Florida Power
CORPORATION

Crystal River Unit 3
Docket No. 50-302

June 26, 1992
3F0692-18

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

Subject: Change to Quality Program Description - Reactor Building Painting

References: A. FPC to NRC letter 3F1186-19, dated November 19, 1986
B. NRC to FPC letter 3N0287-15, dated February 9, 1987

Dear Sir:

In accordance with 10 CFR 50.54(a)(3), Florida Power Corporation (FPC) is submitting for NRC approval a proposed change to the Crystal River Unit 3 (CR-3) Quality Program Description (FSAR Section 1.7). FPC proposes to reduce the Quality Program commitment to comply with Regulatory Guide 1.54, Revision 0 for painting inside the Reactor Building (RB). The proposal was evaluated as involving a reduction in commitment because some systems and components within the RB will no longer be within the scope of the definition of Class I Service Level. Areas that remain in the Class I Service Level scope will continue to be painted in accordance with the existing program controlled by Requirement Outline (RO) RO-3147, Painting and Protective Coatings. FPC is providing the background for the proposed change, the methodology used to develop the revised program, and justification for its acceptability.

BACKGROUND

The present FSAR Clarification 1 to R.G. 1.54 on page 1-136 describes the classification of Class I Service Level for CR-3 as "... those systems and components which may be exposed to a LOCA atmosphere." FPC established this definition in 1987 when the RB painting program for CR-3 was revised using RO-3147, Revision 2 to control the program. This RO was submitted to the NRC in Reference A and Reference B found that revised program acceptable.

FPC's objective is to improve the condition of the coatings within the Reactor Building for material preservation and appearance. The current FPC program for RB coatings is not effectively supporting this objective. This is primarily due to the broad application of stringent requirements needed to assure coatings will not fail when exposed to LOCA conditions. While all the areas of the RB can be

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expected to be exposed to the LOCA conditions, only those RB areas which can communicate with the ECCS emergency sump are of concern for post-LOCA mitigation. RB areas which can not communicate with the emergency sump should be permitted to have coating requirements less stringent. Consequently, FPC proposes to redefine where Class I Service Level will be applied. Class I Service Level will apply to items in, or to be installed in portions of the RB that have been determined to be either a "near field" or a "far field" area. These "fields" have been established by FPC based upon an analysis of potential coatings failures.

This change in Quality Program commitment will result in two levels of protective coatings control for the RB. Both levels of control will be described in Requirement Outline RO-3147, Painting and Protective Coatings. The proposed change in Class I Service Level provides a reasonable assurance that CR-3 can continue to operate in a manner that protects the health and safety of the public. FPC has reached this conclusion based upon the methodology used to develop the "near field" and "far field" evaluation.

METHODOLOGY FOR EVALUATION OF COATINGS FAILURE

To preclude the failure of an excess amount of protective coating during an accident from blocking the ECCS emergency sump, FPC developed an analysis to determine (1) the localized flow velocities within the RB as a result of worst case ECCS and Reactor Building Spray (BS) System flows and (2) the flow velocities necessary to transport failed protective coating particles. Also as a part of the analytical effort, FPC quantified the total areas of failed protective coatings which could either free fall directly onto the emergency sump mesh or be transported to the emergency sump resulting in ECCS sump blockage.

The portion of the RB where failed coatings could fall directly onto the sump are identified as "near field." The "far field" are areas where the transport of the failed coatings could result in the coating particles contributing to ECCS sump blockage. The "near field" is only on the 95 ft elevation of the RB. The "far field" consists of several areas on all elevations of the RB. Attachment 2 contains sketches which show the locations of the "fields." This analysis shows that failure of protective coatings outside those areas regarded as the "near field" and "far field" is not a concern for CR-3 because the fluid flow velocities are inadequate to transport the failed coatings to the ECCS sump.

The analysis is based on conservative assumptions which include:

1. All coating particles are the minimum size (¼" x ¼") which could block the sump mesh. Larger particles would not be as easily transported by the recirculation flow.

