CP&L
Carolina Power & Light Company

APR 24 1984

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Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 & 50-324/LICENSE NOS. DPR-71 & DPR-62
ALTERNATIVE SHUTDOWN CAPABILITY ASSESSMENT REPORT

Dear Mr. Denton:

Carolina Power & Light Company (CP&L) hereby submits twenty (20) copies of the Alternative Shutdown Capability Assessment (ASCA) Report for the Brunswick Steam Electric Plant Units 1 and 2. The material contained in this report has been discussed with the NRC Staff in a series of monthly meetings and in two previously issued quarterly reports dated November 7, 1983, and January 30, 1984. It is being submitted in resolution of the requirements of 10 CFR 50.48 and 10 CFR 50 Appendix R.

This submittal contains eleven technical exemption requests; our schedule for completion of the Appendix R modifications; a request for an exemption from the schedule requirements of 10 CFR 50.48(c)(4) to the extent necessary to enable CP&L to complete all of the modifications in accordance with our proposed schedule; and a discussion of fire protection features in place at Brunswick which will provide adequate protection of the public health and safety and which warrant, therefore, continued operation pending completion of all of the proposed modifications.

Executive Overview

Following issuance of 10 CFR 50 Appendix R in 1981, CP&L embarked upon an exhaustive review of the Brunswick plant's compliance with that regulation. Our initial conclusions were that a combination of modifications and exemption requests would be necessary in order to meet the new fire protection requirements of Appendix R. NRC denied this proposed solution (letter from Mr. D. G. Eisenhut, NRC, to Mr. E. E. Utley, CP&L, dated July 27, 1983). Carolina Power & Light Company then shifted its efforts toward the present alternative shutdown approach for resolution of Appendix R. NRC agrees with this approach in principle and has been consulted extensively in the development of the attached Alternative Shutdown Capability Assessment (ASCA) report for Brunswick.

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The ASCA report text contains seven (7) sections:

Section 1 Introduction.

Section 2 Discussion of fire areas and the detection/suppression characteristics of each.

Section 3 Description of the process used to identify safety functions, safe shutdown systems, components, circuits and associated circuits.

Section 4 Identification of methods for compliance with Appendix R, Section III.G for all plant areas and proposed system modifications.

Section 5 Description of proposed fire boundary, detection and suppression modifications required to:

1. Bring identified fire areas into compliance with the specific criteria of 10 CFR 50 Appendix R, Section III.G; or
2. Meet the requirements for equivalent protection presented in the exemption requests contained in Section 7.

Section 6 Discussion of the proposed alternative shutdown systems to achieve Appendix R alternative shutdown capability.

Section 7 Description of the exemption requests sought, and the bases for each.

Carolina Power & Light Company is requesting eleven (11) exemptions from the provisions of 10 CFR 50, Appendix R. These include seven (7) exemptions from Section III.G.2, three (3) from III.G.3, and one (1) from III.J.

Background

In 1981, NRC promulgated Appendix R to 10 CFR 50. Carolina Power & Light Company performed an exhaustive review of the fire protection measures in place at the Brunswick Steam Electric Plant (BSEP) in order to determine whether BSEP complied with the new Appendix R requirements. This review was an extension of, and utilized the format of our original BTP 9.5-1 Appendix A study. We enlisted the support of fire protection engineering consultants in performing this review.

Our analysis of BSEP against these new requirements revealed that 78 exemptions from Appendix R, combined with an extraordinarily large and costly modification program was necessary in order to meet all requirements of Appendix R. The NRC Staff responded unfavorably to our proposed solution in their draft Safety Evaluation Report (SER) dated January 31, 1983.

This denial left CP&L in an extremely difficult position regarding compliance with Appendix R. The combination of modifications and exemption requests described above was not acceptable to NRC. The only feasible option remaining to satisfy 10 CFR 50 Appendix R was to design and implement an Alternative Safe Shutdown System as specifically authorized in Section III.G.3 of Appendix R and in the draft SER.

Carolina Power & Light Company, therefore, performed studies to determine the optimum approach for designing an alternative safe shutdown system. This approach was presented to the staff as the BSEP Alternative Shutdown Capability Assessment (ASCA) approach on May 2, 1983 in a letter from Mr. P. W. Howe (CP&L) to Mr. D. B. Vassallo (NRC). NRC responded on July 27, 1983 by agreeing to a schedule which would allow us to perform the ASCA. Carolina Power & Light Company proposed to meet monthly with NRC's technical reviewers, to submit quarterly status reports, and to submit the ASCA study by April 30, 1984. These commitments have been met.

The monthly progress meetings with NRC were of great help to us in providing a forum for problem solving during the crucial interim stages of the ASCA study. Our proposed modifications and exemption requests which are contained in the ASCA report have already been discussed with NRC technical reviewers during these meetings; we, therefore, expect that this submittal should be acceptable to the staff; and we, accordingly, have initiated work on the plant modifications proposed.

In addition to performing in-depth comparisons with Appendix R and devising solutions to resolve discrepancies, CP&L has made, and is continuing to make, significant progress in advancing the fire protection capabilities at Brunswick. These advances include:

1. Modifications under 10 CFR 50 Appendix R, Section III.J in all areas where access and egress to remote shutdown equipment is required have already been completed.

2. Installation of rated hatches in the Diesel Generator Building (in progress).

3. Installation of a suppression system in the Cable Spreading Rooms (in progress).

4. Development of a Fire Protection Improvement Plan and a fire protection "philosophy" with vastly increased emphasis on training, staffing, and procedural incorporation of Fire Protection commitments. Details of this plan are provided in Attachment 3 to this letter.

Request for Technical Exemptions

Eleven (11) exemptions from 10 CFR 50 Appendix R are hereby requested. These include seven (7) exemptions from Section III.G.2, three (3) from III.G.3 and one (1) from III.J. These exemptions are being requested under the provisions of 10 CFR 50.12. Attachment 2 to this letter summarizes these exemption requests and Section 7 of the ASCA report provides the detailed bases and justification for each of these exemption requests.

Request for Schedular Exemption

We have factored the remaining proposed Appendix R fire protection modifications into our outage planning scheme and have determined that the proposed modifications can be completed by the end of the third refueling outage for each unit following the present (1984) Unit 2 refueling outage. These third refueling outages are currently estimated to occur in the 1989-1990 time frame (Reload No. 6 for Unit 1 and Reload No. 8 for Unit 2). The actual process of engineering, procurement, and installation of proposed modifications has, of course, already begun. An explanation of the factors which we have considered in establishing this schedule is provided in Attachment 3 to this letter along with a detailed discussion of fire protection features in place which warrant continued operation until all of the proposed modifications can be made. The schedule which we propose constitutes the earliest rational completion schedule which is consistent with CP&L's management responsibility for safe operation of BSEP.

Depending upon the timing of the NRC Staff's acceptance of CP&L's proposed modifications, an exemption from the schedule requirements of 10 CFR 50.48(c)(4) may be necessary. This is because it is likely that CP&L will not complete all modifications proposed in the ASCA Report within the period after NRC approval specified in 10 CFR 50.48(c)(4). CP&L, therefore, hereby requests an exemption from 10 CFR 50.48(c)(4) to the extent it may be necessary to enable CP&L to complete all of the modifications within the schedule which we have proposed. Information sufficient to justify such an exemption is set forth in detail in Attachment 3 and is supplemented by the information provided throughout this submittal.

Attachments

This submittal contains four attachments. Attachment 1 describes the ASCA methodology and provides a roadmap to the ASCA report. Attachment 2 summarizes our technical exemption requests. Supporting information for our schedular exemption request is contained in Attachment 3, along with a justification for continued operation. The ASCA report comprises Attachment 4.

