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SNRC-1744

AUG 10 1990

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

SNPS Environmental Qualification Program Revision
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

Gentlemen:

LILCO has completed a revision to its Environmental Qualification (EQ) Program in accordance with 10 CFR 50.59 and a copy of the safety evaluation is attached. The revision permits (1) the deferral of EQ related preventive maintenance tasks and (2) the use of parts not qualified in accordance with 10 CFR 50.49 in applications where qualified parts would be used to withstand the harsh environmental conditions which could exist at an operating nuclear power plant.

The revision is technically justified for the following reasons:

- (1) Shoreham's reactor is defueled and all fuel is in the spent fuel storage pool,
- (2) LILCO is contractually prohibited from operating Shoreham,
- (3) NRC Confirmatory Order Modifying NPF-82 requires LILCO to obtain NRC approval prior to placing fuel back in the reactor,
- (4) LILCO's "Radiological Safety Analysis for Spent Fuel Storage and Handling" indicates that
 - (a) active systems for pool water makeup are not required and that passive cooling in the fuel pool is sufficient to maintain fuel cladding integrity and
 - (b) only two accidents previously analyzed in Chapter 15 of the SNPS USAR are relevant: Fuel-Handling Accident and Liquid Radwaste Tank Rupture.

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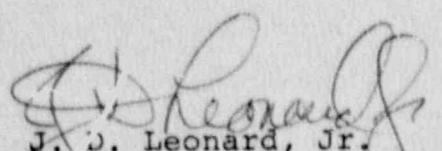
The NRC Staff has reviewed and concurs with the analysis and concludes that there is no credible accident for Shoreham in the defueled condition which could result in the release of radioactive materials to the environment in quantities that would require protective actions for the public.^{1/} Since Shoreham's spent fuel is in a low burnup condition and Shoreham is not operating, the plant electric equipment within the scope of 10 CFR 50.49(b) is in a mild environment as defined in 10 CFR 50.49(c). Additionally, for Shoreham in the defueled, non-operating condition, there is no credible accident which could alter the mild environment.

LILCO will track the process by which EQ related preventive maintenance tasks are deferred and the process of replacing EQ parts with non-EQ parts.

LILCO's determination of the acceptability of the above mentioned program revision applies only to Shoreham in its defueled condition and is not considered to be an irreversible step toward decommissioning in that environmental qualification of electric equipment important to safety can be re-established if fuel is ever to be placed back into the Shoreham reactor.

Should you have any questions or require additional clarification of the program revision please do not hesitate to call my office.

Very truly yours,



J. J. Leonard, Jr.

Vice President Office of Corporate Services
and Office of Nuclear

GJG/ap
Attachment

cc:	S. Brown	w/Attachment
	T. T. Martin	"
	B. Norris	"

1/ See NRC Safety Evaluation By The Office Of Nuclear Reactor Regulation Supporting Proposed Exemption And Amendment No. 6 To Facility Operating License NPF-82, July 31, 1990.

SCOPE OF SAFETY EVALUATION

The purpose of Revision 1 is to clarify the wording utilized in Attachment B, Section 1 and 2.

The purpose of this safety evaluation is to determine whether the modification of the Environmental Qualification Program (EQP) at (Continued on Sheet 2)

REFERENCES

See Sheet 2.

DISCUSSION

See Sheet 2.

CONCLUSION

The modification of the EQP as detailed in the discussion above does not result in an unreviewed safety question for the reasons presented in the discussion.

LEAD ENGINEER (PREPAKER)

DATE

REVIEWED BY

DATE

J. L. Linton / Chas Basch 8/10/90

E. B. Sals 8/10/90

APPROVALS

SECTION HEAD

DATE

Nuclear Analysis

DATE

J. L. Linton 8/10/90

R. J. Paccini 8-10-90

DIVISION MANAGER

DATE

DATE

E. W. Paccini 8/10/90

DATE

SCOPE OF SAFETY EVALUATION (Cont'd.)