2. No overlap of the particles on the sump screen.

3. Minimum coating thickness of 5-6 mils to assure maximum "slideability" of the particle as a result of minimum particle weight.

4. A recirculation fluid temperature of 150°F to assure maximum particle buoyancy and minimum flow velocity required for particle transport.

ACCEPTABILITY OF METHODOLOGY

FPC has an established plan for controlling the use of protective coatings within the RB. Maintenance of the entire RB to the stringent requirements of this plan has proved to be very difficult involving significant resources and unnecessary personnel exposure. The results of our efforts using the overly stringent requirements have not satisfactorily met our objectives to improve the overall conditions in the Reactor Building. As an extensive analytical effort has shown, those areas located outside the "near field/far field" are not contributors to the potential failure of the ECCS emergency sump to perform its function. Failed coatings outside of the "near field" can not fall directly onto the RB emergency sump. Likewise, failed coatings outside the "far field" can not be transported to the sump because the flow velocities during LOCA recovery will be inadequate to move enough coatings to clog it.

The condition of the RB surfaces, systems, and components outside of the "near field/far field" will be maintained and improved considering economics and ALARA concepts. FPC will control these areas with revised requirements in RO-3147 and assure that high quality coatings are still applied to surfaces.

As required by the regulations, Attachment 1 contains all FSAR pages affected by this change and the reasons for this change. The established management controls in RO-3147 lead FPC to conclude that the revised coatings program continues to satisfy the criteria of 10 CFR 50, Appendix B.

Sincerely,

P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB/JWT

Attachments

xc: Regional Administrator, Region II
Senior Resident Inspector
NRR Project Manager

PROPOSED CHANGE TO THE QUALITY PROGRAM DESCRIPTION FSAR SECTION 1.7

1. Description of Proposed Change:

Revised Clarification 1 to the requirements of NRC Regulatory Guide 1.54 to redefine Class 1 Service Level. The revised definition is based on Florida Power Calculation MS-89-0049, Evaluation Analysis of Potential Coating Failures, Rev. 0, 2/23/90. The clarification will result in two levels of protective coatings control for Reactor Building (RB) equipment. Both levels of control will be described in Requirement Outline (RO) RO-3147.

2. Reason for the Proposed Change:

If an excess amount of protective coating were to fail during an accident and enter the RB sump, an unacceptable amount of blockage of the wire mesh which covers the sump could result in a loss of Low Pressure Injection and Reactor Building Spray during post-LOCA recovery. Analysis determined 1) the localized flow velocities within the RB as a result of worst case ECCS and BS flows and 2) the flow velocities necessary to transport failed protective coating particles. In addition, particles which could free fall directly onto the sump mesh were considered. A second analysis quantified the total areas of failed protective coatings which could either fall directly onto the sump or be transported to the sump and not result in a loss of sump operability.

Based on the analyses, the portions of the RB where failed coatings could fall directly into the sump are identified as the "near field." The areas where the transport of the failed protective coatings could result in the particles contributing to sump blockage are identified as the "far field."

The analyses revealed that failure of protective coatings outside the "near field" and/or "far field" is not a concern. Failed coatings outside of the "near field" cannot fall directly into the RB sump. Failed coatings outside of the "far field" cannot be transported to the RB sump because flow velocities during LOCA recovery will be inadequate to transport coatings large enough to cause clogging. Qualification of the protective coatings per RO-3147 within the identified RB "near fields" and "far fields" will result in the elimination of sump blockage concerns as a result of failed RB protective coatings. Applying qualified coatings to areas beyond the "far field" does not enhance the safety of the plant since those coatings would not be transported to the sump if failure occurred.

3. Classification of Commitment:

The Proposed Change does involve a reduction in a FPC Regulatory Commitment.

