JAN 1 . 1985

Docket No.: 50-412

Mr. Earl J. Woolever
Vice President, Nuclear Construction
Duquesne Light Company
Robinson Plaza Building, No. 2, Suite 210
PA Route 60
Pittsburgh, Pennsylvania 15205

Dear Mr. Woolever:

Subject: Backfit Items for Beaver Valley, Unit No. 2

Reference: Letter from E. J. Woolever to D. G. Eisenhut dated November 20, 1984

In the referenced letter, you had indicated the need for the staff to provide you clearly stated requirements and an outline of the staff's safety rationale for the requirements.

In response to your request, we have reviewed Attachments 1 through 9 of your letter and have provided you the requested additional information for each of the four sections to the tables in Attachments 1, 2, 3, 4 and 7. Attachment numbers correspond to the Attachment numbers in the referenced letter. I suggest, to maintain an orderly record for future discussion, you include in your tables the NRC information supplied in the Attachment to this letter.

Information you committed to provide us on the issue in Attachment 5 (motor operated accumulator isolation valves) indicates you meet our requirements and this provides a basis for resolving this issue; therefore, the position we identified in draft SER Section 7.3.3.15 (as noted in your letter dated June 15, 1984) is withdrawn.

Also, information you committed to provide us on the issue in Attachment 8 (alarm for rocker arm lube oil reservoir) indicated you meet our requirements and this provides a basis for resolving this issue; therefore, the question raised in 430.119 (as noted in your letter dated June 25, 1984) and directing you to "provide a low level alarm for the rocker arm lube oil reservoir" is withdrawn.

Based on our understanding from discussions with your staff on how you meet our requirements, we are prepared to withdraw our position on the issue in Attachment 6 (spent fuel pool heat load). This position, which we identified in draft SER Section 9.1.3 (as noted in your letter dated June 15, 1984), will be withdrawn when you docket the information on this issue. This also applies to our position on the issue in Attachment 9 (diesel lube oil fill procedure). This position we identified in our September 13, 1984 meeting with you (as noted in your letter dated October 11, 1984).

Since these four are now resolved or being resolved, no additional information was provided on these issues.

Sincerely,

George W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing

Enclosures:
As stated

cc: See next page

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Issue: Review Criteria for Probable Maximum Precipitation (PMP)
Backfit Issue No.: L-84-16
DLC Backfit No.: 1
Re.: Attachment 1 to DLC letter dated 11/20/84

I. PROPOSED REQUIREMENTS

The NRC position is adequately described in DLCs statement of the NRC position under their discussion of "Relationship of New Requirements to Existing Regulatory Position". That discussion should be transposed in its entirety to this section. The following paragraph should be added to the transposed discussion:

The criterion that best meets the requirements of GDC-2 with respect to hydrologic events is the PMP, and HMR 51/52 provide methods for estimating PMP for small drainage areas. Prior to publication of HMR 52, there were no documented authoritative procedures for evaluating PMP for small drainage areas nor for distributing the PMP into short time periods to correspond to these small drainage areas. Because HMR 51/52 provide methods and procedures, not previously available, for estimating PMP for small drainage areas, the staff's position is that HMR 51/52 should be used as a basis for review in accordance with procedures cited in SRP 2.4.2 and 2.4.3.

NRC COMMENTS

The staff's review procedures that utilize Probable Maximum Precipitation (PMP) were established to meet General Design Criterion 2 (GDC-2), "design bases for protection against natural phenomena," of 10 CFR 50, Appendix A, which requires in part that nuclear power plant structures, systems and components be designed to withstand the effects of floods without loss of capability to perform their safety functions. The objective is to prevent loss of capability for safe shutdown resulting from the most severe flood conditions that can reasonably be predicted to occur at a site as a result of severe hydrometeorological conditions.

In searching for a consistent design criterion for protection against local flooding, the staff adopted the Probable Maximum Flood (PMF) as developed by the Corps of Engineers. This criterion was originally developed to be applied to the design of Federal Structures (principally dams) whose failure by flooding could result in substantial loss of human life or property. The NRC staff adopted this methodology as the design basis for Federally licensed nuclear facilities for similar reasons.

Procedures for evaluating PMF have evolved in various Corps of Engineers (COE) and National Weather Service (NWS) publications. Of particular interest for precipitation-induced flooding (Probable Maximum Precipitation or PMP) are HMR's 33, 51, and 52. HMR 33, published in 1956, provided generalized charts for establishing the level of PMP for specified drainages of the United States east of the 105th meridian. HMR 51, published in 1978, updated HMR 33 by expanding the PMP estimates to a specific range of drainage area sizes and storm durations. HMR 52, published in 1982, provides a stepwise approach for adapting PMP estimates derived from HMR 51 to specific drainage areas.