Conclusion

Carolina Power & Light Company believes that our monthly progress meetings with NRC, the Nuclear Utility Fire Protection Group efforts, and the recent discussions between NRC and the industry on Appendix R interpretation have provided an effective framework within which the fire protection issue can be resolved for Brunswick. We believe that with continued communication with NRC Staff, we can achieve full compliance with Appendix R within the schedule provided herein. We, therefore, propose to continue meeting with NRC Staff on a quarterly basis to review progress and status through implementation of the remaining Appendix R modifications proposed in the ASCA report.

The technical exemptions requested are consistent with our understanding of conditions which are accepted as providing protection equivalent to Appendix R. The schedule proposed constitutes the earliest credible completion schedule consistent with CP&L's management responsibility for safe operation of the Brunswick facility.

We have initiated design and engineering consistent with the requirements of the ASCA, and request your early action with respect to the exemptions requested.

We are available to discuss the details of this submittal with your Staff at your convenience.

Yours very truly,

M. A. McDuffie
for E. E. Utley

GSC/cfr (9813COM)

Attachments (all receive Attach. 1-3;
*receive ASCA Report)

cc: Mr. P. R. Bemis
Mr. R. Eberly
Mr. N. E. Fioravante
Mr. M. Grotenhuis (NRC)
Mr. S. D. MacKay
Mr. D. O. Myers* (NRC-BSEP)
Mr. J. P. O'Reilly* (NRC-RII)
Mr. D. B. Vassallo
Mr. R. H. Vollmer

ATTACHMENT 1

ASCA Report Methodology and Summary

The purpose of the Alternative Shutdown Capability Assessment (ASCA) effort is to provide the capability to achieve and maintain cold shutdown regardless of the location of any fire in the plant. This study achieves that goal by ensuring that required plant functions are available when needed. These functions and the minimum set of systems required to provide these functions are provided as Table 1 to this summary. A description of the system selection process follows.

ASCA Report Summary

For each system selected, plant piping & instrumentation drawings (P&IDs), system descriptions, and one-line diagrams were used to identify the safe shutdown flow paths and operational characteristics that must be established to accomplish the desired safe shutdown functions. From this information, a list was compiled which identified all flowpath components required for each system's performance of its safe shutdown function and any components whose spurious operation could adversely affect the safe shutdown function. This list was then entered into the data base management system.

A functional block diagram was produced for each function showing the potential redundant combinations of success paths for achieving the required function. These diagrams provide the criteria used to judge the ability of BSEP to meet the separation requirements of Appendix R.

The safe shutdown component lists developed during the safe shutdown analysis were evaluated to identify the required safe shutdown electrical circuits and cables. Once these cables were identified, they were also entered into the data base management system. Typical circuits which are not required for component operation are annunciator, computer, motor winding heaters and external monitoring circuits that are electrically isolated from the electrical circuits of concern.

The BSEP computer-based conduit and cable raceway schedules (CASP) were then used to identify the physical routings of individual cables. The electrical raceway drawings overlayed with the BSEP fire zones were marked up with the safe shutdown cable routing and safe shutdown equipment. These drawings determined the physical location of all safe shutdown equipment by specifying the fire zone in which the equipment and cables are located. These fire zones were later combined to produce meaningful fire areas for subsequent separation analysis. This information was compiled to produce the final data base to be used in the Appendix R separation analysis.

Using the functional block diagrams and the safe shutdown equipment information, the Appendix R separation analysis was performed using the data base management system. This analysis identified the safe shutdown components which could potentially be damaged by a postulated fire in each area. The analysis was done for safe shutdown from both the Control Room and existing local control stations. The functional block diagrams were then evaluated for all safe shutdown functions to identify deviations from the separation criteria of Appendix R.

The next step was to develop options to resolve the identified deviations. These options include, but are not limited to, modifying the plant to comply with Section III.G.2 or providing alternative shutdown. This process identified those safe shutdown components which required modifications to facilitate safe shutdown operation from Control Room, existing remote shutdown panels, or local control stations.

The separation and protection requirements of 10 CFR 50 Appendix R apply not only to safe shutdown circuits but also to "associated" circuits, i.e., those circuits which could prevent operation or cause maloperation of shutdown systems and equipment. Associated circuits were divided into three groups: common power supply, spurious operations, and common enclosures.

The associated circuit criteria were applied to the identified network of safe shutdown circuits to determine those additional circuits requiring protection. Proper coordination of devices provides reasonable assurance that circuits of concern associated with safe shutdown circuits by common power supplies are sufficiently protected to ensure that fire damage does not propogate to the safe shutdown circuit.

To confirm the validity of this assumption, a review was conducted of the 1982 BSEP Fire Protection Safe Shutdown Analysis which evaluated the existing electrical circuit protection and coordination for safe shutdown power supplies. The results of the current review confirmed that most of the circuit over-current protective devices reviewed had been properly selected and were coordinated. Design changes will be initiated to correct the few remaining deficiencies identified during the review.

Associated circuits by spurious operations were analyzed in two ways. First, spurious operation candidates which could affect proper safe shutdown system operation were addressed by including these devices on the safe shutdown equipment list for the affected safe shutdown system. Second, spurious operation candidates which could cause an uncontrolled loss of primary coolant were analyzed on a case-by-case basis. Redundant pairs of valves were analyzed together and resolution options were provided.

The fundamental concern for protecting circuits associated by common enclosure is to ensure that fire damage does not propagate into enclosures containing redundant safe shutdown divisions. An analysis verified that adequate protection is provided through the use of overcurrent devices for all voltage levels except for some 120V ac instrumentation circuits. The latter was shown to be of no concern. Also, cable routing configuration would tend to prevent fire propagation.

In the analysis, options for the resolution of Appendix R Alternative Shutdown Deviations were developed. Where deviations from compliance with Appendix R existed within a fire area, select groups of alternative shutdown options that will provide for compliance were developed from the data base. These options included combinations of both fire protection and alternative shutdown capability features.

Initially, a numerical quantification selection scheme was developed and numerical values were assigned to each variable. Attempts at implementation

revealed that this simplistic approach yielded decisions that were not the most correct (all options developed would satisfy the need) nor the most acceptable. After the initial attempt at implementation, weighted variable values were assigned to each category, however, the process was still not fully adequate to make proper selections.

Subsequently, an Effectiveness = Acceptance x Correctness model was developed. Acceptance was based on the acceptability by CP&L and NRC management. In most cases these were similar. Engineered fixes were most acceptable, minimization was stressed for both exemption requests and additional operator action. Administrative controls were avoided where possible.

Because the acceptance criteria were similar for everyone concerned in that decision process, a correctness scheme was developed. The paramount consideration was safety, followed by life cycle cost for adequate fire protection, and plant operations impact. Other concerns of relatively equal weight were maintainability, engineering difficulty, constructibility, and modifications that are traditionally unacceptable. Correctness was based on how "pure the fix is" (i.e., an engineered fix that has no associated life-cycle cost nor operator action and training required was considered relatively pure). About one-half of the proposed modifications were in this category. Examples are fuses or fuse and switch combination circuit modifications.

Having the problem defined in the Options Provided for Selection and the correctness decision defined as the variable in the Effectiveness = Acceptance x Correctness formula, the only remaining need was the application of a proper selection strategy. Conference discussion, the group's choice to provide quality decisions, was selected as the best strategy.