4. Basis for Determination of Classification of Commitment:

The current Quality Program Description classifies the entire RB as containing areas which are subject to the LOCA atmosphere. This proposed change is a reduction since there will be RB areas which will be painted to less stringent requirements in that some systems and components are no longer within the scope of the definition of Class I Service Level.

Qualified coatings in the "near field" and "far field" will not result in post-LOCA coatings failure. Although the post-LOCA environment may result in the failure of unqualified coatings outside the identified "fields," their failure would neither result in direct sump screen coverage, nor would they be transported to the RB sump. Transport to the RB sump will not occur as a result of localized flow velocities within the RB which are insufficient to overcome frictional forces. Protective coatings for systems and components in the Reactor Building that do not fall within the "near field" or "far field" will still be controlled by the revised RO-3147 Project Specification.

FSAR SECTION 1.7 TEXT CHANGES

NRC Regulatory Guide 1.54 - "Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants" (Rev. 0, 6/73) - Endorses ANSI N101.4-1972.

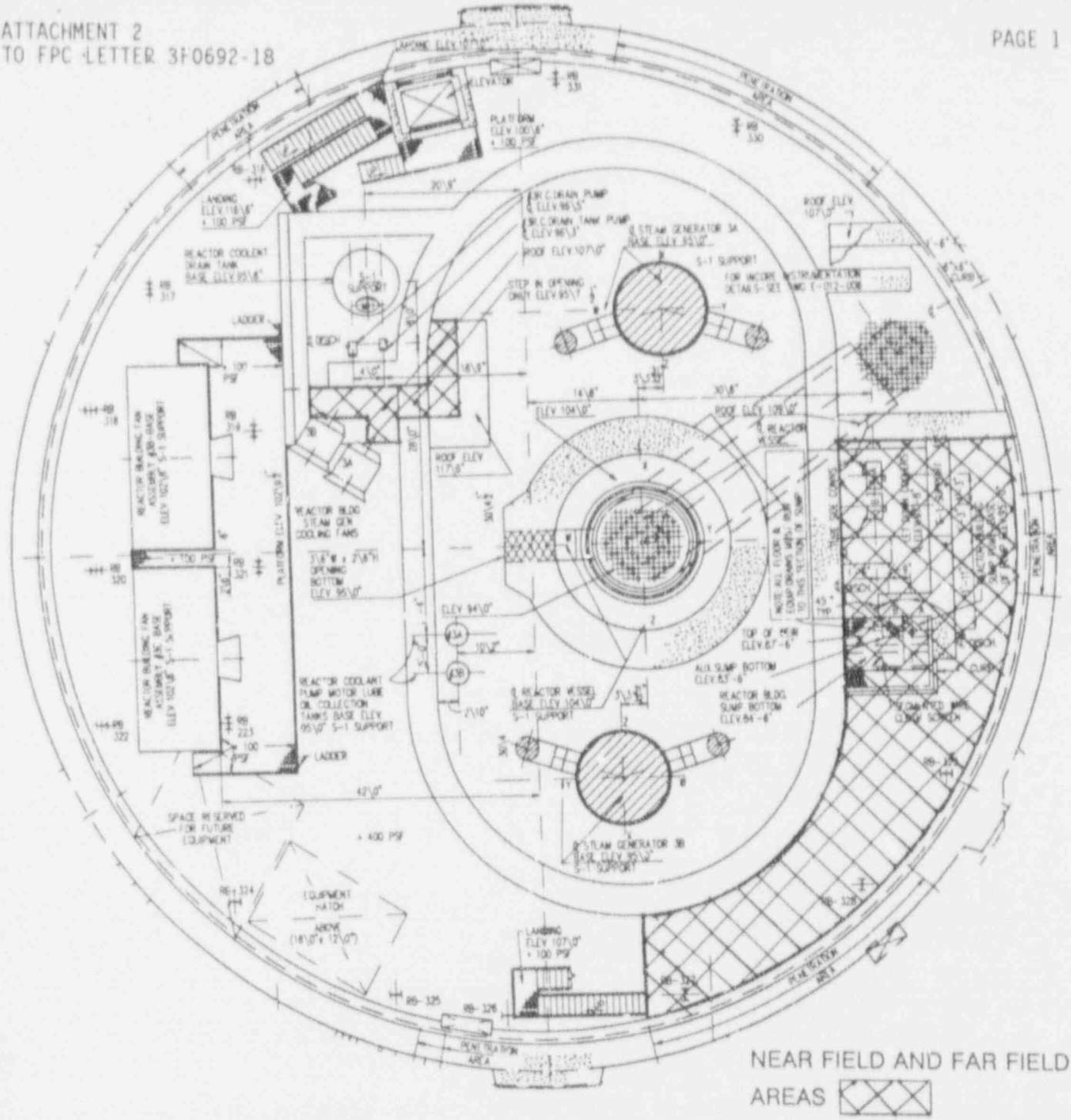
The Quality Program meets the general intent of this guide for portions of the reactor building where protective coating failure could result in the loss of Reactor Building emergency sump operability. The program concerning protective coatings is further delineated in the project specification for Painting & Protective Coatings, RO-3147, and all appropriate plant procedures.