The point to be made from the above discussion is that PMF is the design criterion adopted by the NRC to assure that GDC-2 is met; and the category of PMF resulting from precipitation-induced local flooding requires as input the PMP. The guidelines provided by HMR's 33, 51 and 52 are evolving procedures developed by the COE and NWS to evaluate the PMF for local flooding. The NRC Standard Review Plans, direct the staff to take into consideration improved methodologies in its review process. Such considertions are also included in the industry's own guidelines. Thus, ANSI N170-1976 contained references to HMR-33 and its more recent version, ANSI/ANS 2.8 - 1981, includes reference to HMR-51. HMR-52 was published in 1982 and there have been no updated versions of either NRC or ANSI guides to reflect its existence. Nevertheless, because it represents a refinement of the PMP methodology for small drainages that are typical of nuclear sites, its use is appropriate so long as PMP is the criterion for determining that a facility meets GDC-2.

DLC POSITION

The DLC position indicates conflicting guidance by the NRC staff in correspondence dated August 31, 1983, October 12, 1984, and November 8, 1984.

NRC COMMENTS

On August 31, 1983, we requested in 11 questions, information to continue our safety review. One of the questions asked that they adjust their site flooding analysis using HMR 51/52. All the other requested information was needed to review the applicant's analysis already in the FSAR. Other than submitting a topographic map, they did not respond to any of the questions addressing site flooding; instead, they made an appeal based on the evaluation request. Since we needed responses to the

other questions to continue our FSAR review, we resubmitted our August 31, 1983, questions on October 12, 1984, without the request to adjust their flooding analysis with HMR 51/52. DLC, by letter dated November 8, 1984, provided a response to these questions. The HMR 51/52 requirement was suspended pending resolution of DLC's appeal. The November 6, 1984, letter from NRC merely restated NRC's position on the issues that the applicant wished to appeal.

DLC COMMENTS

DLC states that "NRC's acceptance review found the BVPS-2 license application acceptable for docketing with the PMP evaluation based on HMR-33."

NRC COMMENTS

The DLC statement is accurate; however, an acceptance review is not and should not be considered to represent a detailed analysis or evaluation. On the contrary, during an acceptance review, the staff reviewers make a rapid survey to determine if the material submitted by the applicant is sufficient to initiate a detailed review. Finding the license application acceptable for docketing should therefore not be construed to imply that calculation methods used by the applicant, such as PMP analysis, are acceptable.

II. HOW PROPOSED REQUIREMENT WOULD IMPROVE SAFETY

The NRC position as stated by DLC is adequate.

DLC POSITION

DLC states, "The roofs of safety-related structures are designed to support water accumulation at the parapet overflow level. Postulating a greater PMP event results in increased overflow rather than increased accumulation. . ."

NRC COMMENTS

The FSAR contains no information regarding roof design so the staff cannot agree or disagree with the statement. Additional information will be required, from the applicant before the staff is able to determine if roofs of safety-related structures are capable of supporting the loads that would be induced by ponded water from a PMP. Additionally, the first statement is not entirely correct because for increased flow over the parapets, the water level has to increase. DLC should provide information to demonstrate that roofs of safety-related structures can support the weight of any additional storage above the level of the parapets.

DLC POSITION

DLC further indicates that because HMR 33 describes PMP as being synonymous with "maximum possible precipitation", the HMR 33 PMP has a probability of zero. Therefore, unless the staff can demonstrate that a storm more severe than the HMR 33 PMP has a probability greater than zero, no increase in safety can be demonstrated for the use of a more severe projection.

NRC COMMENTS

It is well established that the appropriate design basis for precipitation induced flooding at nuclear plants is the Probable Maximum Flood (PMF). An integral component of PMF determination is PMP. PMP is not an absolute value as suggested by DLC, but represents a best estimate of an upper bound whose value is subject to change as additional data become available and more detailed studies are conducted. The value of PMP given in HMR 33 was the best estimate of PMP in 1956 when HMR 33 was published and the value of PMP determined in HMR 51/52 is the best estimate today.

DLC POSITION

In an attempt to show how conservative HMR 33 is, DLC also states that, "The highest actual rainfall for the Pittsburgh area was 2.09 inches in 1 hour (during 1876). The HMR 33 analysis uses a 1 hour intensity of 9.3 inches/hour."