The group consisted of members from operations, maintenance and engineering. Other members of the Appendix R matrix organization, such as fire protection, engineering, and licensing, participated as needed. With very few exceptions, all decisions were made by our staff with the most knowledgeable member for each decision issue chairing the discussion. The decisions were documented in the Selection Option Summary. All decisions were then presented to the Appendix R steering committee for concurrence.

The Alternative Shutdown Capability Assessment Report was compiled from the data gathered during the data base management system development and information acquired during the option selection process. That and other information required by the NRC is presented in the report.

The ASCA report text contains seven sections. Following the introduction in Section 1, Section 2 presents the BSEP fire areas which are part of the basis of the Appendix R analyses performed. Criteria for establishing fire areas are discussed as well as the process used to determine the associated fire hazard severity. The plant's active fire protection features are summarized with the detection and suppression systems grouped for each fire area on an area-by-area-basis.

Section 3 describes the process used to identify safety functions, safe shutdown system, components and circuits, and associated circuits of

concern. Related assumptions and considerations are also discussed. (This section reflects resolution of NRC's December 21, 1983 evaluation of associated circuits as discussed in monthly ASCA progress meetings.)

Section 4 identifies plant areas not in compliance with Appendix R Section III.G.2 and presents feasible options for achieving compliance.

Section 5 describes the fire boundary and suppression modifications proposed at Brunswick which are considered necessary to:

1. Bring identified fire areas into compliance with the specific criteria of 10 CFR 50 Appendix R, Section III.G; or

2. Meet the requirements for equivalent protection as presented in the exemption requests contained in Section 7.0.

Section 6 provides a discussion of the proposed alternative shutdown systems. The systems modifications necessary to achieve the alternative shutdown capability are detailed and the operation of the alternative shutdown system is discussed.

Section 7 presents a detailed analysis for each fire area identified in Section 4 as not being in compliance with Section III.G of Appendix R, and for which an exemption is sought. Each of the areas is described in detail and an individual fire hazards analysis is provided. Tables and drawings summarizing significant fire area information are also provided at the end of each subsection.

Appendix A of the ASCA Report references detailed information requested by Generic Letter 81-12 and associated clarification letters.

FUNCTION, SYSTEM AND MODE RELATIONSHIPS

FUNCTION	SYSTEM A	SYSTEM B	MODE Hot Shutdown	MODE Transition	MODE Cold Shutdown
Reactor Pressure & Level Control	HPCI ADS	RCIC ADS	Y	Y	N
Torus Cooling	RHR	RHR	N	Y	N
DG Cooling Water	SWDG	SWDG	Y	Y	Y
RHR Cooling Water	SW	SW	N	Y	Y
EPS (AC)	EB1 EB3	EB2 EB4	Y	Y	Y
EPS (DC)	DC	DC	Y	Y	Y
Shutdown Cooling	RHR	RHR	N	N	Y

DEFINITIONS

- ADS - Automatic Depressurization System
- COLD SHUTDOWN - Mode Switch in Shutdown and Reactor Coolant $\leq$ 212°F
- EPS - Emergency Power Supply
- HOT SHUTDOWN - Mode Switch in Shutdown and Reactor Coolant > 212°F
- HPCI - High Pressure Coolant Injection
- RCIC - Reactor Core Isolation Cooling
- RHR - Residual Heat Removal
- SW - Service Water
- SWDG - Service Water Diesel Generator
- TRANSITION - Hot Shutdown with Torus Cooling Required

Y = Yes   N = No

Table 1

Summary of Technical Exemptions and Justifications

This attachment provides a short summary of the technical exemptions sought and justifications which are discussed in detail in Volume 1, Section 7 of the ASCA Report. The numbering sequence from Section 7 is used below for convenience.

7.2.1

Exemption request from III.G.2 provisions for safe shutdown separation features on -17, 20, and 50 feet elevations in Unit 1 Reactor Building.

Justification is based upon automatic detection and suppression, separation zone considerations, physical separation of redundant trains, water curtain, venting paths precluding stratification, use of fire stops on exposed cables, and addition of sprinklers.

7.2.2

Exemption request from III.G.2 provisions in Unit 1 ECCS room for safe shutdown separation features and for unrated penetrations.

Justification is based upon low fire potential; lack of ignition sources; electrical cables inside conduit; sufficient propagation retardancy; adequate separation and detection; installation of wrap, fuses, and a "quick response" sprinkler head; an inerted primary containment; and features of existing seals.

7.2.3

Exemption request from III.G.2 provisions for safe shutdown separation features on -17, 20 and 50 feet elevations in Unit 2 Reactor Building.

Justification is based upon automatic detection and suppression, separation zone considerations, physical separation of redundant trains, venting paths precluding stratification, use of fire stops on exposed cables, and addition of sprinklers.

7.2.4

Exemption request from III.G.2 provisions in Unit 2 ECCS room for safe shutdown separation features and for unrated penetrations.

Justification is based upon low fire potential; lack of ignition sources; electrical cables inside conduit; sufficient propagation retardancy; adequate separation and detection; installation of wrap, fuses, and a "quick response" sprinkler head; an inerted primary containment; and features of existing seals.

7.2.5

Exemption is requested from III.G.2 provisions for safe shutdown system separation for the Diesel Generator Building basement.

Justification is based upon minimal personnel use of the basement; activities do not involve combustibles; fixed combustibles are self extinguishing; the proposed Halon automatic suppression system combined with the existing automatic suppression system will prevent a fire from damaging redundant trains or diesel pad seals; redundant alarms would mobilize the fire brigade promptly; and stairwells provide protected staging areas for initiating fire response activities.

7.2.6

Exemption is requested from III.G.2 provisions for safe shutdown system separation (intervening combustibles) for Service Water Building, elevations 4 feet and 20 feet.

Justification is based upon lack of ignition sources; minimal fixed combustibles; existing suppression, detection, hose stations, and separation; and installation of barriers.

7.2.7

Exemption from III.G.2 provisions is requested as necessary from full area suppression for Diesel Generator Building, fire area DG-8.

Justification is based upon small amount of fixed combustibles; unlikelihood of cable ignition; fire detection; and installation of rated barriers.

7.2.8

Exemption from III.G.3 provisions for fixed suppression is requested for Turbine Building.

Justification is based upon automatic detection and early brigade response; existing automatic suppression over certain equipment and lack of ignition sources; ceiling penetrations providing venting paths; the ability to achieve safe shutdown; and that additional suppression would not enhance safe shutdown capability.

7.2.9

Exemption from III.G.3 provision for suppression in any "area, room, or zone" where alternative shutdown capability is provided is requested for rooms in the control and diesel generator buildings.

Justification is based upon automatic detection alarmed in the control room; availability of manual fire fighting equipment; alternative shutdown capability is provided; low fire hazards; the control room suppression exemption; and installation of suppression in two rooms in the Control Building.

7.2.10

Exemption is requested from III.G.3 provisions for suppression and detection for the East Yard.

Justification is based upon constant patrols and closed circuit TV surveillance; the dike surrounding the diesel fuel tank; combustion products venting to atmosphere; low probability of radiant energy damage to CST level switches and AC power feeds; and alternative shutdown capability is provided to the RCIC logic circuits and for a fire in manholes.

7.2.11

Exemption from emergency lighting provisions of III.J is requested for the East Yard.

Justification is based upon ready availability of hand lights that will be adequate for traversing East Yard and reading gages; also, additional modifications would not enhance safe shutdown capability.