ANSI N101.4-1972 was written to address the protective coating requirements for the construction phase of nuclear power plants. It does not adequately address the more frequently required small amount of painting that is necessary during the operational phase of a plant's life.

RO-3147 meets the requirements of ANSI N101.4-1972 with the following clarifications.

1. REQUIREMENT: Section 1.2.2.1 - "Class I Service Level applies to those systems and components of nuclear facilities. . . ."

   CLARIFICATION: FPC considers "Class I Service Level" to be those systems and components which may be exposed to a LOCA atmosphere ~~(i.e., those items in, or to be installed, inside the primary containment building). This definition of Class I Service Level is consistent with the ASTM Committee D.1 "Manual of Coating Work for Light Water Nuclear Power Plant Primary Containment & Other Safety Related Facilities."~~ where failure of the protective coating could have a detrimental effect on plant safety. This definition applies to items in, or to be installed in portions of the primary containment building. The portions of the primary containment where Class I service is necessary is identified in "Evaluation Analysis of Potential Coating Failures" (FSAR Section 1.11, Reference 2) This evaluation establishes "near field" and "far field" locations within the containment where failure of the protective coatings could result in Reactor Building emergency sump blockage and possibly affect emergency sump operability post-LOCA. The "near field" location is an area where failed protective coatings could fall directly into the emergency sump. "Far field" locations are areas where fluid velocities during LOCA recovery are capable of transporting failed protective coatings to the emergency sump and possibly result in sump blockage. RO-3147, Section 3:02 details the requirements for these items and is consistent with ANSI N101.2-1972.