NRC COMMENTS

Major storms produce rainfall that varies considerably over the impacted region, which is reflected in different amounts measured by the raingages scattered throughout the region. DLC selected a rainfall record that had a maximum one hour rainfall of 2.09 inches and claims that it is the "highest actual rainfall for the Pittsburgh area." This measurement may be the case for that one gage but it may not be representative of extreme values from other gages in the area and particularly the Pennsylvania region. As an example the gage at Smethport, Pa., 140 miles northeast of the site, had a measured value of 15 inches in one hour and 30.8 inches of rain in 4.5 hours. This measured 15 inches for one hour supports the PMP estimate produced by the use of the HMR 51/52 methodology for a one square mile area. Precisely because of this variation in measurements of extreme rainfall from one place to another is the reason that general procedures have been developed that incorporate measured information from a larger region. And it was the occurrence of storms such as the one at Smethport that resulted in the revision of PMP values by the publication of HMR 51/52.

III. ON RELATION OF NEW REQUIREMENT TO EXISTING REGULATORY POSITIONS

As indicated previously, this Section in the table of Attachment 1 to the applicant's November 20, 1984 letter should be transposed to Section I, and in its place, provide the following staff restatement of the NRC position:

The current SRP 2.4.2 states in Section III Review Procedures: "Construction permit (CP) stage reviews are carried out under this SRP section to evaluate the significance of the controlling flood level with regard to the plant design basis for flood protection. At the operating license (OL) stage, a brief review is carried out to determine if new information has become available since the CP review and to evaluate the significance of the new information with regard to the plant design basis for flood protection. New information might arise, for instance, from the occurrence of a new maximum flood of record in the site region, from identification of a source of major flooding not previously considered, from construction of new dams, from flood plain encroachments, or from advances in predictive models and analytical techniques. If the CP-stage evaluation of flooding potential has been carefully done, all sources of major flooding should have been considered and any new floods of record should fall well within the design basis. Improvements in calculational methods may occur, but generally will be concerned with increased accuracy in stream flow and water level predictions rather than with substantive changes in the flows and levels predicted. Where the OL review reveals that the controlling flood level differs more than 5% less conservatively from the CP evaluation, any supplemental provisions needed in the flood protection design basis should be directed toward early warning measures and procedures for assuring safe shutdown of the plant or toward minor structural modification to accommodate the design flood level." Thus the requirement is a part of existing regulatory positions.

DLC POSITIONS

BVPS-2 meets GDC 2.

BVPS-2 was designed prior to the issuance of HMR 51 and 52.

Construction of the BVPS-2 safety related structures reached a significant percentage of completion prior to the issuance of HMR 52.

No regulations provide for the use of HMR 51/52.

No regulations require update of PMP evaluation methodology.

NRC COMMENTS

In the staff's view, the request that the effect of intense local precipitation be calculated using the updated data and analysis contained in HMR 51/52 for comparison with older analysis and data contained in HMR 33 is consistent with the responsibility of the Agency not to ignore new information which may affect the safety of the plant. Ordinarily such assessments are made generically. However, local precipitation effects relate to plant specific topography and must therefore be determined individually. DLC expressed concern in their response that plant construction has reached a point that changes in design would have adverse effects on costs or schedule. Such considerations were anticipated in the Standard Review Plan and are explicitly discussed. Further, the document states that if the OL review shows that the controlling flood is significantly less conservative than from the CP evaluation, any supplemental provisions in the flood protection design basis should be accomplished through early warning measures and procedures for assuring safe shutdown of the plant or by minor structural modifications to accommodate the design flood level. None of the eight plants which have responded to this request have been required to make more than minor modifications. In summary, this application by the staff is consistent with the practices of the SRP and staff positions previously approved. Therefore, this is an exception from Chapter 0514 per Section 046.

IV. ITEM: SUGGESTED TIME FOR IMPLEMENTATION

NRC COMMENTS

The staff expected the adjusted evaluation of local site flooding in a reasonable time (about 4 months) following the first request for it on August 31, 1983.

Issue: Fire Suppression in the Cable Spreading Room
Backfit Issue No.: L-84-10
DLC Backfit No.: 17
Re.: Attachment 2 to DLC letter dated 11/20/84

I. Proposed Requirements

The applicable Standard Review Plan (NUREG-0800) Section 9.5.1, paragraph II.2 identifies an acceptable level of safety for fire protection that will meet the requirements of §50.48, GDC 3 and 5. In order to meet these requirements, the following specific criteria have to be met:

> Branch Technical Position (BTP) CMEB 9.5-1 as it relates to the design provisions given to implement the fire protection program.

The BTP CMEB 9.5-1 at paragraph C.7.c (page 9.5.1-45) states:

> "C. Cable Spreading Room
>
> The primary fire suppression in the cable spreading room should be an automatic water system such as closed-head sprinklers, open-head deluge system, or open directional water system... When gas systems are installed, drains should have adequate seals or the gas extinguishing systems should be sized to compensate for losses through the drains."

To meet the BTP CMEB 9.5-1 guidelines, a fixed water suppression system should be installed to backup the present gas suppression system.

