10 | Comp. Fail. Hist. | 06/13/90 | 2222 | Turbine Building | Medium | <30 min. | 48% Power | FW | Elect. Fail. | Visual | FW Pump Motor | Motor Winding | FW Pump Motor | FW(1) | None |
| 149 | 84 | Comp. Fail. Hist. | 06/13/90 | -- | Reactor Building | Light | <20 min. | 0% Power | RCIC | Elect. Fail. | Visual | RCIC Valve CB | CB Contacr Coil | RCIC Valve CB | None | None-0% Pwr |
| 150 | 79 | Comp. Fail. Hist. | 06/27/90 | 0920 | Reactor Building | Light | <10 min. | Power Oper. | Contl Rod Drive | Elect. Fail. | Audio Alarm | CRD MG Set Motor | Motor Insul | CRD MG Set Motor | CRD(1) | None |
| 151 | 96 | Comp. Fail. Hist. | 07/01/90 | -- | Diesel Gen. Building | Light | <10 min. | 60% Power | EDG | Overht Matl | Visual | DG Air Compr | Compr Lube Oil | DG Air Compr | None | None |
| 152 | 108 | Comp. Fail. Hist. | 07/06/90 | 1130 | Switch Yard | Light | <1 Hr. | 0% Power | Plant AC Pwr Distr. | Elect. Fail. | Visual | Xformr Term. Box | Xformr Intern. | Main Xformr | Plant AC Pwr Dist(1) | None-Hot Stdby |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 153 | 413 | 90-28 | 07/23/90 | 1135 | Control Room | Medium | 3Hrs-20min. | 0% Power | Contl Room HVAC | Overht Matl | Visual | Contl Room AHU | Fan Belt Matl | Contl Room AHU | Contl Room HVAC(1) | None-0% Pwr |
| 154 | 92 | Comp. Fail. Hist. | 07/23/90 | 1334 | Auxiliary Building | Light (Smoke In Room) | <30 min. | Power Oper. | Plant AC Pwr Distr. | Elect. Fail. | Audio Alarm | 3KV XFormr | Xformr Insul | 3KV Xformr | Plant AC Pwr Dist(1) | None |
| 155 | 40 | Comp. Fail. Hist. | 08/02/90 | -- | Diesel Gen. Building | Light | <5 min. | 0% Power | EDG | Overht Matl | Visual | Engine Turbo-Charger | Bearing Lube | DG Eng Turbo-Charger | EDG(1) | None-Cold Shutdn |
| 156 | 36 | Comp. Fail. Hist. | 08/19/88 | 1846 | Reactor Building | Light | <30 min. | Power Oper. | NSSSS | Elect. Fail. | Visual | FlrDrn Temp HiTrip Relay | Relay Coil | FlrDrn Temp HiTrip Relay | None | None |
| 157 | 39 | Comp. Fail. Hist. | 09/10/90 | 0001 | Auxiliary Building | Light | <30 min. | 97% Power | Instr AC Pwr Distr. | Elect. Fail. | Annunc Alarm | DC Pwr Supply. AC Input | Elect. Intern. | DC Power Supply | Instr AC Pwr (1) | None-0% Pwr |
| 158 | 95 | Comp. Fail. Hist. | 09/21/90 | 1450 | Auxiliary Building | Light | <5 min. | Power Oper. | Plant DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger CB | Circuit Breaker Intern. | Battery Charger CB | None | None |
| 159 | 35 | Comp. Fail. Hist. | 10/12/90 | -- | Diesel Gen. Building | Light | <10 min. | 0% Power | EDG | Elect. Fail. | Visual | DG LO Heater CB | Breaker Xformr Intern. | DG LO Heater CB | EDG(1) | None-0% Pwr |
| 160 | 47 | Comp. Fail. Hist. | 10/17/90 | 1730 | Auxiliary Building | Light | <10 min. | 0% Power | Contl Rod Drive | Elect. Fail. | Smoke Detect. | Reactor Trip Bypass Breaker | Breaker Elect. Contac. | Reactor Trip Bypass Breaker | None | None-Cold Shutdn |
| 161 | 109 | Comp. Fail. Hist. | 10/18/90 | 1211 | Turbine Building | Light (Smoke Residue) | <5 min. | Power Oper. | MS | Elect. Fail. | Visual | Capactr Solen. Valve | Elect. Intern. | MS Stm Trap Isol Vlv | None | None |
| 162 | 72 | Comp. Fail. Hist. | 10/21/90 | -- | Service Water Pumphouse | Light | <1 Hr. | 0% Power | NSW | Elect. Fail. | Visual | ServWtr Pump Motor | Motor Intern. | ServWtr Pump Motor | None | None-0% Pwr |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 163 | 96 | Comp. Fail. Hist. | 11/08/90 | 1050 | Auxiliary Building | Light | <20 min. | 0% Power | Plant DC Pwr Distr. | Elect. Fail. | Smoke Alarm | Battery Charger Shunt | Charger Intern. | Battery Charger | Plant DC Pwr Dist(1) | None |
| 164 | 8 | Comp. Fail. Hist. | 11/20/90 | -- | Auxiliary Building | Light | <5 min. | Power Oper. | RHR | Elect. Fail. | Visual | Recirc Pump Dischg Valve | Motor Oper. Intern. | Recirc Pump Dischg Valve | RHR(1) | None |
| 165 | 97 | Comp. Fail. Hist. | 11/26/90 | -- | Diesel Gen. Building | Light | <1 Hr. | Power Oper. | EDG | Elect. Fail. | Visual | DG Air Compr Motor | Motor Intern. | DG Air Compr | EDG(1) | None |