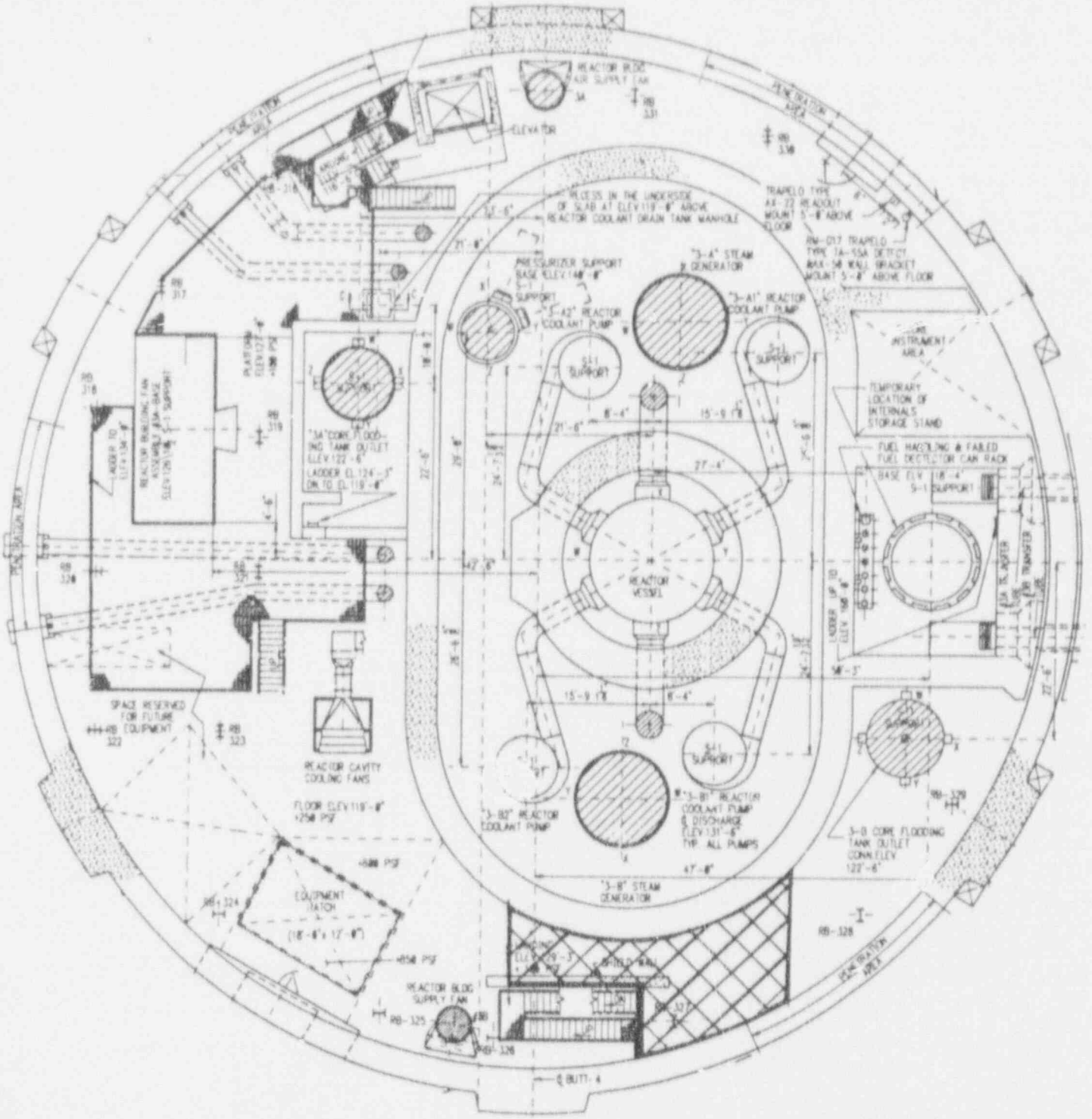


NEAR FIELD AND FAR FIELD AREAS

REACTOR BUILDING 95 FOOT ELEVATION

NOTES: 1) CROSS HATCHING INDICATES AREAS WHERE FAILED COATINGS COULD FALL DIRECTLY INTO THE SUMP OR LOCAL FLOW VELOCITIES EXCEED CRITICAL FLOW VELOCITIES FOR THE FAILED COATINGS.