NRC Comments

> The purpose of fire protection in a nuclear plant is to minimize the adverse effects of fires on structures, systems, and components important to safety. The cable spreading room at Beaver Valley 2 contains such systems. The Beaver Valley 2 cable spreading room provides only partial separation between the two safety trains. The area in common contains

a concentration of vertical cable trays and is located at the farthest distance from the access doors for manual fire fighting. Safety train switchgear is also located in the same fire zone but is physically located away from the vertical cable tray area. The DLC proposed fire suppression system for the cable spreading room is a gaseous CO_2 system. As a result of the Browns Ferry fire in 1975 guidelines were developed by the NRC with consultation by the industry and approved by the NRC's Regulatory Requirements Review Committee (R^3C) which specified that primary fire suppression should be an automatic water system or that if gaseous systems were the primary suppression that they must be backed up with an installed water spray system and hose stations and portable extinguishers immediately outside of the room.*

DLC Comment

None of the regulations pertaining to fire protection for nuclear power plants specify the suppression mediums to be used.

NRC Response

True. However, the regulations reference the documents that recommend the suppression for cable spreading rooms. §50.48 Footnote 3 states that basic guidance is contained in the aforementioned Appendix A to BTP APCSB 9.5-1. As part of the Commission's consideration of a fire protection rule for future plants (SECY 80-546/SECY 81-114), the Commission agreed that until a rule is in place, new licenses (those issued after January 1, 1979) should contain a condition requiring compliance with the commitments made by an applicant and agreed to by the staff. The Commission also agreed that deviations from our guidelines should be specifically identified and justified by the applicant and that such deviations should be specifically evaluated by the staff in the SER. In the instant case, justification for the lack of a water system in the cable spreading room has not been provided by the applicant.

*Appendix A to BTP APCSB 9.5-1, dated August 23, 1976, as approved by R^3C states (page 37):

> "The primary fire suppression in the cable spreading room should be an automatic water system such as closed-head sprinklers, open-head deluge, or open directional spray nozzles..."
>
> "Alternately, gas systems (Halon or CO_2) may be used for primary suppression if they are backed up by an installed water spray system and hose stations and portable extinguishers immediately outside the room and if the access requirements stated above are met."

DLC Comment

Although the BTP 9.5-1 paragraph cited in the November 6, 1984, NRC letter expressed a preference for water, other parts of the same BTP address design considerations for gas suppression sytems used in cable spreading rooms.

NRC Response

The NRC guidelines for the cable spreading room do not prohibit the use of gas systems. They only recommend a backup water system if the licensee prefers to use a gas as the primary suppression medium.

DLC Comment

At least 14 operating plants along with several NTOL's use gas systems as the primary fire suppression systems in cable spreading rooms. Since these plants have not been required to obtain exemptions to Title 10, DLC must conclude that water suppression is not required by existing regulations.

NRC Response

In some operating plants constructed and licensed prior to January 1979, the existing configuration of the cable spreading room, in spite of a lack of a fixed water suppression system was deemed acceptable for a variety of reasons, e.g., cost effectiveness, adverse impact of inadvertent operation due to the presence of switchgear or other electrical equipment, application of fire retardant measures to cables. However, most of the 34 plants licensed after January 1, 1979 or to be licensed have provided a water suppression system, either primary or backup, in the cable spreading room.

The plants which have not provided a water suppression system together with their acceptable deviations are:

Plant	Justification
Byron 1 & 2	Improved divisional separation
Catawba	Armored cable
Diablo Canyon 1 & 2	Electrical equipment present
McGuire 1 & 2	Armored cable
Shoreham	Electrical equipment present

DLC Comment

The SRP identifies an acceptable means for meeting the requirements which underlie the SRP. However, 10 CFR 50.34(g) states, "The SRP is not substitute for the regulations, and compliance is not a requirement."

NRC Response

We agree, however, 10 CFR 50.34(g) requires applicants to identify differences from the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP criteria provide an acceptable method for complying with the Commission's regulations (i.e., 10 CFR 50.48):

"(g) Conformance with the Standard Review Plan (SRP). (1)(i) Applications for light water cooled nuclear power plant operating licenses docketed after May 17, 1982 shall include an evaluation of the facility against the Standard Review Plan (SRP) in effect on May 17, 1982 or the SRP revision in effect six months prior to the docket date of the application, whichever is later.

(ii) Applications for light water cooled nuclear power plant construction permits, manufacturing licenses, and preliminary or final design approvals for standard plants docketed after May 17, 1982 shall include an evaluation of the facility against the SRP in effect on May 17, 1982 or the SRP revision in effect six months prior to the docket date of the application, whichever is later.

(2) The evaluation required by this section shall include an identification and description of all differences in design features, analytical techniques, and procedural measures proposed for a facility and those corresponding features, techniques, and measures given in the SRP acceptance criteria. Where such a difference exists, the evaluation shall discuss how the alternative proposed provides an acceptable method of complying with those rules or regulations of Commission, or portions thereof, that underlie the corresponding SRP acceptance criteria.