Shoreham Nuclear Power Station (SNPS) as described in the last paragraph of the "Discussion" involves an unreviewed safety question. This evaluation recognizes the defueled non-operating condition of the plant and the storage of the slightly activated fuel load in the spent fuel storage pool (Reference 6). This defueled status is the basis of this evaluation. The modification revises the Environmental Qualification Report (EQR) to reflect the plant defueled condition (Attachment B). The Mechanical Environmental Conformance Report (MEECR) which is a subset of the EQR will be included in the Modified EQR. Should the plant status change in the future, a reconsideration of the EQR modification must precede this change.

REFERENCES

- 1) 10 CFR 50.49
- 2) 10 CFR 50.59
- 3) USAR Section 3.11,15
- 4) Regulatory Guide 1.89, Revision 1
- 5) Equipment Qualification Report (EQR), submitted to the USNRC under SNRC Letter 917, dated June 27, 1983.
- 6) Radiological Safety Analysis, NED 4170024 Revision 0
- 7) SMUD letter to NRC dated May 9, 1990 "Environmental Qualification Update"
- 8) Calculation No. C-RPD-529, Rev. 0, dated June 7, 1989
- 9) Calculation No. CCI-036590, Rev. 0, dated May 9, 1990, "Rosemount Transmitters 1152 and 1151 Qualified Life Extension"

DISCUSSION

10 CFR 50.49 mandates that each holder of a license to operate a nuclear power plant establish a program for qualifying electrical equipment important to safety that is relied upon to remain functional during and following design basis events to ensure:

- (i) the integrity of the reactor coolant pressure boundary,
- (ii) the capability to shut down the reactor and maintain it in a safe condition, and
- (iii) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the 10 CFR 100 guidelines.

Non-safety related electric equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions of safety related equipment and certain post accident monitoring equipment are also included under this scope of 10 CFR 50.49.

The program, commensurate with its importance and scope, involves a great deal of record keeping, personnel, supplier contact, surveillance, etc., for an operating plant or a plant intended for operation.

SNPS is a non-operating defueled plant and the current licensee (LILCO) and the future licensee (LIPA) do not intend to operate it. In a letter to the NRC, dated January 12, 1990, LILCO committed to not place nuclear fuel back in the reactor without prior NRC approval. On March 29, 1990, the NRC issued a confirmatory order prohibiting LILCO from placing any nuclear fuel into the reactor without prior approval from the NRC.

At present, all 560 fuel bundles have been removed from the reactor and are being stored in the spent fuel storage pool. It is important to understand that the Shoreham spent fuel is in a low burnup condition. The Shoreham Nuclear Power Station operated during low power testing at power levels not exceeding 5% of rated power. The effective burnup of the fuel is approximately 2 full power days. This results in an estimated total core wide heat generation rate of approximately 350 watts as of June 1990 (Reference 6). The estimated fuel heat load will decay to approximately 250 watts by June 1991. Figure 1 depicts the fuel heat load versus time. Based on this low heat generation rate, systems for active cooling are not required, and only minimal capacity demands on the demineralized water makeup, is required for pool makeup to handle evaporation.

A review of the regulatory requirements against the present condition of the plant indicates that the environmental qualification program with respect to Shoreham is no longer required. Physically and administratively the reactor is already shut down and maintained in a safe condition. There is no fuel in the reactor and the integrity of the reactor coolant pressure boundary has been ensured through the SLIP program. The reactor, at all times, is physically and administratively permanently maintained in this condition.

Based on the above, the spectrum of accidents postulated in Chapter 15 of the USAR applicable to the plant in the defueled condition are:

- a. Fuel Handling Accident (FHA) (Fuel Bundle Drop).
- b. Radwaste Tank Rupture.