| 166 | 46 | Comp. Fail. Hist. | 12/05/90 | 1736 | Turbine Building | Light | <1 Hr. | 0% Power | Plant AC Pwr Distr. | Elect. Fail. | Visual | 600VAC Supply Breaker | Shunt Trip Coil | 600VAC Supply Breaker | Plant AC Pwr Dist(1) | None-0% Pwr. |
| 167 | 27 | Comp. Fail. Hist. | 12/08/90 | -- | Auxiliary Building | Light | <10 min. | 0% Power | AFW | Overht Matl | Visual | AFW Pump | Pump Packing | AFW Pump | AFW(1) | None-Cold Shutdn |
| 168 | 74 | Comp. Fail. Hist. | 01/03/91 | 1005 | Diesel Gen. Building | Light | <5 min. | Power Oper. | EDG | Overht Matl | Visual | DG Engine | Fuel Oil | DG Engine | EDG(1) | None |
| 169 | 5 | Comp. Fail. Hist. | 01/06/91 | 2053 | Turbine Building | Medium | <1 Hr. | >2% Power | Turb-Gener. | Overht Matl | Visual | Gener. Magnet Bearing | Bearing Lube Oil | Gener. Magnet Bearing | T-G | Turb Trip (Manual) |
| 170 | 47 | Comp. Fail. Hist. | 02/17/91 | -- | Service Water Pumphouse | Light | <10 min. | 100% Power | NSW | Overht Matl | Visual | ServWtr Pump Motor | Motor Winding | ServWtr Pump Motor | NSW(1) | None |
| 171 | 61 | Comp. Fail. Hist. | 02/21/91 | 0830 | Auxiliary Building | Light | <30 min. | 0% Power | CVCS | Elect. Fail. | Visual | Aux Oil Pmp Mot | Motor Intern. | Aux Oil Pmp Mot | None | None-Cold Shutdn |
| 172 | 368 | 91-08 | 03/09/91 | 0918 | Control Room | Light | <5 min. | 0% Power | Contl Room HVAC | Overht Matl | Smoke Detect. | DG Exhaust | Fuel Oil | -- | -- | None-0% Pwr |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 173 | 80 | Comp. Fail. Hist. | 03/09/91 | 0727 | Turbine Building | Light | <5 min. | 100% Power | FW | Elect. Fail. | Visual | FW Pump Contlr | Xformr Resistr | FW Pump Contlr | None | None |
| 174 | 86 | Comp. Fail. Hist. | 04/13/91 | 1345 | Turbine Building | Light | <30 min. | 93% Power | FW | Overht Matl. | Visual | FW Pump Bearing | Bearing Lube Oil | FW Pump | FW(1) | Power Reduced |
| 175 | 9 | Comp. Fail. Hist. | 03/27/91 | -- | Reactor Building | Light | <5 min. | Power Oper. | HPCI | Elect. Fail. | Visual | Test Return Valve | Motor Oper. Leads | Test Return Valve | HPCI | None |
| 176 | 66 | Comp. Fail. Hist. | 04/16/91 | 0001 | Diesel Gen. Building | Light | <30 min. | 0% Power | EDG | Elect. Fail. | Visual | DG Air Compr Motor | Motor Intern. | DG Air Start Compr | EDG(1) | None-Refuel. |
| 177 | 23 | Comp. Fail. Hist. | 04/27/91 | -- | Auxiliary Building | Light (Smoke Smell) | (5 min. | 47% Power | RCS | Elect. Fail. | Visual | PORV Block Vlv CB | Circuit Breaker Contacr | PORV Block Vlv CB | None | None |
| 178 | 77 | Comp. Fail. Hist. | 05/03/91 | -- | Reactor Building | Light | <1 Hr. | 0% Power | RCIC | Elect. Fail. | Visual | Trip/ Thottl Valve | Solen. Coil | Trip/ Throttl Valve | RCIC | None-0% Pwr |
| 179 | 85 | Comp. Fail. Hist. | 05/04/91 | 1416 | Auxiliary Building | Light | <5 min. | 0% Power | AFW | Elect. Fail. | Visual | AFW Pump Motor | Motor Intern. | AFW Pump Motor | AFW(1) | None-0% Pwr |
| 180 | 282 | 91-04 | 05/09/91 | 1255 | Auxiliary Building | Light | <10 min. | 85% Power | HPSI | Elect. Fail. | Visual | Pipe Heat Tracing | Elect. Intern. | CVCS Heat Tracing | CVCS(1) | None-Reducng Pwr for Refuel. |
| 181 | 107 | Comp. Fail. Hist. | 05/11/91 | 0524 | Switch Yard | Light | <1 Hr. | Power Oper. | Plant AC Pwr Distr. | Elect. Fail. | Visual | 13.8KV Circuit Breaker | Breaker Intern. | 13.8KV Circuit Breaker | Plant AC Pwr Dist(Alt) | None |
| 182 | 15 | Comp. Fail. Hist. | 05/19/91 | 1359 | Reactor Building | Light (Smoke Smell) | <20 min. | Power Oper. | RPS | Elect. Fail. | Visual | RPS MG Set Motor | Motor Insul | RPS MG Set | RPS(1) | None |

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SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 183 | 31 | Comp. Fail. Hist. | 05/19/91 | -- | Auxiliary Building | Light | <10 min. | Power Oper. | Cont. Coolng | Overht Matl | Visual | Recirc. Fan Bearing | Bearing Lube | Cont. Recirc. Fan | Cont. Cool(1) | None |
| 184 | 9 | Comp. Fail. Hist. | 05/30/91 | -- | Reactor Building | Light | <1 Hr. | 80% Power | HPCI | Elect. Fail. | Visual | Pump TurnGr Relay | Relay Contac. | Turbine Driven Pump | HPCI | None |
| 185 | 029 | 91-02 | 06/15/91 | 2350 | Offsite | Light | >2 Hr. | 88% Power | Plt AC Pwr Distr. | Overht Matl (Lightng) | Visual | Xformr Lightng Arrestr | Elect. Insul | Xformr Lightng Arrestr | Plt AC Pwr Distr | Reactor Trip (Manual) |