(3) The SRP was issued to establish criteria that the NRC staff intends to use in evaluating whether an applicant/licensee meets the Commission's regulations. The SRP is not a substitute for the regulations, and compliance is not a requirement. Applicants shall identify differences from the SRP accepance criteria and evaluate how the proposed alternatives to the SRP criteria provide an acceptable method of complying with the Commission's regulations."

DLC Comment

It appears that the NRC staff may intend to elevate the status of SRP 9.5-1 and BTP 9.5-1, which it incorporates by reference, to the level of a requirement. 10 CFR 50.34(g) states that compliance with the SRP is not a requirement.

NRC Response

The staff does not intend to elevate the BTP 9.5-1 to the level of a requirement. However, the Commission has stated that the "essential elements" for acceptable fire protection programs are defined, in part, in Appendix A to BTP 9.5-1:

> "Because of these facts, the Commission approved on April 23, 1980[14] a proposed rule concerning fire protection. This proposed rule and its Appendix R have been developed to establish the minimum acceptable fire protection requirements necessary to resolve these contested areas of concern for nuclear power plants operating prior to January 1, 1979.[15] Other fire protection criteria that have been used by the staff during its plant-specific fire protection program reviews are contained in Appendix A to BTP 9.5-1. The combination of the guidance contained in Appendix A to BTP 9.5-1 and the requirements set forth in this proposed rule define the essential elements for an acceptable fire protection program at nuclear power plants docketed for Construction Permit prior to July 1, 1976, for demonstration of compliance with General Design Criterion 3 of Appendix A to 10 CFR Part 50. Similar acceptable guidance is provided in BTP 9.5-1 for nuclear power plants docketed for Construction Permit after July 1, 1976."
>
> (Memorandum and Order CLI-80-21 In the matter of Petition for Emergency and Remedial Action, May 23, 1980)

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[14] This rule is scheduled for publication in the Federal Register on May 29, 1980.

[15] Commissioner Kennedy and Hendrie agreed with the fire protection safety provisions of the proposed Appendix K to 10 CFR Part 50, but disagreed with the implementation schedule proposed by the Commission. A statement of Commissioners Kennedy and Hendrie separate views in this regard is attached.

II. How the Proposed Requirements would Improve Safety

The design scenario for a CO_2 system consists of prompt detection and extinguishment of a fire. However, the "actual" scenario may be considerably different. For example, (1) CO_2 systems are subject to impairment when workers are in the room for prolonged periods, and failure of personnel to reactivate the automatic portions of the system can lead to the CO_2 system being impaired for a considerable time, (2) if considerable heat is produced before the CO_2 system discharges, this heat may cause additional short circuits during the soak time. That may result in unreviewed transients, (3) if fire doors are not properly latched, pressure buildup due in the room due to the CO_2 discharge in the room may open the doors and dissipate the supply of CO_2, (4) if fire dampers fail to close the CO_2 concentration may not be maintained, CO_2 and combustion products may be transported to other areas.

In the event the CO_2 system does not promptly extinguish the fire, water would be applied by the fire brigade using fire hoses. Because of the large fire loading and congestion, we deem this task to be difficult and uncertain. There are several vertical cable trays near the floor level which lead to rapid fire propagation and the production of considerable smoke. The smoke and congested configuration of cable trays would make manual fire fighting difficult. Therefore, a fixed water backup suppression system should be provided to reduce this uncertainty and provide reasonable assurance that the fire will be suppressed promptly even if the CO_2 design "scenario" is not achieved.

DLC Comment

DLC does not consider the selection of CO_2 to be a weak link in the defense-in-depth chain. Both water and CO_2 have design requirements which must be considered in the suppression system design. The staff has chosen to label their design requirements as limitations. Water suppression systems have their own set of design requirements which can also be labeled as limitations.

BVPS-2 uses covered cable trays and has electrical switchgear located in the fire area in which the cable spreading room is located.

NRC Response

Fire in the cable spreading room may damage cable from both safety trains which are normally used to shutdown the reactor and maintain it in a safe shutdown condition. A significant fire may generate large amounts of heat and smoke that may, in addition, damage building structures, affect adjacent areas, and produce unreviewed transient conditions.

The alternate shutdown capability provided for the cable spreading room is a minimum capability. Thus, the operating staff is challenged to cope with fire induced spurious signals and their resulting plant transients while

achieving and maintaing stable hot shutdown conditions. As the fire progresses, transients that cannot be controlled by the operators, may occur. Therefore, because the alternate shutdown capability for the cable spreading room has limited capability, it is essential that there is reasonable assurance that a cable spreading room fire can be extinguished promptly. The ability of CO_2 to accomplish this action depends on maintaining a certain concentration of CO_2 in the cable spreading room for a period of time necessary to terminate the fire and prevent reignition using a limited supply of CO_2.

