



April 7, 2010
NRC:10:032

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Response to U.S. EPR Design Certification Application RAI No. 340, Supplement 1

Ref. 1: E-mail, Getachew Tesfaye (NRC) to Martin Bryan, et al (AREVA NP Inc.), "U.S. EPR Design Certification Application RAI No. 340 (4094), FSAR Ch. 6," January 29, 2010.

Ref. 2: E-mail, Martin Bryan (AREVA NP Inc.) to Getachew Tesfaye (NRC), "Response to U.S. EPR Design Certification Application RAI No. 340, FSAR Ch. 6," March 1, 2010.

In Reference 1, the NRC provided a request for additional information (RAI) regarding the U.S. EPR design certification application (i.e., RAI No. 340). In Reference 2, AREVA NP, Inc. provided a technically correct and complete response to 1 of the 5 questions in this RAI. Technically correct and complete responses to 2 of the remaining 4 questions in RAI No. 340 are enclosed with this letter.

The following table indicates the respective pages in the response document that contain AREVA NP's response to the subject questions:

Question #	Start Page	End Page
RAI 340 — 06.02.01-54	2	10
RAI 340 — 06.02.01-56	11	11

The schedule for a technically correct and complete response to Question 06.02.01-53 is unchanged and provided below. The response to Questions 06.02.01-57 is dependent upon the results of ongoing GSI-191 head loss testing and evaluations which will demonstrate sump strainer performance. Because of the ongoing activities, AREVA NP is not providing a response at this time. The schedule for a technically correct and complete response to Question 06.02.01-57 has been revised and is provided below.

Question #	Response Date
RAI 340 — 06.02.01-53	May 12, 2010
RAI 340 — 06.02.01-57	July 15, 2010

AREVA NP considers some of the material contained in the enclosure to be proprietary. As required by 10 CFR 2.390(b), an affidavit is enclosed to support the withholding of the information from public disclosure. The enclosed response also contains security-related

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sensitive information that should be withheld from public disclosure in accordance with 10 CFR 2.390. A public version of the response document is provided with the proprietary and security-related sensitive information redacted.

If you have any questions related to this submittal, please contact me by telephone at 434-832-2369 or by email at sandra.sloan@areva.com.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Sloan".

Sandra M. Sloan, Manager
New Plants Regulatory Affairs
AREVA NP Inc.

Enclosures

cc: G. Tesfaye
Docket No. 52-020

AFFIDAVIT

State of Georgia

County of Cherokee

MARK J. Burzynski personally appeared before me and took an oath that the following is true and correct:

1. My name is Mark J. Burzynski. I am Manager, Product Licensing for AREVA NP Inc. and as such I am authorized to execute this Affidavit.
2. I am familiar with the criteria applied by AREVA NP to determine whether certain AREVA NP information is proprietary. I am familiar with the policies established by AREVA NP to ensure the proper application of these criteria.
3. I am familiar with the AREVA NP information contained in letter NRC:10:032, "Response to U.S. EPR Design Certification Application RAI No. 340, Supplement 1," and referred to herein as "Document." Information contained in this Document has been classified by AREVA NP as proprietary in accordance with the policies established by AREVA NP for the control and protection of proprietary and confidential information.
4. This Document contains information of a proprietary and confidential nature and is of the type customarily held in confidence by AREVA NP and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in this Document as proprietary and confidential.
5. This Document has been made available to the U.S. Nuclear Regulatory Commission in confidence with the request that the information contained in this Document be withheld from public disclosure. The request for withholding of proprietary information is made in accordance with 10 CFR 2.390. The information for which withholding from disclosure is

requested qualifies under 10 CFR 2.390(a)(4) "Trade secrets and commercial or financial information".

6. The following criteria are customarily applied by AREVA NP to determine whether information should be classified as proprietary:

- (a) The information reveals details of AREVA NP's research and development plans and programs or their results.
- (b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service.
- (c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for AREVA NP.
- (d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for AREVA NP in product optimization or marketability.
- (e) The information is vital to a competitive advantage held by AREVA NP, would be helpful to competitors to AREVA NP, and would likely cause substantial harm to the competitive position of AREVA NP.