| 186 | 70 | Comp. Fail. Hist. | 06/15/91 | -- | Auxiliary Building | Light (Smoke Residue) | <5 min. | 100% Power | RCS Contl Instr CB | Elect. Fail. | Visual | RCS Contl Instr CB | Circuit Breaker Intern. | RCS Contl Instr | RCS Contl Instr(1) | None |
| 187 | 77 | Comp. Fail. Hist. | 09/06/91 | -- | Reactor Building | Light | <1 Hr. | 100% Power | RHR | Elect. Fail. | Fire Alarm | HtXchgr Vent Vlv CB | Breaker Xformr Intern. | HtXchgr Vent Vlv CB | RHR(1) | None |
| 188 | 78 | Comp. Fail. Hist. | 09/11/91 | -- | Turbine Building | Light | <1 Hr. | 80% Power | FW | Elect. Fail. | Trouble Alarm | FW Pump Turning Gear | Gear Solen. Coil | FW Pump Turning Gear | FW(1) | None |
| 189 | 31 | Comp. Fail. Hist. | 09/13/91 | -- | Auxiliary Building | Light | <30 min. | Power Oper. | Cont. Rad. Monit. | Elect. Fail. | Visual | Rad. Sample Pmp Mot | Motor Intern. | Rad. Sample Pmp Mot | Cont. Rad. Monit(1) | None |
| 190 | 70 | Comp. Fail. Hist. | 09/17/91 | -- | Auxiliary Building | Light | <5 min. | 0% Power | RHR | Elect. Fail. | Visual | RHR Inlet Valve | Motor Oper. Intern. | RHR Inlet Valve | RHR(1) | None-Refuel. |
| 191 | 102 | Comp. Fail. Hist. | 09/25/91 | -- | Turbine Building | Medium | <1 Hr. | 100% Power | FW | Overht Matl | Visual | FW Pump Turbine Governr | Piping Insul | FW Pump | FW(1) | None |
| 192 | 51 | Comp. Fail. Hist. | 09/27/91 | 1650 | Auxiliary Building | Light | <5 min. | 0% Power | CVCS | Elect. Fail. | Visual | Chargng Pump CB | CB Close Coil | Chargng Pump CB | None | None-Refuel. |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 193 | 40 | Comp. Fail. Hist. | 10/11/91 | -- | Auxiliary Building | Light | <5 min. | 0% Power | CVCS | Overht Matl | Visual | Pump Speed Incrsr | Gear Box Oil | Chargng Pump | CVCS(1) | None-0% Pwr |
| 194 | 2 | Comp. Fail. Hist. | 10/17/91 | 1418 | Turbine Building | Light | <20 min. | 100% Power | Cond. | Elect. Fail. | Visual | Cond. Pump Motor | Motor Surge Capac. | Cond. Pump Motor | Cond(1) | Reduced Power |
| 195 | 4 | Comp. Fail. Hist. | 10/21/91 | 2015 | Turbine Building | Light (Smoke Smell) | <20 min. | Power Oper. | Turb-Gener. | Elect. Fail. | Visual | Gener. Leads Coolng | Circuit Breaker Contacr | Gener. Leads Cooling | Turb-Gener. | Power Reduced |
| 196 | 424 | 91-08 | 10/23/91 | 1110 | Auxiliary Building | Light | 15 min. | 0% Power | Rad. Monitr System | Elect. Fail. | Visual | Rad. Monitr Xformr | Xformr Intern. | Rad. Monitr Xformr | None | None-0% Pwr |
| 197 | 26 | Comp. Fail. Hist. | 11/06/91 | -- | Reactor Building | Light | <30 min. | 0% Power | RBCC | Elect. Fail. | Visual | Drywell Chiller Control | Panel Wiring | Drywell Chiller Control | RBCC(1) | None-0% Pwr |
| 198 | 54 | Comp. Fail. Hist. | 11/08/91 | 0056 | Auxiliary Building | Medium | <30 min. | 100% Power | Plant AC Pwr Distr. | Elect. Fail. | Visual | AC Pwr Bus | Power Cables | AC Pwr Bus | Plant AC Pwr Dist(1) | Power Reduced |
| 199 | 99 | Comp. Fail. Hist. | 11/18/91 | -- | Turbine Building | Light | <1 Hr. | Power Oper. | FW | Elect. Fail. | Visual | FW Reg Isol Vlv CB | Circuit Breaker Coil | FW Reg Isol Vlv CB | None | None |
| 200 | 54 | Comp. Fail. Hist. | 11/19/91 | -- | Auxiliary Building | Light | <20 min. | 0% Power | Cont. Cooling | Person. Error | Visual | Cont. Coolng Fan | Extens. Cord Frictn | Cont. Cooling Fan | Cont. Cool(1) | None-Cold Shtdn |
| 201 | 37 | Comp. Fail. Hist. | 11/27/91 | -- | Reactor Building | Light | <5 min. | Power Oper. | RPS | Elect. Fail. | Visual | IRM Voltge Regul. | Elec. Intern. | IRM Voltge Regul. | RPS(1) | None |
| 202 | 37 | Comp. Fail. Hist. | 12/02/91 | 1100 | Reactor Building | Light | <20 min. | 0% Power | SBLC | Overht Matl | Visual | SLC Pump Fan CB | Packing Matl Coil | SLC Pump Fan CB | None | None-0% Pwr |

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| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 203 | 11 | Comp. Fail. Hist. | 01/02/92 | 2230 | Switch Yard | Light | <30 min. | 100% Power | Plant AC Pwr Distr. | Elect. Fail. | Failure Alarm | Xformr Fan Motor | Fan Motor Insul | Unit Aux Xformr | Plant AC Pwr Dist(1) | None |