ATTACHMENT 3

Information in Support of Request for Schedular Exemption

Carolina Power & Light Company (CP&L) intends to complete all modifications to Units 1 and 2 described in the ASCA Report prior to the end of the third refueling outage for each unit following the current (1984) refueling outage for Unit 2. These third outages are presently anticipated to occur in the 1989 - 1990 time frame. This is a realistic schedule based upon a prudent and responsible assessment of the nature of the modifications which must be made to achieve compliance with Appendix R in conjunction with the other important NRC-required work which must be performed at BSEP. Justification for this schedule, along with our justification for continued operation, is provided in this attachment. This discussion is based on our current outage schedule, i.e. as of April 1984.

The modifications identified in the ASCA report, which are required to be made in order to bring Brunswick into compliance with Appendix R, can be divided into ten (10) major categories as listed below:

1. Addition of redundant power supplies and transfer switches to ensure one train of safe shutdown equipment is available at all times.

2. Addition of instrumentation and a new power supply to the Remote Shutdown Panel.

3. Rerouting of power feeds to ensure train separation.

4. Addition of local control switches to Motor Control Centers (MCC) not presently equipped.

5. Enhancement of local control capability on MCC's presently equipped with local control switches.

6. Replacement of single pole breakers with double pole breakers to prevent spurious operation of the Main Steam Isolation Valves.

7. Changes in certain Control Logic schemes such as adding fuses, adding a key lock switch, changing contacts from NO to NC, rewiring limit switches and adding jumpers.

8. Wrapping of power cables with a rated fire barrier where rerouting of cable is not feasible.

9. Installation of additional suppression and barrier modifications to enhance existing capabilities in certain areas in accordance with Appendix R.

10. Mechanical modifications to allow manual operation of certain components.

The need for additional modifications may become apparent as a result of review of the current plant modification backlog (i.e. those modifications not in an as-built status at the beginning of this effort, March 1983). This

backlog has been discussed with NRC. Action is underway to clear these items, and we will continue to keep NRC informed as to the status of this backlog as we progress with our review.

The overall scope of the Appendix R work is significant, thus, our estimate of three refueling outages for each unit for completion. Our goal is to complete these modifications in a timely, but safe, manner. These modifications involve safety-related equipment or work in areas where there is a potential for disruption of safety equipment and most are Technical Specification related. Work performed on these systems during plant operation would require the use of the "ACTION" statement in the Technical Specifications, thus placing us in a Limiting Condition for Operation (LCO). Our policy regarding use of LCO's to perform modification work is that LCO's will only be taken when, (1) it is absolutely safe to do so, and (2) the safety significance of the modification warrants taking the LCO (i.e. when the modification provides a significant increase in the safety of the plant). Since most of these modifications involve safety-related/Technical Specification systems, it is prudent to establish a schedule on the assumption that they will have to be made during an outage. We will, however, attempt to perform work during plant operation whenever possible, based upon the restrictions discussed above, in order to expedite completion of the Appendix R modifications.

In scheduling the Appendix R work, we have compared the existing outage required work with the presently planned outages to determine when the work can most readily be accomplished. Our outage control philosophy is to schedule resources such that all work is being accomplished in a safe and efficient manner. This philosophy necessarily limits the number of people on site to that which can be supervised effectively. This limitation in turn has an impact on the amount of work which can be scheduled during an outage. Modifications performed during an outage require closeout with regard to operating and maintenance procedures. The review and approval process, including incorporation of changes in many support programs, and the training of operating and maintenance personnel provides an added limit on the amount of work that can be planned for an outage. We believe that this approach to outage planning enables us ultimately to complete a higher quality of work in a shorter period of time and will enable us to reach compliance with Appendix R in the most rapid and controlled manner.

Our letter to Mr. D. B. Vassallo dated March 29, 1984 discussed our interest in developing a living schedule to ensure timely completion of required modifications and other work at our Brunswick facility in a controlled and appropriately prioritized manner. The Site Planning and Control Section was established at Brunswick to establish such a plan, and work is proceeding on development of a methodology for scheduling and prioritization of work. We expect this methodology to be completed and partially benchmarked by August 1984. At the appropriate time in the development of this program, we plan to integrate our Appendix R efforts into it. This would be an additional aid in assuring the optimum efficiency in handling the Appendix R work scope.

The next major refueling outage for both Unit 1 (Spring 1985, Reload 4) and Unit 2 (Spring 1986, Reload 6) is presently loaded with both projects and resources to practical limits for the planned duration of each. Currently, the IE Bulletin 79-01B modifications (equipment qualification (EQ)) and IGSCC work on the recirculation piping are scheduled for these extensive outages

(the EQ work alone entails in excess of 100 plant modifications (PMs) for each unit). This work will "fill" the Reactor Building. A description of the EQ modification work is being submitted to NRC by separate letter. The potential impact of the IGSCC work on parallel activities is presently unknown; its full impact could, of course, add significantly to the complexity of the outage schedules. For the Unit 1 outage, completion of the Mark I Program torus modifications is a regulatory requirement while work required for improved plant reliability includes feedwater heater repair/replacement, low quality liquid radwaste upgrade, and some Phase III Service Water (SW) piping replacement. For the Unit 2 outage, regulatory work to be performed includes TMI data systems, Safety Parameter Display System (SPDS), and ten-year ISI, while work required for improved plant reliability includes some Phase III SW piping replacement and low quality liquid radwaste upgrade. Thus, these outages can accommodate only a small amount of Appendix R modification work, and it must be focused in areas away from the Reactor Building.

The subsequent refueling outage for Unit 1 (mid-1987, Reload 5) will emphasize Appendix R work and includes completion of SW piping replacement, 10 year ISI, SPDS, and TMI data systems. The Unit 2 outage (mid-1988, Reload 7) will emphasize Appendix R work and includes completion of Phase III SW piping replacement, feedwater heaters replacement, and turbine inspection.

Appendix R work which cannot be accomplished in these outages will be scheduled to be performed during the following refueling outages (for Unit 1 - Reload 6 in Spring 1989 and for Unit 2 - Reload 8 in 1990).

Based upon the complexity and magnitude of the anticipated Pipe Crack and E.Q. work (most of which will take place in the Reactor Building), and in consideration of our above stated outage control philosophy, the bulk of the Appendix R work which can be performed in the next outage on each unit following the present (1984) outages will be in areas outside of the Reactor Building. We will, of course, schedule work as much as feasible to accommodate Appendix R Reactor Building modification work during the second refueling outages but it is not possible to assume that completion of all fire protection work (especially in the Reactor Building) will be completed prior to the third outages.

One of the primary constraints on the installation of modifications during an outage of moderate duration (such as our "middle" outages) is the difficulty and time needed to take out, utilize, and complete a clearance for a system or component. Many of the Appendix R modifications will require a plant clearance to be researched and one train of a safety system to be tagged out while the modification is performed on that train. The complexity of outage planning requires a man-power/location of work assessment for each clearance to determine all work to be accomplished on that portion of a safety train when it is tagged out (e.g., TMI mods, EQ upgrade, Appendix R PMs, maintenance, repairs). Therefore, this train may remain out of service longer than required for only Appendix R PMs.

Before the same Appendix R modifications can commence on the redundant safety train, it is required that the train that has been modified be returned to service and be declared operational. In order to declare a modified safety

train operational, the operating procedures controlling that safety equipment must be revised and approved, operators must be trained, and maintenance procedures must be revised and in-place and documentation of the modification must be completed. At that point, research of the clearances needed to take the redundant train out of service is completed, and the same outage sequencing/manpower/space loading assessments are carried out to merge with all other outage activities active on-site.

This procedure is repeated for all modifications worked during an outage and partially explains why an Appendix R modification that might require several days to accomplish on a particular system, may lead to several weeks of calendar time before work can start on the second safety train of that system. Thus, with any responsible duration for the "middle" outages on Units 1 and 2, it is apparent that all Appendix R modifications on both redundant trains of equipment/systems cannot be accomplished during these second refueling outages. Outage-related modifications remaining, therefore, will be completed during the subsequent, or "third" refuelings (Reloads 6 and 8 for Units 1 and 2, respectively).