The information in the Document is considered proprietary for the reasons set forth in paragraphs 6(b) and 6(c) above.

7. In accordance with AREVA NP's policies governing the protection and control of information, proprietary information contained in this Document has been made available, on a limited basis, to others outside AREVA NP only as required and under suitable agreement providing for nondisclosure and limited use of the information.

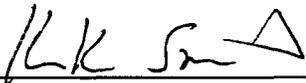
8. AREVA NP policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.



(Signature of Affiant)

Sworn to or affirmed and subscribed before me this 7th day of April, 2010.



(Signature of Notary)

KENNETH SMITH
NOTARY PUBLIC, CHICKSEE COUNTY, GEORGIA
MY COMM. EXPIRES 12/31/2013

Notary Public, State of Georgia

**Response to
Request for Additional Information No. 340, Supplement 1**

01/29/2010

**U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 06.02.01 - Containment Functional Design
Application Section: 06.02.01**

**QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects)
(SPCV)**

Question 06.02.01-54:

Figure 9-7 of Technical Report ANP-10299, Revision 1 presents the GOTHIC nodalization diagram for the sample LOCA containment analysis. The containment design is complex, with many vertical and horizontal dividing walls. It contains approximately 150 subcompartments. There is no description in the Report of how the containment space, including subcompartments, was assigned to the 30 nodes represented in the calculations.

Provide a description of the dividing boundaries used for development of the multi-node GOTHIC model. This could be done, for example, in terms of an overlay of the GOTHIC nodalization and the various containment drawings as was presented at the October 23, 2009 Audit.

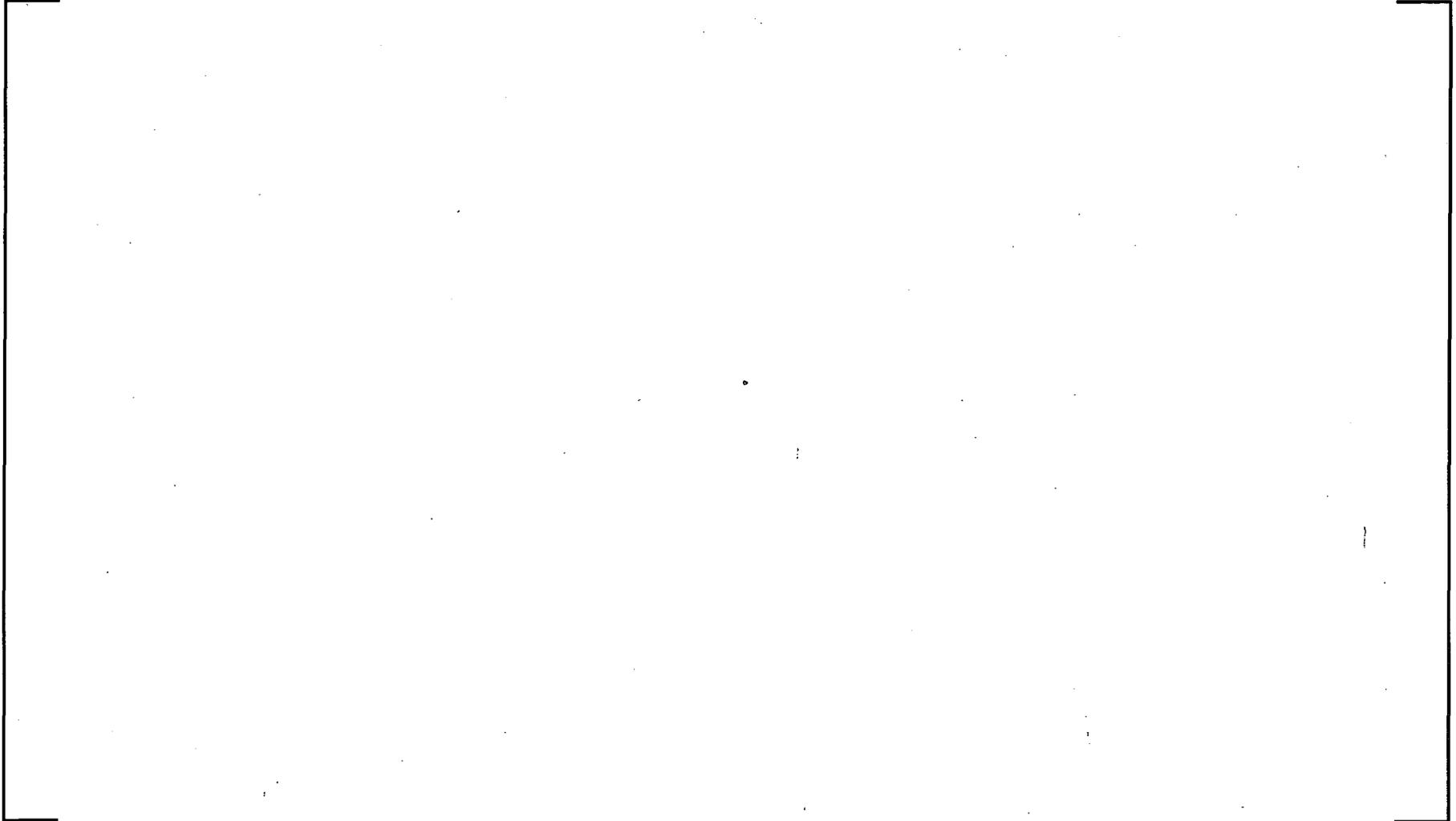
Response to Question 06.02.01-54:

