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October 11, 1984
RBG- 19,176
File No. G9.5, G9.8.6.2

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

River Bend Station - Unit 1
Docket No. 50-458

Enclosed is Gulf States Utilities Company's (GSU) response to the Safety Evaluation Report (SER) Confirmatory Item #16 (Section 6.2.3) regarding secondary containment pressure following a loss-of-coolant accident (LOCA). The analysis includes revised time delays for diesel start and fan speed-up. Although the time to reach the building design pressure increased, the dose analysis remains within the limits of 10CFR100.

The enclosed River Bend Station (RBS) Final Safety Analysis Report (FSAR) pages and figures have been revised to reflect the above analysis and will be incorporated in a future amendment.

Sincerely,

J. E. Booker

J. E. Booker,
Manager-Engineering
Nuclear Fuels & Licensing
River Bend Nuclear Group

JEB/WJR/JWL/je

Enclosures

B001
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operation to ensure that the actual leak rate does not exceed this value.

During normal operation, the annulus inleakage approximately equals the exhaust capability of the annulus pressure control system. The exhaust air is not diverted through the SGTS unless it is radioactive. If the leak rate is actually less than 2,000 cfm, the initial pressure is at a value lower in magnitude than -3 in W.G. (e.g., -2 in W.G.).

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Two full-capacity SGTS exhaust fans are provided, each powered by a separate standby diesel generator. The DBA is assumed to occur with the annulus at its maximum normal operating conditions, namely, -3 in W.G. and 2,000 cfm inleakage. If a DBA occurs along with loss of offsite power and if a standby diesel generator also fails to start, the other standby diesel generator is available approximately 10
30 sec later (i.e., when the generator is up to speed). The SGTS fan then receives power from this standby diesel
38 generator and is available within 30 sec after the DBA (i.e., when the fan is up to speed). The design flow rate
INSERT of the SGTS in the post-accident mode is 12,500 cfm, which is equal to the maximum estimated flow rate being exhausted from the annulus and the shielded compartments in the auxiliary building during a DBA.

6.2.3.2.2 Annulus Mixing System

The annulus mixing system is provided for a thorough mixing of any leakage from the primary containment to the annulus, while the annulus is being maintained at a pressure of -0.50 in W.G. by the SGTS. Upon receipt of a LOCA or high radiation signal from the radiation monitor(s), the annulus mixing system is automatically actuated by starting the annulus mixing fans. For a detailed description of this system and its components, see Section 9.4.6.

6.2.3.2.3 Fuel Building Charcoal Filtration System

The fuel building charcoal filtration system is designed to limit the release of airborne radioactivity to the environment and maintain the building at a pressure of -0.25 in W.G. Regulatory Guide 1.52 is used as a basis of design for the fuel building charcoal filtration system. See Table 6.5-1 for a compliance summary. For a detailed description of the fuel building charcoal filtration system and its components, see Section 9.4.2

Insert for Page 6.2-59

30 sec plus 8 sec for the fan to get up to speed

The assumptions used in the pressure transient analysis for the annulus and the auxiliary building are as follows:

1. External wind speed is zero.

2. Offsite power is lost simultaneously with LOCA.

3. The single active failure is the failure of one standby diesel generator to start.

4. System frictional pressure losses are 21.5 in W.G. at 12,500 cfm flow.

5. The SGTS centrifugal exhaust fan characteristic is shown on Fig. 6.2-59.

6. The annulus exhaust rate at a 21.5 in W.G. pressure loss is 2,500 cfm and the auxiliary building exhaust rate is 10,000 cfm, with the SGTS exhaust
38 fan operating at 30 sec.

Results of the analysis of the annulus and the auxiliary building indicate that a pressure of -0.25 in W.G. is
203 attained in 161 and 54 sec, respectively.
111

The assumptions used in the pressure transient analysis for the fuel building are as follows:

1. External wind speed is zero.

2. Offsite power is lost simultaneously with LOCA.

3. The single active failure is the failure of one standby diesel generator to start.

4. System frictional pressure losses are 18 in W.G. at 10,000 cfm flow.

5. The fuel building charcoal filtration system centrifugal exhaust fan characteristic is shown on Fig. 6.2-60.

6. The fuel building exhaust rate at 18 in W G. is
18 10,000 cfm beginning at 10 sec.

Results of the fuel building analysis indicate that a
36 pressure of -0.25 in W.G. will be attained in 14.5 sec.

Fig. 6.2-61a indicates that there is a period following a LOCA during which a gauge pressure greater than -0.25 in

24 W.G. exists in the annulus. This period begins approximately 25 sec after the LOCA and lasts for
179 approximately 135 sec. The dose rate analysis during this period indicates that release of contaiminated air from the secondary containment is within the limits of 10CFR100.