The results of calculation (Reference 8) demonstrates that the Total Integrated Dose (TID) on the refueling deck for a six month period following a FHA will be 32 rads. The TID as a result of Radwaste Tank Rupture is considered insignificant compared to the FHA. Furthermore, the results of analysis (Reference 6) of the FHA indicate that the integrated offsite whole body and skin doses, with the Reactor Building Normal Ventilation System operational, are less than 0.03% of 10 CFR 100 limits. Consequently, there are no EQ equipment relied upon to mitigate or prevent the release of such an insignificant amount of radiation.

For the plant, since obtaining its 5% license and due to the limited power output during this period, i.e., 2 full power days, the TID for normal and

postulated accident operation is conservatively estimated at less than 100 rads. In comparison, this estimated radiation value is less than 10% of the lowest known radiation threshold of Class 1E equipment such as electronic devices.

Basically, radiation environments with a TID of $1.0E3$ Rads are considered as a radiation mild environment (Reference 4).

Review of the present condition of the plant indicates that the high energy sources capable of producing harsh environments are de-energized and will remain so. Therefore, the postulated accidents mentioned above will not result in significant increases in temperature, pressure or humidity.

The postulated environmental conditions based on the above accidents will not be significantly more severe than normal plant conditions. Therefore, the capability of the equipment and systems still in operation will not be challenged due to the postulated accidents, hence the environment can be classified as a mild environment. Additionally, the normal ambient temperatures within the Reactor Building have been significantly lower than postulated. A four (4) year monitoring of the Reactor Building secondary containment ambient temperatures at various elevations (Reference 9) has determined that the average temperature is approximately 79°F versus the 104°F postulated (Figure 2). This further lessens the environmental stresses imposed on equipment still in operation.

The evaluation would not be complete without a consideration of future requirements for the EQP and details of SNPS's EQP modification intent. To this end the change in the EQP will be primarily in its physical work. The EQP will continue to use its record keeping function to track all items and systems under its purview. Safety related systems that are still being used and require maintenance and replacement of components will no longer require spare parts to be purchased under the EQP, but all non EQ replacements will be recorded and tracked by the plant program. Components purchased will be reviewed on a case-by-case basis to ensure that suitable parts are purchased for their current purpose but not necessarily within the constraints of the EQP. The EQ PM-SAWS activities will be inactivated and tracked by the existing plant program.

The Shoreham plant condition is not unique. Rancho Seco plant is also a defueled plant with the fuel in the spent fuel pool. Sacramento Municipal Utility District (SMUD), licensee of the Rancho Seco plant, has notified the NRC of a similar modification to their EQ program. The NRC reviewed SMUD's submittal (Reference 7) and has no adverse comment on it (according to Mr. J. Delezonecki of SMUD licensing group).

SHOREHAM NUCLEAR POWER STATION

(1) CHECKLIST APPLICABLE TO: EQP Modification

(2) SAFETY EVALUATION - PART A

The item to which this evaluation is applicable represents: a change to the station or procedures as described in the USAR, or a test or experiment not described in the USAR.

Yes ☒ No ☐

If the answer to the above is "Yes", attach a detailed description of the item being evaluated and the affected section(s) of the USAR with the applicable changes indicated.

(3) SAFETY EVALUATION - PART B

Will this item require a change to the station Technical Specifications:

Yes ☐ No ☒

If the answer to the above is "Yes", identify the Specification(s) affected and/or attach the applicable page(s) with the change(s) indicated.

(4) SAFETY EVALUATION - PART C

As a result of the item to which this evaluation is applicable:

(A) Will the probability of an accident previously evaluated in the USAR be increased?

Yes ☐ No ☒

(B) Will the consequences of an accident previously evaluated in the USAR be increased?

Yes ☐ No ☒

(C) May the possibility of an accident which is different than any already evaluated in the USAR be created?

Yes ☐ No ☒

(D) Will the probability of a malfunction of equipment important to safety previously evaluated in the USAR be increased?

Yes ☐ No ☒

(E) Will the consequences of a malfunction of equipment important to safety previously evaluated in the USAR be increased?

Yes ☐ No ☒

(F) May the possibility of malfunction of equipment important to safety different than any already evaluated in the USAR be created?