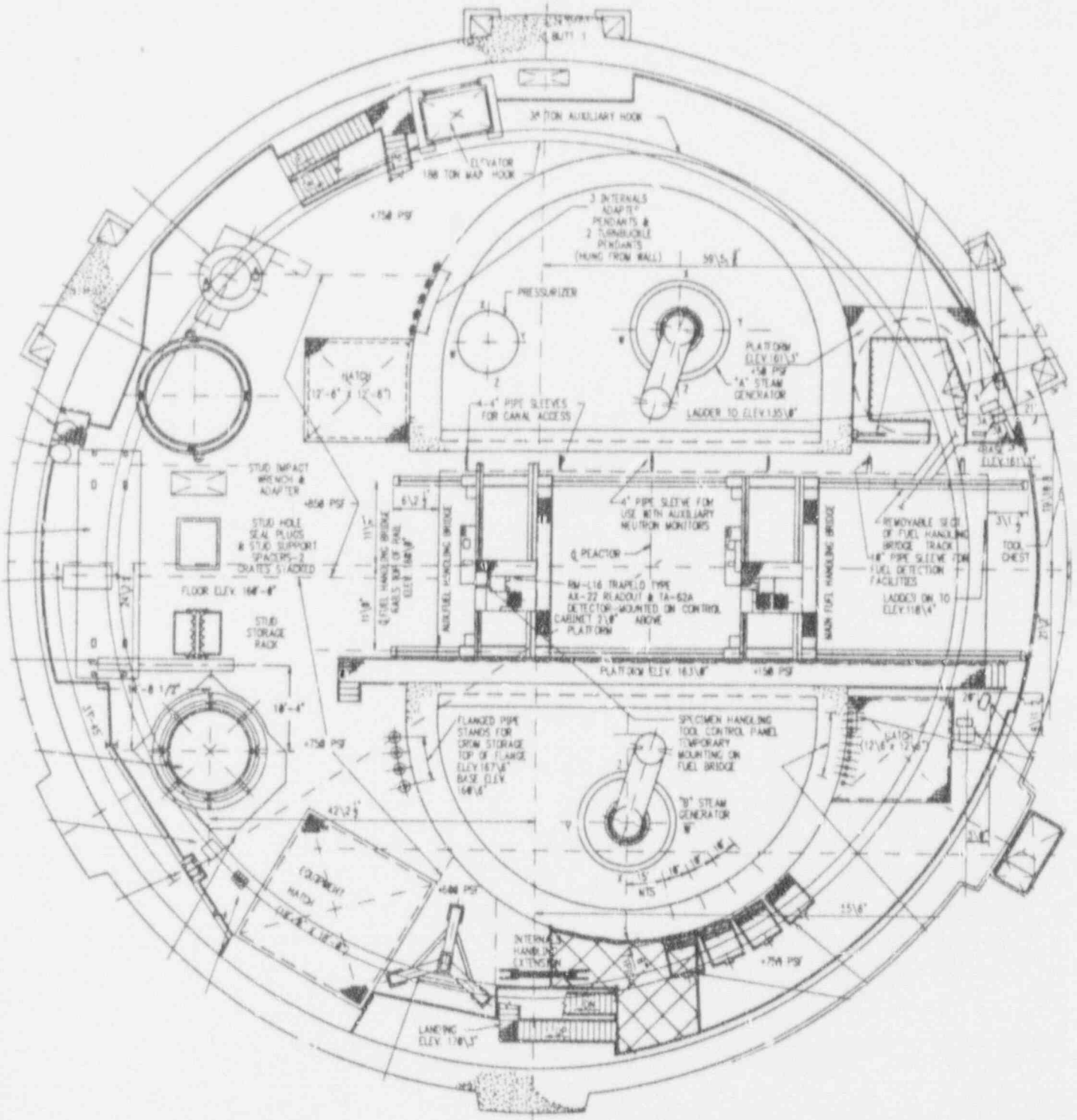
2) CROSS HATCHED AREA NEAR OPENING IN D-RING IS NOT A CONCERN BECAUSE FLOW VELOCITIES IN THE AREA BETWEEN THE D-RING OPENING AND THE SUMP ARE INSUFFICIENT FOR PARTICLE TRANSPORT.



FAR FIELD AREA

REACTOR BUILDING 119 FOOT ELEVATION

NOTE: CROSS HATCHING INDICATES AREA EXCEEDING CRITICAL FLOW VELOCITIES FOR FAILED COATING.



FAR FIELD AREA

REACTOR BUILDING 160 FOOT ELEVATION

NOTE: CROSS HATCHING INDICATES AREA EXCEEDING CRITICAL FLOW VELOCITIES FOR FAILED COATING.