| 204 | 65 | Comp. Fail. Hist. | 01/11/92 | 0230 | Diesel Gen. Building | Light | <20 min. | 0% Power | EDG | Overht Matl | Annunc Alarm | DG Air Compr | Drive Belt | DG Air Compr | None | None-0% Pwr |
| 205 | 325 | 92-02 | 01/17/92 | 0215 | Control Room | Light | <5 min | 100% Power | -- | Food Cooking | Fire Alarm | -- | Food Cooking | -- | -- | None-0% Pwr |
| 206 | 71 | Comp. Fail. Hist. | 03/17/92 | -- | Auxiliary Building | Light | <5 min. | 0% Power | Contl Rod Drive | Elect. Fail. | Visual | MG Set Voltge Regul. | Voltge Regul. Intern. | MG Set Pump CB | CRD(1) | None-Cold Shutdn |
| 207 | 352 | 92-04 | 03/21/92 | -- | Reactor Building | Light | <10 min. | 0% Power | React Bldg HVAC | Elect. Fail. | Visual | HVAC PwrSup CB | Breaker Trip Coil | HVAC PwrSup CB | React Bldg HVAC | None-0% Pwr |
| 208 | 104 | Comp. Fail. Hist. | 04/10/92 | 2144 | Auxiliary Building | Light | <10 min. | 0% Power | AFW | Elect. Fail. | Visual | AFW Swapovr Valve | Motor Oper. Intern. | AFW Swapovr Valve | AFW(1) | None-Refuel. |
| 209 | 46 | Comp. Fail. Hist. | 04/21/92 | -- | Diesel Gen. Building | Light | <1 Hr. | 95% Power | EDG | Elect. Fail. | Visual | Bypass LO Pump CB | Breaker Starter Contac. | Bypass LO Pump CB | EDG(1) | None |
| 210 | 26 | Comp. Fail. Hist. | 05/22/92 | -- | Reactor Building | Light | <5 min. | 100% Power | RHR | Elect. Fail. | Visual | RHR Pump Motor | Motor Stator Coil | RHR Pump Motor | RHR(1) | None |
| 211 | 91 | Comp. Fail. Hist. | 06/02/92 | 0600 | Turbine Building | Light | <10 min. | 0% Power | Cond. | Elect. Fail. | Visual Motor | Cond. Demin. IsolVlv | Motor Oper. Intern. | Cond. Demin. IsolVlv | None | None-Cold Shutdn |
| 212 | 2 | Comp. Fail. Hist. | 06/10/92 | 2100 | Auxiliary Building | Light | <1 Hr. | 100% Power | AFW | Elect. Fail. | Visual | Turb Digital Control Panel | Elect. Intern. | Turbine Driven Pump | AFW(1) | None |

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| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 213 | 387 | 92-10 | 06/13/92 | 1100 | Other Bldgs (Offgas Recomb) | Light | >2 Hrs. | 2% Power | Offgas Recombr Distr. | Overht Matl | Temp. Detect. | Charc Guard Bed | Charcol | Charc Guard Bed | -- | None |
| 214 | 59 | Comp. Fail. Hist. | 06/29/92 | 1345 | Auxiliary Building | Light | <5 min. | 100% Power | DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger Rectifr | Rectifr Intern. | Battery Charger | DC Pwr(1) | None |
| 215 | 80 | Comp. Fail. Hist. | 06/29/92 | 0600 | Diesel Gen. Building | Light | <20 min. | 100% Power | EDG | Overht Matl | Fire Suppr Alarm | DG Air Compr | Lube Oil | DG Air Compr | EDG(1) | None |
| 216 | 39 | Comp. Fail. Hist. | 06/30/92 | 2038 | Auxiliary Building | Light | <1 Hr. | 0% Power | CCW | Elect. Fail. | Visual | CCW Isol Valve | Limit Switch Intern. | CCW Isol Valve | CCW(1) | None-Refuel. |
| 217 | 39 | Comp. Fail. Hist. | 07/12/92 | 1854 | Turbine Building | Light | <30 | 0% Power | Cond. | Overht Matl | Annunc. Alarm | Cond. Pump | Pump Packing Matl | Cond. Pump | Cond(1) | None-0% Pwr |
| 218 | 33 | Comp. Fail. Hist. | 07/25/92 | 0152 | Switch Yard | Light | <20 min. | 100% Power | Plant AC Pwr Distr. | Overht Matl | Fire Alarm | Unit Aux Xformr | Bus Insul | Unit Aux Xformr | Plant AC Pwr Dist(1) | None |
| 219 | 46 | Comp. Fail. Hist. | 07/28/92 | 0241 | Diesel Gen. Building | Light | <5 min. | 0% Power | EDG | Elect. Fail. | Visual | Jacket Water Pmp Mot | Motor Insul | Jacket Water Pmp Mot | EDG(1) | None-Refuel. |
| 220 | 5 | Comp. Fail. Hist. | 08/14/92 | -- | Reactor Building | Light | <5 min. | Power Oper. | HPCI | Elect. Fail. | Visual | Aux Oil Pump CB | Circuit Breaker Intern. | Aux Oil Pump CB | HPCI | None |
| 221 | 104 | Comp. Fail. Hist. | 08/20/92 | 0700 | Turbine Building | Light (Smoke Smell) | <20 min. | 100% Power | ESFAS | Elect. Fail. | Audio Alarm | Card Rack Pwr Sup | Power Supply Intern. | Card Rack Pwr Sup | None | None |