Figure 06.02.01-54-1 through Figure 06.02.01-54-8 provide an overlay of the containment boundaries used in the GOTHIC nodalization.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Figure 06.02.01-54-1—Reactor Building Plan at Elevation -8 Feet



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Figure 06.02.01-54-2— Reactor Building Plan at Elevation +5 Feet



Figure 06.02.01-54-3— Reactor Building Plan at Elevation +17 Feet

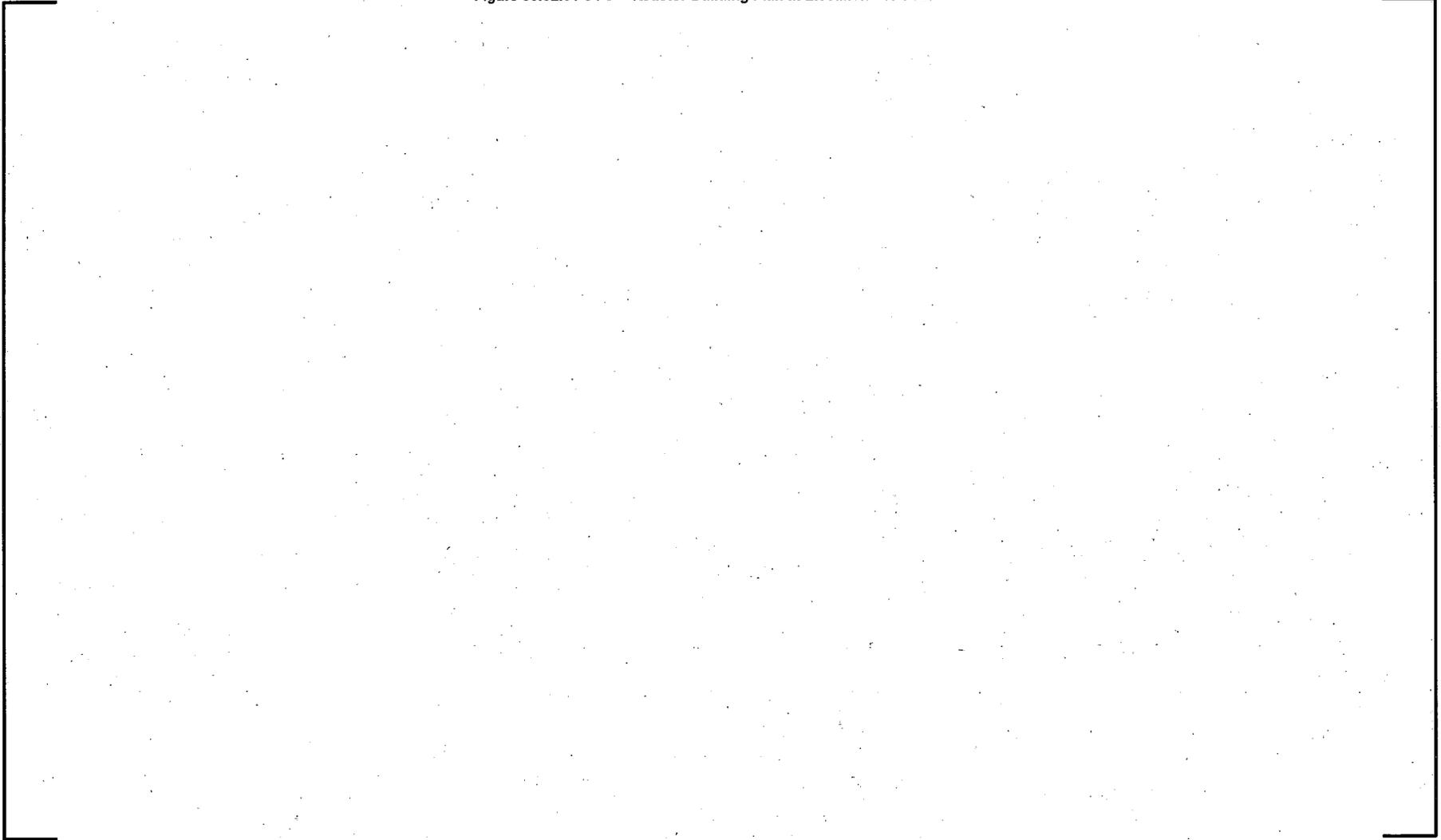


Figure 06.02.01-54-4— Reactor Building Plan at Elevation +29 Feet

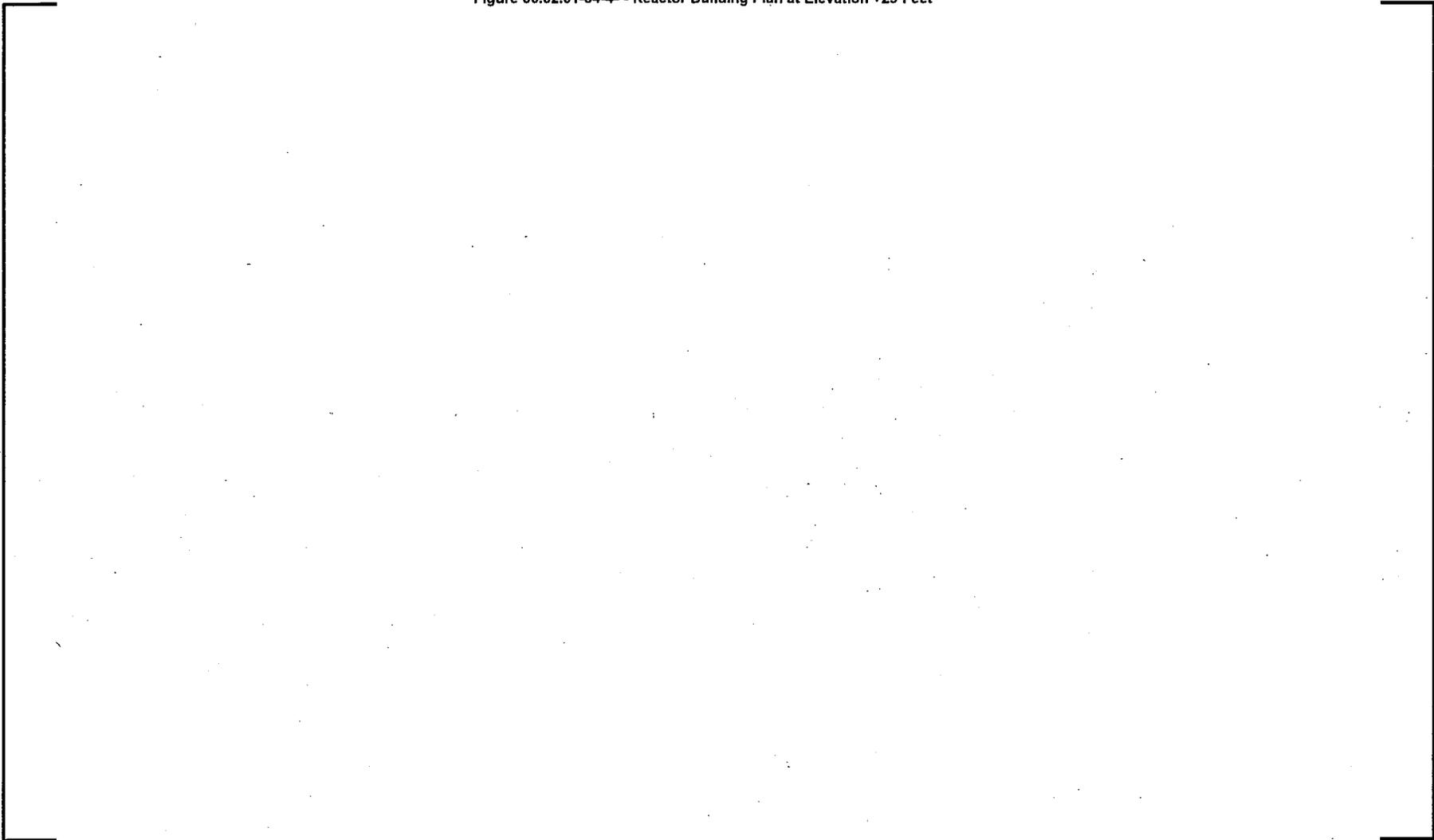
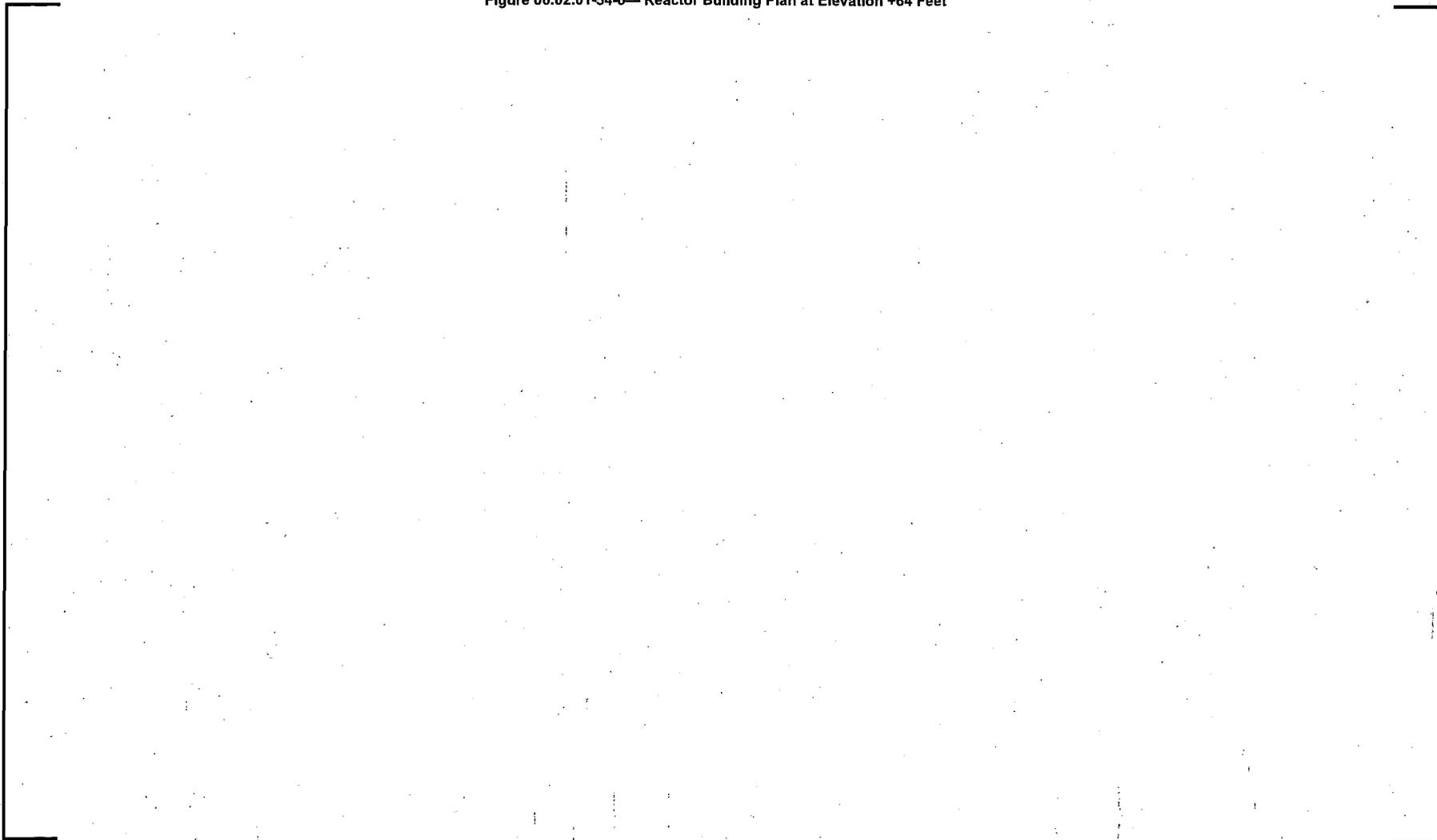