DLC has not provided justification that: (1) there is no benefit to the backup water system or (2) there is an adverse impact to a backup water system. DLC has not yet submitted information on the extent to which cable trays will be covered but has indicated informally that not all cable trays will be covered. They presently plan to use manual hose streams to fight a fire in the room if the CO_2 system is inadequate to control the fire. Therefore, protection of the switchgear from this less discriminate use of water must be considered. The staff believes that a fixed backup water suppression system installed in the largest area of the cable spreading room away from the electrical switchgear will provide better protection to the switchgear than manually applied water.

III. Relation of New Requirements to Existing Regulatory Positions

The staff position is unchanged from regulatory positions which have existed since 1976. This application by the staff is consistent with the practices of the SRP and staff positions previously approved. Therefore, this is an exception from Chapter 0514 per Section 046.

IV. Suggested Time for Implementation

DLC Comment

DLC is unable to establish a position since no time has been proposed.

NRC Response

Section C.1.e of BTP CMEB 9.5-1 provides guidance on the implementation of the fire protection program:

> "(1) The fire protection program (plans, personnel, and equipment) for buildings storing new reactor fuel and for adjacent fire areas that could affect the fuel storage area should be fully operational before fuel is received at the site. Such adjacent areas include those whose flames, hot gases, and fire-generated toxic and corrosive products may jeopardize safety and surveillance of the stored fuel.
>
> (2) The fire protection progam for an entire reactor unit should be fully operational prior to initial fuel loading in that reactor unit.

(3) On reactor sites where there is an operating reactor and construction or modification of other units is under way, the fire protection program should provide for continuing evaluation of fire hazards. Additional fire barriers, fire protection capability, and administrative controls should be provided as necessary to protect the operating unit from construction fire hazards."

Where good cause has been shown that certain modifications could not be implemented by fuel loading, licensing may proceed on the basis of compensatory measures acceptable to the staff for the time period between fuel load and the completion of the modification.

Issue: Steam Generator
Backfit Issue No.: L-84-13
DLC Backfit No.: 9
Re.: Attachment 3 to DLC letter dated 11/20/84

I. Proposed Requirements

The staff acknowledges that the stated performance requirement can be met by the addition of a fourth S.G. level channel. The staff has, however, provided an opportunity for alternative resolutions of the issue. The current safety analysis in the FSAR, Chapter 15, does take credit for the protective system function of the hi-hi level trip in the analysis of feedwater system malfunctions causing an increase in feedwater flow. The staff has indicated that operator action can be credited for isolating feedwater flow to prevent steam generator overfill if the response to such events at any power level is not required in less than ten minutes or it steam generator overfill events can be shown to have no safety significance. The applicant has not demonstrated that steam generator overfill has no safety significance in Beaver Valley-2. Although the applicant assessed the operator action time during an increase in feedwater flow event at full power, he has not provided an evaluation of the operator action time for such an event at low power where the time available would be expected to be less.

II. How Proposed Requirement Would Improve Safety

The safety concern in this issue is the overfilling of a steam generator and the consequent potential for static or dynamic failure of steam lines or steam line components, and/or the consequent potential for excessively rapid cooling of the reactor coolant system. Resolution of the issue is expected to provide substantial assurance that such events would be extremely improbable.

III. Relation of Requirement to Existing Regulatory Position

The applicant's FSAR, Table 15.0-6, specifies the high steam generator level produced feedwater isolation and turbine trip as an engineered safety feature (FSF) actuation function, and in FSAR Sec. 7.3.2.2.4 that the design of ESFAS systems is consistent with IEEE Std. 279-1972 Section 4.7 in the application of the single failure criterion. These statements are consistent with the staff's criteria applicable to this issue as set forth in SRP Sections. 7.3, by reference, Table 7-1 and App. B to SRP Section 7.1. The Beaver Valley 2 three channel S.G. level control/protection system does not meet the SRP nor does it appear to meet the applicant's statement in FSAR Sec. 7.3.2.2.4.

This application by the staff is consistent with the practices of the SRP and staff positions previously approved. Therefore, this is an exception from Chapter 0514 per Section 046.

IV. Suggested Time for Implementation

The proposed requirement should be implemented prior to the issuance of an operating license for Beaver Valley-2.