Yes ☐ No ☒

(G) Will the margin of safety as defined in the bases to any Technical Specification be reduced?

Yes ☐ No ☒

If the answer to any of the preceding is "Yes", an Unreviewed Safety Question may be involved. Justify the conclusion that an Unreviewed Safety Question is or is not involved. Attach additional pages as necessary.

(5) LEAD ENGINEER: J. P. [Signature] / Chris Bard

DATE: 8/10/90

(6) REVIEWER: _____

DATE: _____

PART A REVIEW OF THE USAR

Applicable sections of the USAR have been reviewed and revised (Attachment A) to show the modification to the EQP (Attachment B). The modification of the EQP will apply while the plant is in the defueled status. Should the plant status change, a revision to the EQP must precede the plant's upgrade to operable status.

PART B REVIEW OF THE TECHNICAL SPECIFICATIONS

The EQP is not explicitly addressed in the Technical Specifications and therefore a change to the EQP does not require a change in the Technical Specifications.

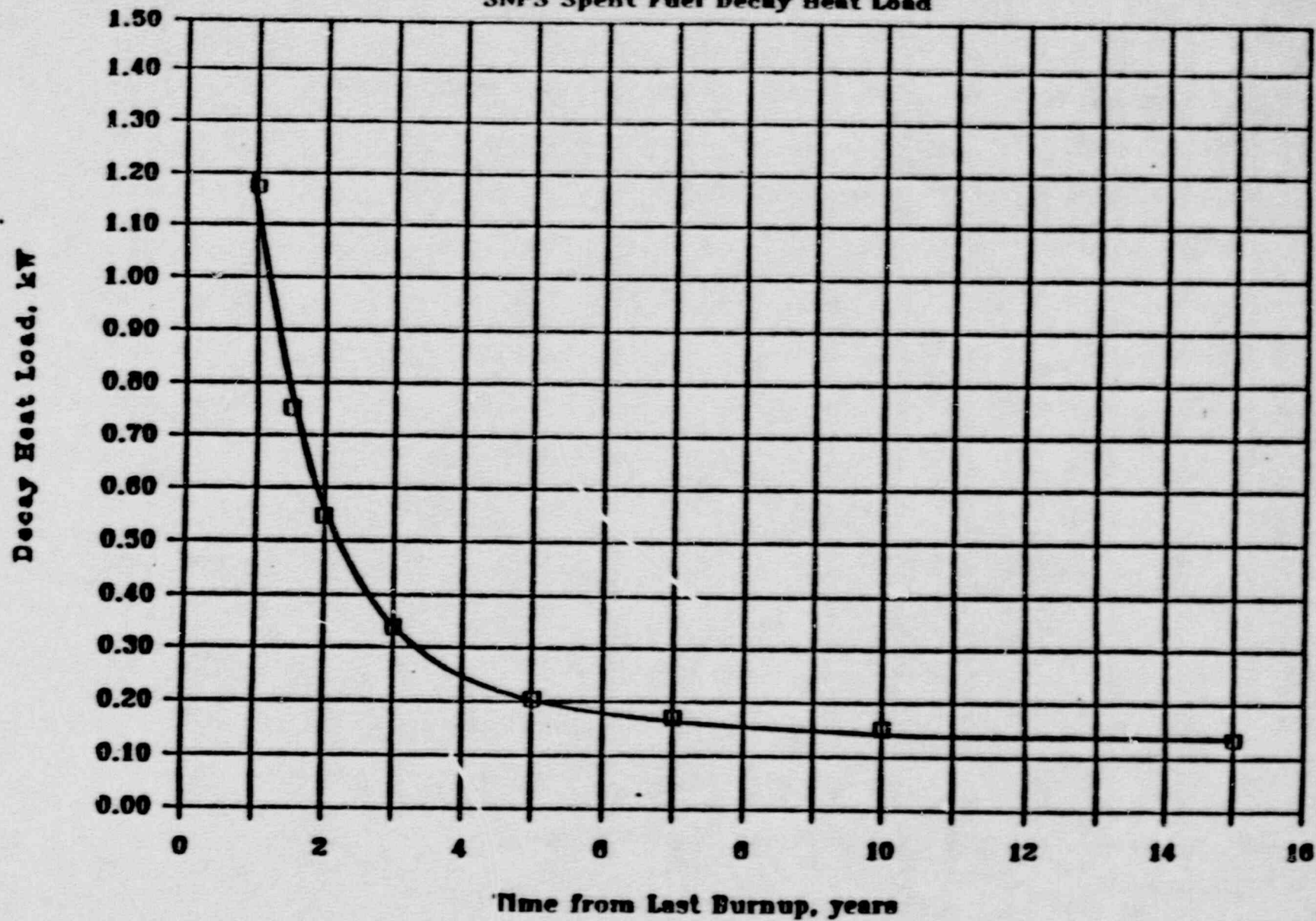
PART C UNREVIEWED SAFETY QUESTION EVALUATION