There are additional factors which would make it impossible to work on Appendix R modifications during the entire length of an outage. The initial weeks of an outage focus on mobilization, establishing access, defueling and clearing obstructions to work (disassembly). If the outage is scheduled for longer than 18 weeks, many seals and valve packings may require rework prior to startup, and resources on-site must be focused to accomplish this work. Also, the last period of an outage must be devoted to training operations and maintenance personnel on the modified systems and ensuring all procedures and modifications, system walkdowns and valve lineups are complete and that final outage periodic tests required by Technical Specifications are complete. These types of activities require that Appendix R modification work must terminate well before the end of an outage period. In Appendix A to this enclosure we have described generally some of the potential problems and complexities which can be encountered in sequencing modification work on safety related systems, and how outage durations, work scopes, and man-loadings, together with the logistic complexities of installations will impact completion of Appendix R modifications. However, we are making every effort to complete this work by the earliest possible time.

A major aspect of the Appendix R project is the engineering effort which must be accomplished prior to detailed mod-by-mod scheduling into outage plans. The engineering process has been underway. We are currently developing Appendix R performance requirements for systems and components and Design Basis Documents (DBDs) for components in order to assure long-term compliance of the plant with Appendix R. Our estimate for preparing and approving performance requirements and DBDs is approximately four to five months. Each plant modification (PM) to be performed for Appendix R will relate to one or more DBDs and to the Appendix R performance requirements for the component/ system to be modified. During the development of each PM, reviews to assure compliance with the DBDs and performance requirements will be conducted and integrated into the PM approval process. The first PMs thus developed will serve as a "model" for the process which will be used from now on for approval of all PMs to ensure that Appendix R performance requirements and DBDs are not compromised in the future.

One of our goals in Appendix R work is to complete the most significant modifications as early as possible. One type of modification which contributes the most to improve compliance with Appendix R quickly are changes to control logic such as adding fuses or switches, changing contact positions, rewiring switches, adding jumpers, etc. These PMs are fairly straight-forward and will be emphasized as early in the engineering process as possible in order to make major strides in achieving phased compliance with Appendix R. Going through this process for the types of modifications described may take 10-15 months when considering time needed for the stages of engineering, PM approval, lead time for construction procurement and planning, waiting until an outage actually occurs, installation, and check-out for operability.

After preparation of performance requirements and DBDs referenced above, we will (as engineering manpower loading allows) begin preparation of the more complex PMs that will be required; one such complex PM would be to provide alternate power feeds for the battery chargers (one on each unit). These PMs are quite complex, both from an engineering and an installation point of view. Preparation of the PM will require at least four months due to necessary involvement of several technical disciplines and because it involves a system that is safety-related and requires seismic and environmental qualification. These "pedigrees" necessitate detailed and multi-organizational review and approval (such as QA, fire protection, operations, maintenance, engineering, ALARA, nuclear safety, etc.); optimally, this review would take at least two months, but it could be longer if revisions (and required re-reviews) are necessary. After preliminary design is completed, equipment specifications can be prepared and forwarded to construction for procurement and installation planning. Further design efforts can proceed using preliminary vendor data, but final vendor drawings, etc. must be factored into the design. The PM package is generated after much of the detailed design is complete since it must include this design as well as procedure changes, plant impact assessment, detailed QA and construction checkoffs for installation, ALARA, ISI, fire protection, nuclear safety reviews, etc. Currently, lead time for procurement of appropriately-qualified transfer switches (for the alternate power feeds for the battery chargers) is estimated in the 12-14 month range; however, the vendor bid/evaluation/selection process would require about 3 months before the order could be placed. (Procurement of certain items, such as these transfer switches, is handled by our engineering staff.) The sequencing of all of these time requirements could put us into 1987 even before installation could begin; these PMs require unit outages of reasonable duration due to Technical Specification limitations, safety considerations, and the large amount of physical work necessary to complete the installation. This is one specific example of Appendix R modification work that can logically extend into and past the time frame of the "second refueling outage" for each Brunswick unit.

Another priority we will use in scheduling PM work is actual outage constraints due to work already scheduled for certain outages. Since the majority (80-85%) of ASCA modifications are for ECCS systems and would require either an LCO or an outage for installation (and are therefore, designated "outage related"), we must schedule the engineering for individual PMs to be completed prior to an outage when the installation could be performed. Since the Reactor Building will be saturated with work during the "first refueling outage" (due to 79-01B work and recirculation piping replacement), we will emphasize, prior to that outage, engineering work on Appendix R PMs that can

be installed in other plant locations in order to maximize the number of Appendix R modifications that can be completed at that time.

In looking at our current outage schedule, and noting that consideration will be given to the factors described above, following is a qualitative sketch of our engineering schedule planning. Since Unit 1 has the only 1985 outage, the engineering will begin with Unit 1. The 1985 outage for Unit 1 will include the EQ work and IGSCC work on the recirculation piping. This and other engineering constraints direct that Appendix R outage modifications not in the Reactor Building be scheduled first. The engineering effort will then shift to Unit 2. The first outage for Unit 2 (1986) will include the EQ work and IGSCC work on the recirculation piping for this unit. Therefore, Unit 2 Appendix R modifications that do not require Reactor Building access are scheduled first.

Since there is a period of time following the efforts for Unit 1 and 2 listed above before which another outage must be planned, the engineering efforts for the non-outage modifications are scheduled next for both units. This will allow their implementation during the non-outage periods to follow.

The remaining engineering efforts (primarily the Reactor Building modifications plus any others that could not be engineered to meet the previous outage) are scheduled next, beginning with Unit 1 to support its 1987 outage. Next, the emphasis will be placed on Unit 2 to schedule its Reactor Building modifications (plus any others remaining) to support its 1988 outage. Our goal is that our engineering efforts would be essentially complete by the "second refueling outages."

Engineering work has been in progress and is continuing. Prefabrication of materials will be accomplished as much as feasible during plant operation to minimize the amount of work to be performed during outages.

There are tremendous logistics constraints to conquer in achieving compliance with Appendix R. We are setting forth a reasonable schedule to accomplish this task while working in a phased compliance approach to accomplish the most significant improvements as early as possible. As noted below, we are convinced that BSEP will pose no significant hazard to the public health and safety due to fire protection concerns during the period required to achieve compliance with Appendix R.

<u>Justification for Continued Operation</u>

I. Prior to the issuance of Appendix R to 10 CFR 50, CP&L had spent approximately $15,000,000 in making extensive modifications to the plant to bring it into compliance with BTP 9.5.1 Appendix A. At that time, we were considered industry leaders in fire protection compliance and were in receipt of one of the few Safety Evaluation Reports (SER's) issued for Appendix A. Though we realize BTP 9.5-1 Appendix A is not at issue here, we believe that many of the modifications made provide justification for continued operation today. These are delineated below:

   A. Brunswick presently has a remote shutdown system. This system was originally designed into the plant and has been enhanced by the addition of critical instrumentation and certain circuit isolation

features. This system could provide us the capability to achieve safe shutdown from the local control stations in the event of a major fire in the Control Room or the Cable Spread Room, once some additional circuits to the Control Building were isolated.

B. Suppression as required by Appendix A already exists for the major safety-related components.

C. Safety-related cables in close proximity to each other have already been provided a high degree of protection in the form of wrappings, partial barriers and localized suppression.