Figure 06.02.01-54-5— Reactor Building Plan at Elevation +45 Feet



Figure 06.02.01-54-6— Reactor Building Plan at Elevation +64 Feet



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Figure 06.02.01-54-7— Reactor Building Plan at Elevation +79 Feet



Figure 06.02.01-54-8— Reactor Building Plan at Elevation +94 Feet



Question 06.02.01-56:

In LOCA calculations air inflow from the containment into the RCS is blocked. It is stated, that this step is conservative and results in higher containment temperature and pressure. There is no mention of the basis for this conclusion. Inflow of air from the containment to the RCS can affect heat transfer in the RCS, for example, condensation. Are there calculations available with the airflow not blocked showing the effect of the air on heat transfer in the RCS?

Provide justification for blockage of air flow from the containment into the RCS in LOCA containment calculations. Provide the basis that establishes that the assumption associated with air flow blockage is conservative.

Response to Question 06.02.01-56:

The RELAP5/MOD2-B&W and GOTHIC computer codes are not coupled. A RELAP Time Dependent Volume (TMDPVOL) is used as the ultimate sink in the mass and energy calculation. The break is connected to the TMDPVOL via a junction, and RELAP control variables are used to integrate the mass and energy at the junction. Air inflow from the containment TMDPVOL into the reactor coolant system (RCS) is a negative term in the control variable and results in a net reduction of mass and energy from RELAP into GOTHIC.

Scoping studies were conducted as part of the methodology development that allowed air inflow from the containment to the RCS. Reverse flow was not observed until after blowdown when the RCS pressure approaches the containment pressure. The limiting large break loss of coolant accident (LBLOCA) containment response in the U.S. EPR FSAR is a hot leg break (69.7 psia at 26.6 seconds). Therefore, air inflow from the containment to the RCS does not impact the limiting containment pressure.

For the cold leg breaks, the long-term containment pressure peaks can potentially be affected by air inflow. The impact from inflow is limited to the period after end of blowdown and before the activation of the boiling pot model. After the boiling model is activated, the methodology directs steam to the break via the path which produces the minimum amount of mixing with emergency core cooling system (ECCS) injection water. Scoping studies show that inflow from the containment during this time cause oscillatory behaviors in RCS that enhanced the condensation potential in the coolant loops. Therefore, for containment pressure analyses, it is conservative to block air inflow and minimize the coolant loop condensation potential.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.