- (A) The probability of any accident previously evaluated in the USAR will not be increased by the modification of the EQP because most of these accidents cannot occur with the reactor defueled and those that can, do not involve EQ equipment as a cause of their occurrence.
- (B) The consequences of an accident previously evaluated in the USAR will not be increased since most accidents evaluated cannot occur with the reactor defueled and those that can have consequences that are well within the restrictions of 10 CFR 100. Consequently no EQ equipment is relied upon to prevent or mitigate the consequences of accidents.
- (C) The possibility of an accident (that can affect the radiation burden to the offsite public) different than those already evaluated in the USAR will not be created as a result of the modification of the EQP. A review of USAR Section 15, a consideration of the defueled condition, and an assessment of the impact of the EQP modification does not reveal any conditions or circumstances that could result in an accident different than those already described in the USAR.
- (D) The probability of malfunction of equipment important to safety will not be increased because of the modification of the EQP. There is no need for the EQ equipment while SNPS is in the defueled condition so that there is actually no EQ equipment to malfunction.
- (E) The consequences of a malfunction of equipment important to safety previously evaluated in the USAR will not be increased for the reasons given in (A), (B), (C), and (D).
- (F) The possibility of a malfunction of equipment important to safety different than any already evaluated in the USAR will not be increased for the reasons given in (A), (B), (C), and (D).

- (G) The margin of safety as defined in the bases to any technical specification will not be reduced because the EQP is not explicitly involved in the bases and for the reasons given in (A), (B), (C), and (D).