D. The fire detection system is already in compliance with Appendix R, thus providing an early warning of fires. This early warning combined with our greatly strengthened Fire Brigade (as discussed in the Fire Protection Improvement Plan excerpt below) provides added confidence that fires will not spread out of control.

II. A further discussion of our present fire protection capabilities from a general and from an area specific standpoint is presented below:

GENERAL

A. Detection Systems - All structures containing safe shutdown systems or equipment are provided with fire detection systems throughout with the exception of the primary containments. These systems utilize high sensitivity products of combustion (ionization) detectors except in locations where other detector types (e.g. infrared) are dictated by the hazard. The detectors are installed in accordance with manufacturer recommendations and NFPA 72E (Automatic Fire Detectors). In addition to providing local audible alarms, these detectors provide audible and visual annunciation in the plant's continuously-manned control room. The detection systems are designed to provide local audible and visual indication of circuit faults such as opens, shorts, detectors removed, switches out of position, and loss of power. These indications are also annunciated in the control room. The functioning of this equipment, including each detector, is verified once every six months by testing.

B. Sprinkler systems have been provided in many areas to provide for fire control and suppression. The locations of these systems were based on the degree of hazard present and the impact of a severe fire. These systems were designed with densities of water application as specified in NFPA 13 (Installation of Sprinkler Systems). All sprinkler systems are provided with low temperature sprinkler heads (e.g., 165°F) to provide for early activation. Audible and visual annunciation of sprinkler system activation is provided in the Control room.

C. Major components of safe shutdown systems (e.g. pumps, diesel generators, etc.) are covered by fixed, automatic fire suppression and detection systems as described in the following area-specific information.

AREA SPECIFIC

A. Reactor Building (Units 1 and 2)

The Reactor Building has safe shutdown equipment on its lower three elevations (e.g., -17 ft., 20 ft., and 50 ft.), but is provided with fire detection on all elevations. The Reactor Building standpipe system feeds hose reels on all elevations. Portable fire extinguishers selected and located per NFPA 10 (Portable Fire Extinguishers), are located on each level.

The -17 foot elevation ECCS equipment is located in separate areas. Each of these areas is equipped with a sprinkler system except for the HPCI area which contains an automatic CO_2 flooding system.

The design point of these sprinkler systems was conservatively selected based on the criteria for an Extra Hazard, Group I, occupancy (e.g., areas where quantity and combustibility of contents is very high, introducing the probability of rapidly developing fires with high rates of heat release). The required density under this criteria is 0.29 gpm/ft^2. The average density provided by the installed sprinkler systems range from 193% to 275% of this value.

The 20 and 50 foot elevations contain safe shutdown cables and motor control centers, and limited amounts of equipment. Sprinklers are provided on these elevations in three outage staging areas (two on 20 foot, one on 50 foot), where relatively high transient fire loadings may occur. These systems provide an average density ranging from 232% to 347% of the design value of 0.19 gpm/ft^2.

B. Control Building

The Control Building has safe shutdown equipment on two of its three elevations (e.g., 23 foot and 49 foot), but is provided with fire detection on all elevations. Standpipe system hose reels are located on all elevations as are portable fire extinguishers. Each elevation is provided with hose reels from a manually activated CO_2 fire fighting system.

C. Diesel Generator Building

The Diesel Generator Building contains safe shutdown equipment on all of its three elevations (e.g., 2 foot, 23 foot, and 50 foot), each of which is provided with fire detection. Additionally, standpipe system hose reels are provided on all elevations as are portable fire extinguishers for use in manual fire fighting.

The 2 foot elevation contains safe shutdown cables for both units, but no other equipment. Recognizing the vulnerability of such cables, this area has a fixed sprinkler system designed to protect the safe shutdown cabling from exposure fires. The sprinkler system was designed assuming the quantity and combustibility of the contents to be moderate (the same classification utilized in

chemical plants, large stack room areas of libraries, and printing and publishing occupancies). The as-installed system, however, can provide a minimum average of 269% of the design requirement. In addition to the general area coverage, the crossing points of a number of opposite division cable trays are provided with localized sprinkler coverage.

The 23 foot elevation contains four emergency diesel generators and four 480 volt emergency electrical system substations. Each generator and each substation is isolated from the adjacent one. Each diesel generator room is protected with full area sprinkler coverage plus localized protection over the fuel oil day tanks and localized protection in the pipe trenches where any spill of combustible liquids (e.g. fuel oil or lube oil) could be expected to flow. These trenches drain to an exterior collection basin. Thus, significant accumulation of combustible liquids is precluded.

The 50 foot elevation contains four sets of 4160 volt switchgear which provide safe shutdown functions. It also contains the building HVAC supply air fans and the oil bath air intake filters for the emergency diesel generators. All of the switchgear rooms are separated from adjacent rooms. Due to the low fire loading in each room, no automatic suppression is provided. In the area in which the HVAC fans and air filters are located, localized protection is provided by an automatic aqueous film forming foam (AFFF) suppression system on each air intake filter. This area, in addition to the standpipe system hose reels provided, is also equipped with two AFFF hose reels for manual fire fighting.

D. Service Water Building

The Service Water Building has safe shutdown equipment on two of its three elevations (e.g., 4 foot and 20 foot). Fire detection is provided on both of these elevations and each is provided with manual fire suppression capability including one or more standpipe system hose reels and portable fire extinguishers.

The 4 foot elevation contains safe shutdown control and power cables. These cables are protected by a sprinkler system designed to extinguish exposure fires. Although this area is virtually devoid of combustibles other than the cables, the sprinkler system was designed for moderate fire loading. The installed system, however, is capable of providing 147% of the designed density of 0.19 gpm/ft^2; a flow 178% above that required in an area where quantities and combustibility of contents is very high and flammable liquids are present.

The 20 foot elevation contains safe shutdown pumps and motor control centers and has sprinklers throughout. Although the area contains minimal exposed combustibles, the sprinkler system was designed for areas where quantity and/or combustibility of contents is high and fires with high rates of heat release are expected. The system, as installed, provides 222% of the design density and 192% of the density specified for areas of the severest hazards.

Additional safety features are provided in each of the major rooms/buildings as follows:

A. Cable Spread Rooms

1. Cables installed are qualified in accordance with IEEE 383 for flame testing.

2. Cables are coated with fire retardant material to prevent propagation between cable trays.

3. Cable tray separation meets the requirements of IEEE 384 (1974).

4. Alternative shutdown capability is provided (refer to I.A of this attachment).

5. Fire detection equipment is installed.

6. Fire fighting equipment is available in the immediate vicinity.

7. Transient combustibles are administratively controlled in the area.

B. Control Room

(Note: On November 10, 1981, NRC granted an exemption from the requirement to install a fixed suppression system in the Control Room.)

1. The control room is continuously manned.

2. Fire detection equipment has been installed generally throughout the Control Room including in cabinets and other areas not readily visible to operators.

3. High risk areas for combustibles such as computer rooms have been separated from the Control Room by three-hour fire barriers.

4. CO_2 fire fighting capability is immediately available to operating personnel.

5. Alternative shutdown capability is provided (refer to I.A of this attachment).

C. Diesel Generator Building

1. Fire zone separation has been installed.

2. Sprinklers have been installed in each diesel cell to meet fire code criteria.

3. Fire detectors have been installed.

4. Foam suppression systems have been provided for use in hazardous areas and on hazardous equipment.

5. Diesel exhaust silencers were relocated outside the building to remove explosion hazard.

6. Cables in the lower level have been protected from exposure fires by the installation of sprinkler systems.

7. Safe shutdown cables have been protected at division crossings by barriers where appropriate.

8. Cables are qualified in accordance with IEEE 383 for fire testing.

9. Cables in the lower level have been coated with fire retardant material to prevent propagation between trays.

D. Reactor Building

1. Safe shutdown cables have been protected from exposure fires by the addition of sprinkler systems.

2. Cables are qualified in accordance with IEEE 383 for fire testing.

3. Safe shutdown cables are protected by barriers and/or sprinklers at divisional crossings where appropriate.

4. Cable tray separation meets the requirements of IEEE 384 (1974).

5. Based on original plant design bases, associated circuits are isolated by a coordinated protection system composed of breakers and fuses.