| 222 | 17 | Comp. Fail. Hist. | 08/21/92 | -- | Containment | Light | <10 min. | 100% Power | Cont. Atmos Cooling | Elect. Fail. | Visual | Drywell Cooling Fan | Fan Control Relay | Drywell Cooling Fan | Cont. Atmos Cool.(1) | None |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 223 | 86 | Comp. Fail. Hist. | 08/28/92 | 1723 | Turbine Building | Light | <5 min. | 10% Power | Turb-Gener. | Overht Matl | Visual | Gener. Rotor | Rotor Frictn. | T-G Gener. | Turb-Gener. | Power Reduced |
| 224 | 46 | Comp. Fail. Hist. | 08/31/92 | -- | Diesel Gen. Building | Light (Smoke Residue) | <1 Hr. | 0% Power | EDG | Elect. Fail. | Visual | Bypass LO Pump Motor | Motor Insul | Bypass LO Pump Motor | EDG(1) | None-Refuel |
| 225 | 78 | Comp. Fail. Hist. | 09/03/92 | -- | Turbine Building | Light | <1 Hr. | 0% Power | FW | Elect. Fail. | Visual | FW Stop Valve CB | Breaker Reverse Contac | FW Stop Valve CB | FW(1) | None-0% Pwr |
| 226 | 85 | Comp. Fail. Hist. | 09/25/92 | -- | Service Water Pumphouse | Light | <5 min. | 0% Power | NSW | Elect. Fail. | Visual | SWBoost Pump CB | Breaker Closing Coil | SWBoost Pump CB | NSW(1) | None-0% Pwr |
| 227 | 46 | Comp. Fail. Hist. | 10/05/92 | -- | Turbine Building | Light | <20 min. | 0% Power | Cond. | Elect. Fail. | Visual | Cond. Shutoff Valve | Motor Oper. Intern. | Cond. Shutoff Valve | Cond(1) | None-0% Pwr |
| 228 | 11 | Comp. Fail. Hist. | 10/17/92 | 2014 | Auxiliary Building | Light (Burng Smell) | <5 min. | 0% Power | DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger | Charger Intern. | Battery Charger | DC Pwr Dist(1) | None-Cold Shutdn |
| 229 | 324 | 92-09 | 10/30/92 | 1130 | Diesel Gen. Building | Medium | >8 Hrs. | 0% Power | -- | Welding Oper. | Smoke Detect. | -- | Welding Matl | -- | -- | None-0% Pwr |
| 230 | 34 | Comp. Fail. Hist. | 10/31/92 | -- | Reactor Building | Light | <1 Hr. | 0% Power | Plant AC Pwr Distr. | Elect. Fail. | Visual | Battery Charger CB | CB Trip Coil | Battery Charger | None | None-Refuel. |
| 231 | 296 | 92-04 | 11/04/92 | 1900 | Reactor Building | Heavy (Temp. Evac.) | >1 Hour | 0% Power | -- | Xotherm Chem. React. | Visual | -- | Epoxy Grout Compound | -- | -- | None-0% Pwr |
| 232 | 86 | Comp. Fail. Hist. | 11/04/92 | 1006 | Control Room | Light | <5 min. | 100% Power | RPS | Elect. Fail. | Visual | RPS Div I Contact | Elect. Intern. | RPS Div I Contact | RPS | Power Reduc/ SCRAM |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 233 | 105 | Comp. Fail. Hist. | 11/09/92 | 1025 | Auxiliary Building | Light | <5 min. | 0% Power | HPSI | Elect. Fail. | Visual | Hot Leg Isol Valve | Motor Oper. Intern. | Hot Leg Isol Valve | HPSI(1) | None-0% Pwr |
| 234 | 29 | Comp. Fail. Hist. | 11/21/92 | -- | Auxiliary Building | Light | <20 min. | Power Oper. | HPSI | Overht Matl | Visual | SI Recirc. Pump | Pump Seal Matl | SI Recirc. Pump | None | None |
| 235 | 41 | Comp. Fail. Hist. | 12/10/92 | -- | Auxiliary Building | Light | <5 min. | 100% Power | CVCS | Overht Matl | Visual | Chg Pmp Vari-Drive | Vari-Drive Belts | Chargng Pump | CVCS(1) | None |
| 236 | 16 | Comp. Fail. Hist. | 12/16/92 | -- | Service Water Pumphouse | Light | <1 Hr. | 100% Power | NSW | Elect. Fail. | Visual | SWPump Circuit Breaker | Breaker Trip Coil | ServWtr Pump CB | NSW(1) | None |
| 237 | 60 | Comp. Fail. Hist. | 12/19/92 | 1420 | Control Room | Light | <10 min. | 100% Power | Instr AC Pwr Distr. | Elect. Fail. | Visual | Annunc Power Supply | Power Supply Intern. | Annunc Power Supply | None | None |
| 238 | 71 | Comp. Fail. Hist. | 01/04/93 | -- | Auxiliary Building | Light (Smoke Smell) | <5 min. | 100% Power | CVCS | Overht Matl | Visual | Packing Cooling Pmp Mot | Motor Intern. | Packing Cooling Pmp Mot | CVCS(1) | None |
| 239 | 20 | Comp. Fail. Hist. | 01/08/93 | 1630 | Auxiliary Building | Light | <30 min. | Power Oper. | Instr AC Pwr Distr. | Elect. Fail. | Visual | Battery Invertr | Invertr Intern. | Battery Invertr | None | None |
| 240 | 6 | Comp. Fail. Hist. | 01/14/93 | 1440 | Auxiliary Building | Medium | <30 min. | 98% Power | CVCS | Overht Matl | Fire Alarm | Chg Pmp Vari-Drive | Vari-Drive Belts | Chargng Pump | CVCS(1) | None |
| 241 | 4 | Comp. Fail. Hist. | 02/07/93 | -- | Reactor Building | Light | <20 min. | Power Oper. | RPS | Overht Matl | Fire Alarm | MG Set Bearing | Bearing Lube | MG Set | RPS(1) | None |