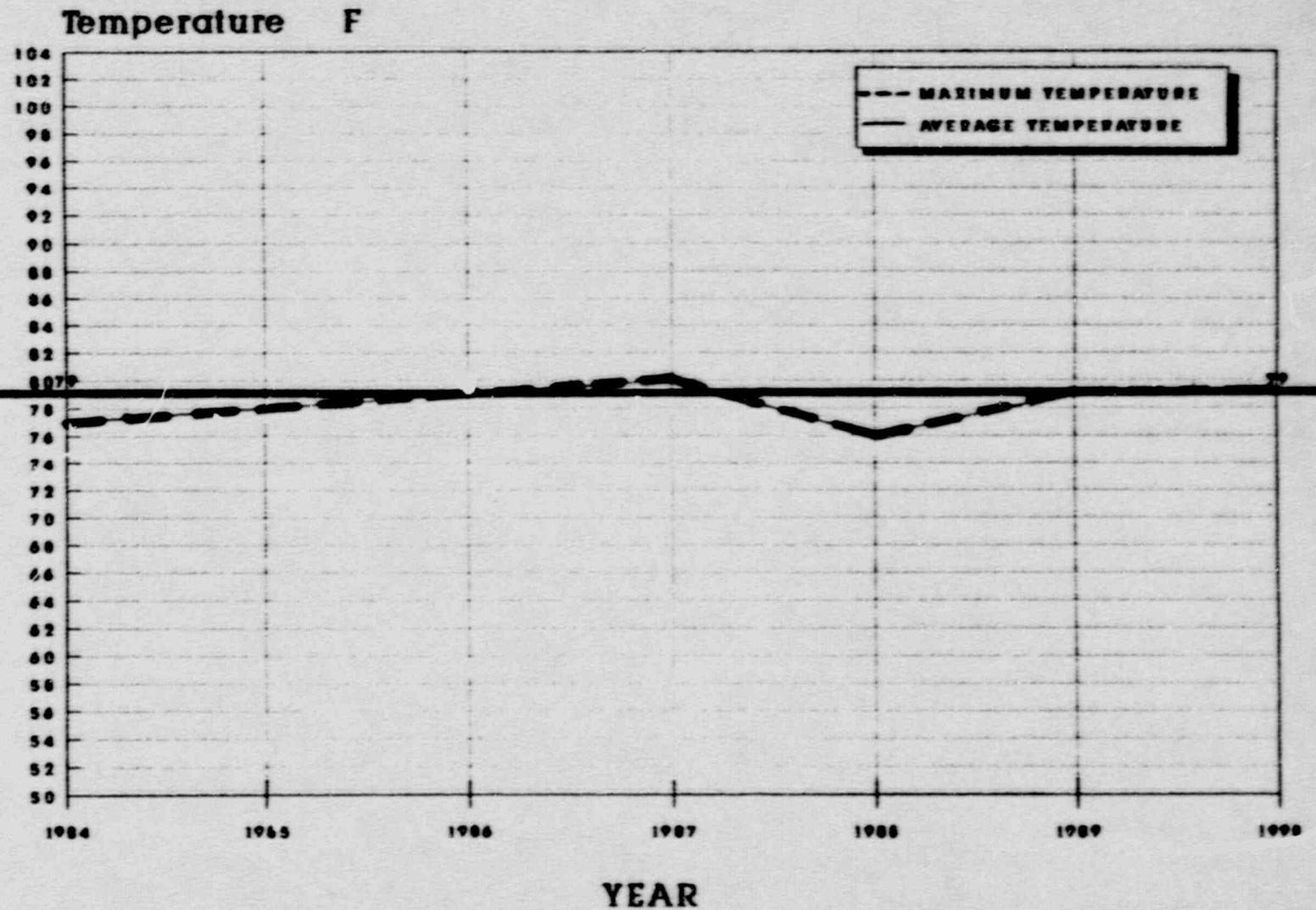
FIGURE - 1

SNPS Spent Fuel Decay Heat Load



AVERAGE TEMPERATURE IN THE SECONDARY CONTAINMENT FOR DURATION OF 1984-1990

Figure - 2



ATTACHMENT A

Revised USAR Sections

Note: Attachments A and B are provided for guidance only.
Actual USAR and EQR revisions wording will be resolved during
the voluntary change review cycle.

3.11 ENVIRONMENTAL DESIGN OF MECHANICAL AND ELECTRICAL EQUIPMENT

3.11.1 Electrical Equipment Environmental Qualification

3.11.1.1 Introduction

The Environmental Qualification Program for safety related electrical equipment for Shoreham Nuclear Power Station has been submitted to the Nuclear Regulatory Commission (NRC) as a separate document entitled: Environmental Qualification Report for Class 1E Equipment, Shoreham Nuclear Power Station, Unit 1.^(a) Originally submitted to the Commission under SNRC letter No. 576, subsequent revisions of the Environmental Qualification Report (EQR) were prepared and submitted, culminating in Revision 5, which was transmitted on June 27, 1983, via SNRC letter No. 917.

Program status was given in the Environmental Qualification Status Report (EQSR)^(a), Appendix F of the EQR discussed above. The EQSR includes detailed equipment scope and cross-index to the qualification requirements and test results. The EQSR is updated periodically.