6. Manual fire fighting capabilities have been provided in all fire zones.

7. Sprinklers have been installed in selected locations where significant quantities of transient materials may accumulate during maintenance and/or modification evolutions.

E. Service Water Building

1. Fire detection equipment has been installed.

2. Sprinklers have been installed in the upper level consistent with the requirement of the fire code.

3. Cables in the lower level have been protected from exposure fires by the installation of sprinklers.

These features, although not meeting the exact provisions of Appendix R in all cases, provide very similar protection to that specified by Appendix R and thus provide justification for operation in the interim while the Appendix R modifications are being made.

III. Additional post-Appendix R fire protection features presently in place or soon to be in place include:

A. The requirements of Appendix R, Section III.J. have already been met in all areas required for remote shutdown with the exception of outdoor lighting. An exemption has been requested from these outside lighting requirements.

B. All existing area suppression systems utilizing sprinklers are sufficiently well-designed to provide a high level of confidence that fires will be contained within an area.

C. Combustible control measures are in place and actively enforced via procedures FP-2, "Control of Combustible Materials and Ignition Sources," and FP-5, "Welding and Burning Controls".

D. The recently approved Brunswick Fire Protection Improvement Plan provides a high level of confidence that our fire protection personnel on site will be able to adequately combat fires and place the plant in a safe condition following a fire. The plan provides for qualifying the entire fire brigade as Auxiliary Operators. It includes provisions for additional fire protection personnel on site, greatly increases the training requirements in the areas of fire protection and plant operations and provides for a complete reevaluation of all fire protection procedures, fire plans and periodic tests to ensure compliance with Appendix R and other commitments.

The Fire Protection Improvement Plan was transmitted to NRC (IE Region II) on March 30, 1984. The following is excerpted from that letter:

BEGINNING OF EXCERPT

This enclosure describes the plan and schedule for preparing a comprehensive Fire Protection Program for Brunswick. The task can be broken down into five phases:

1. Performing a needs analysis.

2. Developing a set of specifications.

3. Writing the procedures.

4. Fire brigade organization.

5. Fire brigade training.

NEEDS ANALYSIS

The needs analysis phase involves gathering the commitment documents which impact Brunswick's Fire Protection Program. These would include, but would not be limited to NUREG 0800; SRP 9.5.1; BTP APCSB 9.5-1 (including Appendix A); 10CFR50 Appendix A and B; 10CFR50.48; Appendix R; Regulatory Guides 1.39, 1.78, 1.101, 1.120; the FSAR; NFPA 4, 4A, 6, 7, 8, 27, and others; commitments made to the NRC; QA audit findings and the Corporate QA Manual; and NRC findings and problems identified at other nuclear plants.

The analysis is an important function in that it must ensure that the program will satisfy all regulatory requirements.

SPECIFICATIONS AND PROGRAM DEFINITION

This phase will begin once the needs analysis is complete. Preparation of the specifications is important because it is here that the Brunswick Fire Protection Program will be defined. Specifications will then be generated for each procedure. These specifications will include the procedure's format, purpose, pertinent commitments, codes, regulations, and will indicate what the procedure will do. Appropriate management review of the specifications will be complete prior to procedural development.

The set of specifications produced will be compared to ensure logical groupings of content, function, purpose, and quantity. This final action will result in a set of procedures which are comprehensive, cohesive, and integrated.

PROCEDURES

The procedure writing phase will be straight-forward. Using the procedure specifications, referenced codes, regulations, standards, commitments, existing procedures, and drawings, the writer will develop the procedure using any additional assistance required. The procedure will be independently reviewed and then approved by appropriate management as required by regulations and plant procedures.

Procedures will be generated to replace the existing fire protection (FP) procedures, fire instructions (FI) including fire plans, and periodic tests which are performed as part of the Fire Protection Program.

Training of shift personnel and Fire Protection staff members will be conducted on these procedures prior to their implementation. Following this training, the procedures will be implemented.

FIRE BRIGADE ORGANIZATION

A new Fire Brigade organization will be implemented to enhance the brigade's fulfilling of regulatory requirements, fire fighting, and fire prevention at BSEP. The new organization will be implemented over the next 18 months in three phases to assure a smooth transition from the current organization.

The final organization will consist of six shifts of fully dedicated Fire Brigade personnel, supported by an administrative, technical, and supervisory staff during day shifts. The shift Fire Brigade personnel will perform fire protection-oriented tasks, such as PTs, fire inspections, fire watch supervision, and fire equipment checks. Their number will be a function of the normal work load which they will be expected to carry, with a planned minimum of five on each shift in accordance with regulations. It is expected that additional personnel will be required for each shift to perform the required tasks and to

maintain continued training. Those which are not utilized for fire protection work activities will be utilized as AOs.

The Fire Brigade organization will be led by the Fire Support Supervisor who will fulfill the requirements for a Fire Chief. Reporting to him will be a Fire Support Specialist, Administrative Specialist, Drill Coordinator, Records Specialist, clerk, and six Shift Fire Supervisors. Fire Brigade members on each shift will report to the Shift Fire Supervisor.

Each operational shift will also have a licensed individual who is fully qualified and trained in fire protection and fire fighting. This person will act as the Fire Commander during a fire. The Fire Commander will be dispatched to the scene of the fire and will report to the Shift Foreman. The Fire Commander directs the fire fighting at the scene with the Shift Fire Supervisor reporting to him. The Shift Fire Supervisor is trained to direct the fire fighting if the Fire Commander is disabled or called to a second fire.

FIRE BRIGADE TRAINING

The Fire Brigade training responsibility will be shifted from Operations to the Training Unit. Drills, practice fire fighting, and real-time training will remain under Operations' control.

The training goals will be to have a Fire Brigade fully trained to deal with fire situations that could reasonably exist and to qualify each Fire Brigade member as an AO. Qualified Fire Protection group personnel will be given AO training in regularly scheduled AO classes.

A comprehensive program is being developed to provide additional training for the Fire Brigade personnel. This training is anticipated to include:

1. Fire Academy Training
2. Fire Brigade Training
3. Fire Inspection
4. Fire Protection Procedures
5. Fire Protection Periodic Testing
6. Fire Protection Equipment Checks

It is also anticipated that the Fire Support Supervisor, Shift Fire Supervisors, and the Fire Commanders receive the above training, plus the following:

1. Regulations and Specifications
2. Fire Chief's Course
3. Supervision Course

4. Fire Rescue

5. EMT (Emergency Medical Technician)

Each Shift Foreman will receive the following training:

1. Fire Brigade Training

2. 24-Hour Academy Training

A training schedule has been developed and the above training should be accomplished without disruption to the current fire protection responsibilities. Training will be tailored to accommodate a time-phased approach to development of the organization.

SCHEDULE

A comprehensive schedule has been developed to provide an effective management tool for implementation. This schedule currently calls for individual project start dates ranging from March through June 1984 and a final total completion date of December 1985. The extensive training program is the primary reason for this extended time period. In addition, various projects cannot be started until prerequisite projects are completed (i.e., the needs analysis must be completed prior to specification development). Due to possible program changes and the availability of outside resources (i.e., Fire Academy), this schedule may change. These changes will be updated in the periodic reports.