| 242 | 106 | Comp. Fail. Hist. | 02/09/93 | 2236 | Turbine Building | Light | <20 min. | 0% Power | Cond. | Overht Matl | Bearing Temp Alarm | Cond. Booster Pmp Mot | Motor Bearing Oil | Cond. Booster Pmp Mot | Cond(1) | None-0% Pwr |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 243 | 106 | Comp. Fail. Hist. | 02/10/93 | 0015 | Auxiliary Building | Light | <5 min. | 0% Power | RHR | Elect. Fail. | Visual | Cld Leg Isol Valve | Motor Oper. Intern. | Cld Leg Isol Valve | RHR(1) | None-0% Pwr |
| 244 | 31 | Comp. Fail. Hist. | 02/11/93 | -- | Auxiliary Building | Medium | <30 min. | 100% Power | Plant DC Pwr Distr. | Elect. Fail. | Visual | Battery Cell Bank | Elect. Contac. | Battery Cell Bank | None | None |
| 245 | 52 | Comp. Fail. Hist. | 03/03/93 | -- | Reactor Building | Light | <5 min. | 0% Power | SBLC | Overht Matl | Visual | Pump Packing Ring | Packing Matl | SBLC Pump | SBLC(1) | None-Cold Shutdn |
| 246 | 31 | Comp. Fail. Hist. | 03/11/93 | -- | Auxiliary Building | Light | <5 min. | 0% Power | Instr AC Pwr Distr. | Elect. Fail. | Visual | Static Invertr Voltmtr | Voltmtr Intern. | Static Invertr | Instr AC Pwr Dist(1) | None-0% Pwr |
| 247 | 8 | Comp. Fail. Hist. | 03/12/93 | -- | Diesel Gen. Building | Light | <5 min. | 0% Power | EDG | Elect. Fail. | Visual | FO Pump Control Xformr | Elect. Intern. | DG FO Transfr Pump | EDG(1) | None-Refuel. |
| 248 | 109 | Comp. Fail. Hist. | 03/14/93 | 1813 | Diesel Gen. Building | Light (Smoke Residue) | <5 min. | 100% Power | EDG | Elect. Fail. | Fire Alarm | DG DC Control Panl CB | Circuit Breaker Rectifr | DG DC Control Panel | EDG(1) | None |
| 249 | 24 | Comp. Fail. Hist. | 03/16/93 | -- | Auxiliary Building | Light | <5 min. | 0% Power | RPS | Elect. Fail. | Visual | 480VAC Power Supply | Power Supply Intern. | 480VAC Power Supply | None | None-Refuel. |
| 250 | 99 | Comp. Fail. Hist. | 03/18/93 | -- | Auxiliary Building | Light | <1 Hr. | 100% Power | Cont. Cool. HVAC | Elect. Fail. | Visual | Cont Cool Fan CB | Circuit Breaker Coil | Cont Cool Fan | None | None |
| 251 | 89 | Comp. Fail. Hist. | 03/23/93 | -- | Auxiliary Building | Light | <1 Hr. | 0% Power | HPSI | Overht Matl | Visual | HPSI Pump Motor | Motor Bearing Oil | HPSI Pump Motor | HPSI(1) | None-Refuel. |
| 252 | 4 | Comp. Fail. Hist. | 03/27/93 | 2055 | Control Room | Light | <5 min. | 0% Power | RPS | Elect. Fail. | Annunc Alarm | IRM Power Supply | Elect. Resistr | IRM Power Supply | None | None-Refuel. |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 253 | 54 | Comp. Fail. Hist. | 03/31/93 | -- | Auxiliary Building | Light | <5 min. | 0% Power | CVCS | Elect. Fail. | Visual | Chargng Pump CB | Circuit Breaker Intern. | Chargng Pump CB | None | None-0% Pwr |
| 254 | 60 | Comp. Fail. Hist. | 04/22/93 | -- | Auxiliary Building | Light | <5 min. | 100% Power | Cont. Rad. Monit. | Elect. Fail. | Visual | RadMon Sample Fan Mot | Motor Intern. | RadMon Sample Fan Mot | Cont. Rad. Monit(1) | None |
| 255 | 327 | 93-13 | 05/14/93 | 1315 | Other Buildings | Heavy (Evac.) | 2Hrs-20min. | 0% Power | -- | Welding Oper. | Fire Alarm | -- | Welding Matl | -- | -- | None-0% Pwr |
| 256 | 15 | Comp. Fail. Hist. | 05/24/93 | 0820 | Turbine Building | Light | <5 min. | 0% Power | Cond. | Elect. Fail. | Visual | Drain Cooler IsolVlv | Circuit Breaker Intern. | Drain Cooler IsolVlv | None | None-Refuel. |
| 257 | 75 | Comp. Fail. Hist. | 05/25/93 | -- | Auxiliary Building | Light | <5 min. | 0% Power | CVCS | Overht Matl | Visual | Pump Mech. Seal | Seal Matl | Charg Pump | CVCS(1) | None-0% Pwr |
| 258 | 45 | Comp. Fail. Hist. | 06/02/93 | 1513 | Auxiliary Building | Light | <10 min. | Power Oper. | Instr AC Pwr Distr. | Elect. Fail. | Audio/ Visual Alarm | Static Invertr Xformr | Xformr Intern. | Static Invertr | Instr AC Pwr Dist(1) | None |
| 259 | 108 | Comp. Fail. Hist. | 06/16/93 | 0055 | Turbine Building | Light | <5 min. | 0% Power | FW | Elect. Fail. | Visual | FW Pmp Turbine Control Panel | Control Panel Intern. | FW Turbine Driven Pump | None | None-Refuel. |
| 260 | 96 | Comp. Fail. Hist. | 06/26/93 | -- | Auxiliary Building | Light | <20 min. | 0% Power | RCS | Elect. Fail. | Visual | Prszr Htr Pwr Contlr | Elect. Intern. | Prszr Heater | None | None-0% Pwr |