3.11.1.1.1 Purpose

The purpose of the Electrical Equipment Environmental Qualification Program for Shoreham is to provide assurance that electrical equipment (safety related, Class 1E equipment and equipment required by Regulatory Guide 1.97) located in potentially harsh environments maintains functional operability when required to mitigate the consequences of a postulated accident or to bring the plant to a cold shutdown condition afterward. This assurance is provided by evaluating information contained in electrical equipment qualification documents to ensure operability requirements are met for the postulated environment to which the equipment may be subjected.

3.11.1.1.2 Scope

The equipment identified for environmental qualification includes:

1. Safety related, Class 1E electrical equipment located in potentially harsh environments and required to operate while in or after being subjected to such an environment
2. Sensing devices located in potentially harsh environments for display instruments that monitor the condition of the plant during and after postulated accidents as required by Regulatory Guide 1.97 (These devices are designated "RG" in the third column of the EQSR.)

SHOREHAM USAR

INSERT A

The purpose of the Electrical Equipment Environmental Qualification Program for Shoreham is to provide assurance that electrical equipment important to safety as defined by 10 CFR 50.49 located in potentially harsh environments maintains functional operability when required to mitigate the consequences of a postulated accident or to bring the plant to a cold shutdown condition afterward. Since the fuel has been removed and stored in the fuel pool, LOCA or HETB cannot occur (see Chapter 15), and there is no potential for creation of a harsh environment (i.e., the remaining design basis accidents discussed in Chapter 15 do not result in harsh environments). Based on these conditions, the Environmental Qualification Report (EQR) is revised to reflect the plant defueled condition.

CHAPTER 15

ACCIDENT ANALYSIS

15.1 GENERAL

Analytical Objective

The spectrum of accidents is divided into classes according to radiological consequences.

The Shoreham Updated Safety Analysis Report (USAR) evaluates the ability of the plant to operate without undue hazard to the health and safety of the public.

Previous chapters of this USAR provide the objectives, design bases, and description of each major system and component. Systems that have unique requirements arising from nuclear safety considerations are evaluated in sections with the heading "Safety Evaluation." The safety evaluations consider the effects of failures within the system. Systems that are essential to safety are capable of performing their functions in adverse circumstances.

The impact on core safety parameters of General Electric Co. (GE) Boiling Water Reactor (BWR) fuel, prepressurized up to three atmospheres, has been evaluated (References 1 through 4). The results of the Nuclear Regulatory Commission (NRC) review of these references is reported in the NRC's Safety Evaluation of the General Electric Topical Report--Fuel Rod Prepressurization. Consistent with the conditions of approval specified in this NRC review, supporting analyses for fuel prepressurized to three atmospheres is based on the following:

1. Loss-of-coolant accident (LOCA) analyses submitted in support of the plant safety analysis do not include the effects of prepressurization up to three atmospheres based on the staff finding that LOCA analyses performed with unpressurized fuel are more limiting, and these have already been reviewed by the staff and found acceptable.
2. The effects of prepressurization up to three atmospheres have not been included in the current analyses of limiting transients. In general, less than 0.01 change in the minimum critical power ratio (MCPR) was found for all events when prepressurized fuel was included in the analyses. Should the Shoreham transients be reanalyzed in the future for other reasons, the effects of fuel rod pressurization will be included.

SHOREHAM USAR

INSERT B

Introduction

As the reactor will not be operated and the fuel is not in the reactor, most of the USAR Chapter 15 events cannot occur.

Based on the plant defueled status the only applicable design basis events are:

- * Fuel Handling Accident (FHA)
- * Radwaste Tank Rupture

Report No. NED 4170024, Revision 0, "Radiological Safety Analysis" documents the results of both accidents listed above.

Calculation No. C-RPD-529, Revision 0, "Offsite and Inside Reactor Building Dose Rates Due to an FHA with Core Inventories as of 6/15/89" determines the results of radioactivity releases.

ATTACHMENT B

Revised Environmental Qualification Report (EQR)