CLOSING COMMENTS:

The Brunswick plant has developed and is implementing what it considers a very comprehensive Fire Protection Program. Many aspects of this program are described in this letter. In addition to those actions identified in this letter, which fall mainly under the auspices of the Operations Subunit and the Training Unit, an engineering program is also in effect. This program not only includes the requirements of Appendix R, but also incorporates many improvements and upgrades to the operation of the Fire Protection System at Brunswick. Should you so desire, CP&L would enjoy the opportunity to present its fire protection upgrade program to you or members of your staff.

END OF EXCERPT FROM FIRE PROTECTION IMPROVEMENT PLAN

SUMMARY

Existing fire protection measures at BSEP, CP&L's commitment to excellence in the fire protection area, and our proven attitude toward safety provide a high level of confidence that fire protection measures will be adequate to protect the public health and safety during the period of time required to make modifications to achieve compliance with Appendix R.

APPENDIX A

The following points describe, in general terms (with a few specific examples) some of the pitfalls and complexities routinely encountered in the plant modification (PM) process. Each of these "bullets" describes a factor which is very time-consuming but which must be considered and resolved satisfactorily and in accordance with appropriate procedures and approvals in order to ensure a good final product.

The plant modification process is very involved and provides comprehensive control of every activity related to plant change. Once an engineering concept has been selected to be the solution to a particular concern (as in the ASCA Report modification listings), only then can the engineering effort begin to prepare the formal plant modification package. ENP-3 is the procedure Brunswick uses to control the plant modification process. This very detailed procedure specifies the various steps of preparation, approvals, cross checks, feedback, installation, testing, etc., which lead to ultimate operability and utilization of a plant modification. Following are highlights of several general and specific considerations and constraints involved in plant modifications:

- Most of the PMs will be performed on safety-related systems/components. Changes to this equipment require attentive review and concurrence by many organizations including On-Site Nuclear Safety, Plant Nuclear Safety Committee, QA, Corporate Nuclear Safety (for FSAR, tech. spec. impact), in addition to management. Therefore, preparation and approval of these plant modification packages require sufficient time to assure the necessary quality.

- If a PM would necessitate revision of an existing procedure or preparation of a new procedure, then the PM package must include such information. Procedures are generally developed only after the specific design is largely completed. This creates an impact on the time required to complete a PM package.

- Many PMs will require that environmentally qualified equipment be used for the installation. Procurement of equipment specified to these standards typically reflects longer lead times than non-EQ equipment.

- Development of PM packages is a very detailed engineering process; we strive to identify, evaluate, and resolve potential pitfalls in design as early as we can in the PM development. For a cable wrap, this would include possible derating of amperage capacity, possible cable support problems due to added weight of the wrap, etc.

- There are many operational constraints to be worked out when the physical installation of a PM begins. One is taking out a clearance on a system so that it can be modified. This can involve working within LCO requirements from Tech. Specs. or in getting the Appendix R modification work scheduled in among necessary maintenance activities, periodic test/surveillance requirements, equipment upgrades, other modifications, etc. This process is very complex and necessitates planning and coordination among several

plant organizations. It should be noted that substantial detailed engineering must be completed before the full impact of a particular PM can be assessed for an outage plan.

- Another functional constraint is providing access to equipment/systems for personnel into the various locations of the plant. Several of these locations are radiation areas in which we must be sensitive to ALARA concerns, radiation surveys, health physics personnel ratios, etc. There are also realistic limitations on the number of personnel who can work effectively in any given area of the plant; the number of people performing other regulatory mandated work (tech. spec. requirements and plant modifications related to non-Appendix R issues) must be considered in setting site priorities.

- In planning for Appendix R work, we are considering the effects of issues such as environmental qualification (EQ) and BWR recirculation pipe cracking. In scheduling for our Appendix R engineering work, we will prioritize this work such that PM packages are completed for items in plant areas that would be available for personnel and equipment access at the point in time when the engineering is completed. For example, EQ and recirculation piping replacement work in a certain outage will limit access to the Reactor Building, so we would plan our Appendix R engineering efforts toward PMs in Service Water or Diesel Generator Buildings so that those PMs could be completed rather than trying to schedule work for the Reactor Building which would be crowded due to the other efforts.

- For modifications such as cable rerouting, we may encounter interferences in the field. This would require that a field revision to the PM package be prepared. Changes involved would include consideration of cable tray loadings and supports and of revisions to cable pull slips. This process can slow down the completion of installation of modifications, but it helps assure that a high quality product is achieved.

- The installation of supply piping for water curtains and suppression systems will probably involve field routing efforts which would entail normally expected field interference and resolution problems and the associated time it takes to work through them.

- Core borings through seismically qualified reinforced concrete structures will be required for several PMs. The process for doing these borings is complex. The PM must identify the location for a boring which must then be structurally analyzed and accepted by the original architect-engineering (AE) firm for the plant. If rebar is encountered while making the boring, a field revision to the PM package must be completed, including a reanalysis and approval by the original AE. One such modification is the addition of a sprinkler in each mini steam tunnel which will be annunciated in the Control Building. This will involve core borings through secondary containment and the Control Building.

- One of the types of modifications that requires the most time to complete is providing an alternate source of power with a manual transfer switch for certain pieces of equipment (i.e., valves and battery chargers). A significant engineering effort is involved in designing interfaces with

existing equipment and control circuitry to provide the appropriate features and functions. Core borings through secondary containment and Control Building will be needed for the battery chargers' alternate power supplies from MCCs in Reactor Buildings; cabling, cable tray supports, and cable pull slips are also involved along with the ever-present possibilities of field interferences and resulting PM package iterations during installation. Equipment needed for these modifications (transfer switches) must be seismically and environmentally qualified and current estimates are that procurement lead times can exceed 50 weeks; even before they can be ordered, we must have completed the process of preparation of specifications, request for competitive bids, receipt of quotes, evaluation and vendor selection. Since these PMs involve safety-related systems, installation during outages is necessary and would have to be scheduled to occur after the preceding steps were completed.

- Certain High/Low Pressure Interface Resolution modifications may require the procurement of new 120 VAC power panels to replace or expand existing panels. These would be required to be seismically and environmentally qualified. Design, procurement, and installation would be subject to the long lead time situations expected for such items.

- Two new fire doors may be installed for each Reactor Building to provide a fire rating of three hours; these are long lead time items.

- Brunswick Plant has a policy to make improvements in quality where possible. For example, there are now more QA hold points during construction than in the past. These types of improvements result in slower implementation of PMs, but it assures a better finished product.

These are brief comments regarding the complexity of the PM implementation process as it can relate to our schedule for completing Appendix R modifications.

INFORMATION SHEET FOR DISTRIBUTION

This box contains ONE COPY of Carolina Power & Light Company's (CP&L)

Brunswick Steam Electric Plant

Alternative Shutdown Capability Assessment Report

- o It consists of six volumes: 1, 2, 3, 4, 5, 6
- o A total of TWENTY (20) copies are provided for Mr. H. R. Denton; they should arrive on April 25, 1984.
- o Please use DISTRIBUTION CODE A006S
- o TWENTY-TWO (22) copies of the transmittal letter from CP&L (Serial Number: NLS-84159 dated April 24, 1984) should arrive on April 25, 1984 via Federal Express or UPS; please use same distribution code for the transmittal letter
- o Should you have any questions, please call Jim McQueen at 919-836-6687.

Thank you.

(9956JAM/PGP)