| 261 | 29 | Comp. Fail. Hist. | 07/15/93 | 0158 | Auxiliary Building | Light | <30 min. | 100% Power | CVCS | Elect. Fail. | Pump Overflo Trip | Chargng Pump Motor | Motor Leads | Chargng Pump | CVCS(1) | None |
| 262 | 42 | Comp. Fail. Hist. | 07/19/93 | 1600 | Auxiliary Building | Light | <5 min. | Power Oper. | RPS | Elect. Fail. | Visual | IRM HiFlux Block. Relay | Relay Coil | IRM HiFlux Block. Relay | None | None |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 263 | 32 | Comp. Fail. Hist. | 07/24/93 | -- | Auxiliary Building | Light | <1 Hr. | Power Oper. | DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger SurgSup | Surge Suppres Intern. | Battery Charger | DC Pwr(1) | None |
| 264 | 58 | Comp. Fail. Hist. | 08/13/93 | -- | Auxiliary Building | Light | <30 min. | Power Oper. | Rad Monitor. | Overht | Smoke Alarm | RMS Sample Pump | Pump Intern. | RMS Sample Pump | RMS(1) | None |
| 265 | 29 | Comp. Fail. Hist. | 08/15/93 | 2154 | Turbine Building | Light | <5 min. | 50% Power | FW | Elect. Fail. | Visual | FW Pump Motor | Motor Stator | FW Pump | None | None |
| 266 | 82 | Comp. Fail. Hist. | 08/21/93 | 1331 | Auxiliary Building | Light | <1 Hr. | 100% Power | Instr AC Pwr Distr. | Elect. Fail. | Visual | Invertr Capactr | Capactr Matl | Invertr | Instr AC Pwr Dist(1) | None |
| 267 | 46 | Comp. Fail. Hist. | 09/11/93 | 0410 | Turbine Building | Light | <1 Hr. | 100% Power | FW | Overht Matl | Visual | FW LO Pump | Lube Oil | FW LO Pump | FW(1) | Reduced Power |
| 268 | 112 (111) | Comp. Fail. Hist. | 09/13/93 | 0330 | Auxiliary Building | Light | <20 min. | 100% Power | Instr AC Pwr Distr. | Elect. Fail. | Visual Motor | 7.5KVA Invertr Capac. | Capac. Intern. | 7.5KVA Invertr | Instr AC Pwr Dist(1) | None |
| 269 | 76 | Comp. Fail. Hist. | 10/05/93 | -- | Diesel Gen. Building | Light | <5 min. | 0% Power | EDG | Overht Matl | Visual | DG Eng Fuel Inject. | Fuel Oil | DG Eng Fuel Inject. | EDG(1) | None-0% Pwr |
| 270 | 36 | Comp. Fail. Hist. | 10/28/93 | 0100 | Turbine Building | Light | <5 min. | 0% Power | Plant AC Pwr Distr. | Elect. Fail. | Visual | Altern Feeder CB | CB Test Button | Altern Feeder CB | None | None-0% Pwr |
| 271 | 92 | Comp. Fail. Hist. | 11/10/93 | 0845 | Auxiliary Building | Light (Smoke In Room) | <1 Hr. | Power Oper. | Instr AC Pwr Distr. | Elect. Fail. | Visual | 480VAC Xformr | Unknown | 480VAC Xformr | Instr AC Pwr Dist(1) | None |
| 272 | 96 | Comp. Fail. Hist. | 11/13/93 | 2200 | Auxiliary Building | Light (Smoke Smell) | <30 min. | 0% Power | Instr AC Pwr Distr. | Elect. Fail. | Annunc Alarm | 7.5KVA Invertr Capac. | Capac. Intern. | 7.5KVA Invertr | Instr AC Pwr Dist(1) | None-0% Pwr |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 273 | 48 | Comp. Fail. Hist. | 11/24/93 | -- | Switchgear Room | Light | <10 min. | 100% Power | CCW | Elect. Fail. | Visual | CCW Pump CB | Circuit Breaker Intern. | CCW Pump CB | CCW(1) | None |
| 274 | 86 | Comp. Fail. Hist. | 12/19/93 | 1350 | Reactor Building | Light | <10 min. | 100% Power Distr. | Plant DC Pwr Distr. | Elect. Fail. | Visual | Battery Charger | Charger Firing Board | Battery Charger | None | None |
| 275 | 52 | Comp. Fail. Hist. | 02/01/94 | -- | Diesel Gen. Building | Light | <1 Hr. | 100% Power | EDG | Overtht Matl | Visual | Jacket WtrHtr Pump | Pump Motor Winding | Jacket WtrHtr Pump | EDG(1) | None |
| 276 | 16 | Comp. Fail. Hist. | 02/04/94 | 2310 | Service Water Pumphouse | Light | <5 min. | 0% Power | NSW | Overht Matl | Visual | Service Water Pump | Packing Matl | Service Water Pump | NSW(1) | None-0% Pwr |
| 277 | 41 | Comp. Fail. Hist. | 02/08/94 | 2100 | Auxiliary Building | Light | <5 min. | 100% Power | CVCS | Overht Matl | Visual | Chg Pmp Vari-Drive | Vari-Drive Belts | Chargng Pump | CVCS(1) | None |
| 278 | 16 | Comp. Fail. Hist. | 02/12/94 | -- | Diesel Gen. Building | Light | <5 min. | 25% Power | EDG | Overht Matl | Visual | DG Air Inlet Valve | Fuel Oil | DG Engine | EDG(1) | None |
| 279 | 78 | Comp. Fail. Hist. | 02/23/94 | -- | Reactor Building | Light | <1 Hr. | Power Oper. | RPS | Elect. Fail. | Visual | MG Set Relay | Relay Matl | RPS MG Set | RPS(1) | None |