Issue: Air Dryers for Emergency Diesel Generators
Backfit No.: L-84-12
DLC Backfit No.: 4
Re.: Attachment 4 to DLC letter dated 11/20/84

I. Proposed Requirements

The applicant correctly states that the SRP is not a requirement, nor is it a substitute for the regulations. While SRP Section 9.5.6 recommends the installation of air dryers to prevent moisture accumulation in the D/G air start system, the direct issue which the staff is seeking is assuring compliance with GDC 2, 4, 5 and 17 by prevention of accumulation of moisture and corrosion products in the air start system. The staff is willing to accept an otherwise acceptable basis for accomplishing this and maintaining a high level of D/G start reliability.

NRC Comments

The staff does not agree that the applicant has established a satisfactory solution to this concern. The recent response to the staff's 50.54(f) for B-56 diesel generator reliability survey revealed that Beaver Valley Unit 1 D/Gs has the lowest long term reliability of all 76 plants responding, and well below the minimum recommended level of 0.90 reliability.

II. How Proposed Requirements Would Improve Safety

Engine start reliability is a valid safety concern and degradation of start reliability can result from the accumulation of moisture and corrosion products in the air starting system.

One way to satisfy this concern (See SRP Section 9.5.6) is by installation of air dryers in the engine air starting system to improve the starting reliability of a diesel engine. The inclusion of an air dryer in these starting systems is also a uniform recommendation of the diesel engine manufacturers.

NRC Comments

Industry operating experience continues to demonstrate that air dryers will improve the engine starting reliability. A recent experience at Susquehanna resulted in a diesel generator failure to start due to accumulation of moisture and corrosion products in the air starting system. As a result Susquehanna is installing air dryers.

The applicant's air starting system provided for the diesel generators relies on periodic blowdown of the air receivers for the removal of entrained oil and excess water from the starting air. The applicant states that this action will preclude any air start system contamination and hence the need for air dryers. This is an unsubstantiated statement. The applicant has not provided data or analysis which demonstrates that:

1. Manual blowdown of air receivers will eliminate moisture and provide clean dry air for engine starting. The air in the air receivers (and system piping) will still be saturated at the operating pressure and temperature. A reduction in pressure, temperature or both will cause condensation.

2. Blowdown of system piping will eliminate generation of corrosion products. (Since the system is continually exposed to moist air, generation of corrosions products is expected).

3. Continuous exposure of the system to moist air will not result in generation of corrosion products.

4. Over a period of time the air start system as designed for Beaver Valley 2 will not result in buildup of corrosion products in the air start system.

5. Buildup of corrosion products in the system will not subject the air start system to potential contamination and failure to perform its safety function.

In summary, the SRP provides guidance and recommendation on how to satisfy both the industry recommendations of supplying "clean and dry air" for diesel engine air starting to improve starting reliability and specific criteria and guidance to meet GDC 17. The applicant has not demonstrated that the design of the D/G air start system at Beaver Valley 2 conforms with the recommendations of the SRP based on operating experience (NUREG/CR-0660) and staff interpretation of GDC 17 as stated above.

III. Relation of New Requirement to Existing Regulatory Position

The installation of air dryers in air starting systems was incorporated into SRP Revision 2 in 1980 after completion of staff study NUREG/CR-0660. This application by the staff is consistent with the practices of the SRP and staff positions previously approved. Therefore, this is an exception from Chapter 0514 per Section 046.

NRC Comments

All plants (except for two) reviewed and licensed since that time have installed or will install by first refueling air dryers in the D/G air starting system if the original system did not provide an air dryer. Many of the plants reviewed by the staff had air dryers incorporated into their D/G air starting systems design. The two plants the staff approved without air dryers in the air starting systems are St. Lucie 2 and Limerick.

At St. Lucie 2, an air dryer in the air starting system is not required because the entire system from the check valve ahead of the air receivers to the air starting motors on the engine is constructed of stainless steel which resists corrosion and formation of rust and scale. The system also includes the normal complement of strainers, filters, blow down connections...etc. normally incorporated in such systems designs.

At Limerick, the air starting system does not require an air dryer for the following reasons: 1) carbon steel is not used in the system piping, receivers or filters; 2) a coalescent filter is installed ahead of the air distributors

to reduce moisture content; 3) the air start valves will not stick due to the presence of liquid, rust or other foreign particles; 4) and the parts of the engine mounted air distributors, pilot air valves, air start check valves, or air start valves are made of non-ferrous metal, or are coated to prevent rust.

Issue: Class 1E Power for Lighting and Communication System
Backfit Issue No.: L-84-15
DLC Backfit No.: 15
Re.: Attachment 7 to DLC letter dated 11/20/84

I. Proposed Requirements

The applicant correctly states that the SRP "is not a requirement" and "there are no General Design Crriteria or regulatory guides that directly apply to the safety-related performance requirement for the lighting system."