| 280 | 269 | 94-02 | 02/26/94 | 0657 | Turbine Building | Light | <10 min. | 100% Power | Plt AC Pwr Distr. | Elect. Fail. | Visual | ICS Power Supply | Elect. Intern. | ICS Power Supply | Plt AC Pwr Distr | Turbine Trip/ Reactor Trip |
| 281 | 69 | Comp. Fail. Hist. | 03/05/94 | -- | Reactor Building | Light | <10 min. | 0% Power | Reactor Recirc. | Elect. Fail. | Visual | RR Pump Trip Breaker | Breaker Trip Coil | RR Pump Trip Breaker | None | None-Refuel. |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 282 | 47 | Comp. Fail. Hist. | 03/07/94 | -- | Auxiliary Building | Light | <1 Hr. | 0% Power Distr. | Ice Cond. | Elect. Fail. | Visual | Ice Cond. Chiller | Chiller Motor Intern. | Ice Cond. Chiller | Ice Cond(1) | None-Refuel. |
| 283 | 52 | Comp. Fail. Hist. | 03/10/94 | -- | Reactor Building | Light | <1 Hr. | Power Oper. | Contl Rod Drive | Overht Matl | Visual | CRD Pump Bearing | Bearing Lube | CRD Pump | CRD(1) | None |
| 284 | 95 | Comp. Fail. Hist. | 04/21/94 | 2245 | Switchgear Room | Medium | <30 min. | 0% Power | Plant AC Pwr Distr. | Elect. Fail. | Fire Alarm | 13.8KV Xformr | Xformr Intern. | 13.8KV Xformr | None | None-Refuel. |
| 285 | 80 | Comp. Fail. Hist. | 05/05/94 | -- | Diesel Gen. Building | Light (Smoke Residue) | <30 min. | 100% Power | EDG | Overht Matl | Visual | DG Turbo-Charger | Exhst Line Insul | DG Engine | EDG(1) | None |
| 286 | 69 | Comp. Fail. Hist. | 05/16/94 | 0525 | Reactor Building | Light (Smoke Smell) | <10 min. | 0% Power | RPS | Elect. Fail. | Visual | IRM Aux Contacr | Elect. Intern. | IRM Aux Contacr | RPS(1) | None-0% Pwr |
| 287 | 40 | Comp. Fail. Hist. | 06/16/94 | -- | Diesel Gen. Building | Light | <5 min. | 100% Power | EDG | Overht Matl | Visual | Engine Turbo-Charger | Fuel Oil | DG Eng Turbo-Chargr | EDG(1) | None |
| 288 | 52 | Comp. Fail. Hist. | 07/03/94 | -- | Turbine Building | Light | <1 Hr. | 60% Power | Cond. | Overht Matl | Visual | Pump Mech Seal | Excess Frictn | Cond. Booster Pump | Cond(1) | None |
| 289 | 65 | Comp. Fail. Hist. | 07/13/94 | 2141 | Diesel Gen. Building | Light | <20 min. | 100% Power Distr. | EDG | Overht Matl | Fire Alarm | DG Air Compr | Compr Drive Belt | DG Air Compr | None | None |
| 290 | 70 | Comp. Fail. Hist. | 07/17/94 | 0602 | Auxiliary Building | Light | <10 min. | 100% Power | Contl Rod Drive | Elect. Fail. | Visual | CRD Power Supply | Power Supply Intern. | CRD Power Supply | CRD(1) | None |
| 291 | 68 | Comp. Fail. Hist. | 09/11/94 | 2200 | Turbine Building | Light (Smoke Residue) | <20 min. | 85% Power | Plant AC Pwr Distr. | Elect. Fail. | Visual | Load Center Power Xformr | Xformr Insul/ Winding | Load Center Power Xformr | None | None |

TABLE II
SMOKE EVENTS DATA - 01/01/86 - 12/31/94

| ITEM NO. | DKT/ PLT ID | LER/ OTHER | EVENT DATE | REPORT TIME | LOCATION PLT AREA | EXTENT SMOKE | EST. DUR. | OPER. MODE | PLT SYS | CAUSE SMOKE | DETECT MEANS | INIT. COMP. | INIT. COMB. | COMP. EFFECT | TRAIN EFFECT | POWER EFFECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 292 | 112 | Comp. Fail. Hist. | 09/28/94 | 1905 | Turbine Building | Light | <20 min. | 100% Power | FW | Overht Matl | Temp Alarm | FW Pump Bearing | Bearing Lube Oil | FW Pump | FW(1) | Power Reduced |
| 293 | 53 | Comp. Fail. Hist. | 09/26/94 | -- | Reactor Building | Light | <1 Hr. | Power Oper. | Combst Gas | Elect. Fail. | Visual | H2/02 Sampl Pump | Pump Motor Intern. | H2/02 Analzr | None | None |
| 294 | 83 | Comp. Fail. Hist. | 12/20/94 | -- | Auxiliary Building | Medium | <30 min. | 47% Power | RPS | Elect. Fail. | Visual | RPS IRM Xformr | Diode Bridge Rectifr | RPS IRM Xformr | RPS(1) | None |

NOTES:

1. The Auxiliary Building is For PWR only. For this table, PWR Reactor Building, Control Building, Cable Spreading Room, and Switchgear Room are included with Auxiiary Building.

2. The Reactor Building is for BWR use only. For this table, BWR Control Building, Waste Treatment Building, Cable Spreading Room, and Switchgear Room are included with the Reactor Building.

3. Smoke events listed do not include Fire Events for this period(see Appendix A - Table II).