SRP Section 5.4.7 provides guidance and recommended actions for safe shutdown of nuclear plants under all modes of operation in response to design basis events. The acceptance criteria in this SRP section is based in part on GDC 34. In addition, GDC 19 specifies that shutdown also be accomplishable from locations outside the control room. Thus, one must be able to go to the appropriate locations and operate and monitor the components and instruments necessary to obtain prompt hot shutdown of the plant. SRP sections 9.5.2 and 9.5.3 provide guidance and recommendations for installation of lighting and communications in these various plant areas.

NRC Comments

The applicant must demonstrate that his plant has been designed to meet this objective. The details are made available for staff review in the FSAR and usually conform to the SRP's guidelines. If they do not satisfy the SRP guidelines, the licensee is required to state which sections of the FSAR do not conform to the SRP and provide an otherwise acceptable basis for the design's conformance with the regulations.

II. How Proposed Requirements Would Improve Safety

In the particular instance of lighting and communications, many of the steps involved to achieve safe plant shut down require operator actions in various areas of the plant. Thus, operators must have the ability of reaching the area(s) involved and at the area(s) be able to perform the actions required and be able to communicate with the control room.

NRC Comments

This can be further clarified with a specific example from the review of Beaver Valley Unit 2. For a seismic event, Unit 2 can be shut down and cooled from the control room to the operating temperature of the Residual Heat Removal System (RHRS) which is 350°F. To activate the RHRS, under such a DBE analysis, an operator must go to the solid state protection system cabinet or the motor control center for the RHRS isolation valves Nos. MOV 701 A and B and MOV 702 A and B. To accomplish these actions, under the above condition, he will need to have sufficient lighting in all the access areas necessary to reach the area, enough lighting to perform his tasks and capability to communicate with the control room.

However, in the case of Beaver Valley Unit 2, the staff has not been able to determine from the FSAR and subsequent meetings with the applicant that the lighting and communication systems in the designated safety related and access areas will survive the event and are adequately designed so that operators can perform the necessary safety functions. We believe that if such analyses and designs are available for Beaver Valley Unit 2 and the information is made available to the staff that Beaver Valley Unit 2 will either be found to have lighting and communications systems which meet the guidelines of the SRP or will be justified on an otherwise appropriate basis.

The general objective of the staff's review of communications and lighting systems and procedures is to determine that the applicant for an OL has met its responsibility in this regard. As noted above, thus far the FSAR does not provide enough information to allow the staff to make such a determination.

III. Relation of New Requirement to Existing Regulatory Position

As noted previously SRP sections 9.5.2 and 9.5.3 provide guidance and recommendations for installation of lighting and communications in the various plant areas. The issue which the staff wants addressed is for the applicant to demonstrate that the lighting and communications systems provided at Beaver Valley Unit 2 are adequately designed to meet the regulations (GDC 34 & 19) so that nuclear plants be capable of safe shutdown under all modes of operation in response to design basis events.

NRC Comments

The staff requirement is not new, it has been in effect from before the first issue of the Standard Review Plan (SRP) NUREG-75/087 (11/24/75). This application by the staff is consistent with the practices of the SRP and staff positions previously approved. Therefore, this is an exception from Chapter 0514 per Section 046.

The staff has surveyed our past experience (Table 1) in the review of these systems and most applicants have accepted the SRP or have provided an otherwise acceptable bases.

TABLE 1

LIGHTING AND COMMUNICATION SYSTEMS

The following plants, have provided adequate lighting and communication systems in all necessary safety related areas which generally conform to the SRP guidelines. Lighting systems in safety related areas are identified as "Emergency Lighting Systems" and consist of a portion of the normal lighting system or a separately dedicated system. The emergency lighting systems are generally powered from a Class 1E AC and/or DC source or from seismically mounted battery packs with chargers powered from a Class 1E source. In any case, the systems are designed to function after a seismic event.

Communications systems in safety related areas generally consists of sound powered systems, backed by battery powered radio transceivers.

1. Millstone 3 4/
2. Hope Creek
3. Catawba
4. Susquehanna
5. Byron 1/2
6. Braidwood 1/2
7. Watts Bar
8. Callaway 1/2
9. Wolf Creek
10. Comanche Peak
11. Clinton 1/2
12. Grand Gulf 1/2
13. Palo Verde 1/2
14. Perry
15. Summer
16. WPS-2
17. Waterford 3
18. Seabrook
19. St. Lucie 2
20. LaSalle 1/2
21. Midland
22. Limerick 1/
23. Marble Hill 2/
24. WNP 3 2/
25. Shearon Harris 1/ 3/
26. River Bend 1/

1/ The applicant stated his design was such that all operations required for plant shutdown can be accomplished from the control room. There is no requirement to go outside the control room.

2/ These items were addressed. Plant construction delayed.

3/ Emergency lighting and communications provided in D/G room.

4/ The communication system is acceptable. Emergency lighting has been provided but levels are still under discussion.