The amount of heat transferred to the secondary containment atmosphere (annulus) has no detrimental effect, since no safety equipment is located inside the annulus. No heat transfer is assumed to the environment. The walls of the shield building are reinforced concrete, 2'-6" thick, and do not offer a contribution of heat into the auxiliary building or fuel building during the transient. The analysis for the drawdown time considered all possible heat loads inside the auxiliary building and fuel building. The cubicles containing equipment (e.g., the ECCS pumps and heat exhangers) that operate during post-LOCA operations are provided with recirculation-type-unit coolers. The unit coolers have been conservatively designed to remove the heat at the rate at which it is being generated during full operation of the equipment.

Constant maximum heat loads are determined for input to the auxiliary and fuel building analysis based on the assumption that all equipment is operating and only the safety related unit coolers powered from the Div. I standby diesel generator are removing heat. The resulting net positive heat load (see Table 6.2-32) is conservatively high because the equipment powered from the failed Div. II standby diesel generator is assumed to be operating while the associated unit coolers are assumed to be unavailable.

6.2.3.4 Tests and Inspection

Tests and inspections of the containment isolation system are discussed in Sections 6.2.4, 6.2.6, and 7.3.1. Tests and inspections of the SGTS and fuel building charcoal filtration system are discussed in Sections 6.5 and 9.4.2, respectively. Primary containment leak rate testing is discussed in Section 6.2.6.

Containment isolation system SGTS, and fuel building charcoal filtration system preoperational testing is discussed in Section 14.2. Doors and hatches are provided with sufficient instrumentation and/or administrative controls to assure that they are normally closed and have no adverse impact on the operation of the SGTS or the fuel building charcoal filtration system. Periodic testing of SGTS, charcoal filter units and secondary containment, including drawdown time, will be performed as indicated in 11
the Technical Specifications.

TABLE 6.2-32

SECONDARY CONTAINMENT

I. Secondary Containment Design

A.	Free Volume (ft³)	
	1. Annulus	418,500 357,400
	2. Auxiliary Building	1,150,000
	3. Fuel Building	360,000 742,000
B.	Pressure, inches of water gauge	
	1. Normal Operation	
	a. Annulus	3 inches negative
	b. Auxiliary Building	1/4 inch negative Atmospheric
	c. Fuel Building	1/4 inch negative
	2. Post-Accident (long term maximum)	
	a. Annulus	1/2 inch negative
	b. Auxiliary Building	1/4 inch negative
	c. Fuel Building	1/4 inch negative
C.	Leak Rate Normal (cfm)	
	1. Annulus	2,000
	2. Auxiliary Building	5,000
	3. Fuel Building	5,000

D. Exhaust Fans	SGTS	ABVS	APCS	FBVS	FBCFS
1. Number					
a. Annulus					
(normal operation)			1		
(post-accident)	1*				
b. Auxiliary Building					
(normal)		1**			
(post-accident)	1*				
c. Fuel Building					
(normal operation)				1**	
(post-accident)					1*
2. Type	Centrifugal & Vaneaxial				

E.	Filters	
	1. Number	1
	2. Type	Charcoal adsorbers (see Sections 6.5.1 & 6.5.3)

TABLE 6.2-32 (Cont)

II. TRANSIENT ANALYSIS

	Shield Building Annulus	Auxiliary Building	Fuel Building
A. Initial Conditions			
1. Pressure (in W.G.)	-3	0	0
2. Temperature (°F)	90	95 122	95 96
3. Outside air temperature (°F)	95	95	95
4. Thickness of shield building wall (dome is 2 ft)	2'-6"	NA	NA
5. Thickness of primary containment wall, nominal	1.50"	NA	NA
B. Thermal Characteristics			
1. Primary Containment Wall			
a. Coefficient of linear expansion (in/in °F)	8.4×10^{-6}	NA	NA
b. Modulus of elasticity (psi)	3.0×10^{7}	NA	NA
c. Density (lbm/ft^3)	490	NA	NA
d. Specific heat (Btu/lbm-°F)	0.10	NA	NA
2. Heat Transfer Coefficients			
a. Primary containment atmosphere to primary containment wall ($Btu/hr\text{-}ft^2\text{-}°F$)	307	NA	NA
b. Primary containment wall to annulus atmosphere ($Btu/hr\text{-}ft^2\text{-}°F$)	5.0	NA	NA
3. Constant heat addition rate (Btu/hr)	0	$.589\times10^{6}$ 2.785×10^{6}	2.039×10^{6}

*On ESF or high radiation signal two trains are available; one is required for system operation.

**During normal operation two trains are available; one is required for system operation.

TABLE 6.2-34

SECONDARY CONTAINMENT OPERATION
FOLLOWING A DESIGN BASIS ACCIDENT

General	Shield Bldg.	Aux. Bldg.	Fuel Bldg.
Type of structure	Reinforced Concrete	Reinforced Concrete	Reinforced Concrete
Free volume (cu ft)	418,500 357,400	1,150,000	360,000 742,000
Annulus width (ft)	5	NA	NA
Location of fission product removal system	Aux. Bldg. El 141'-0"	Aux. Bldg. El 141'-0"	Fuel Bldg. El 148'-0"

Time-Dependent Parameters			
Leak rate (cfm)	2,000 at -3 in W.G.	5,000 at -0.25 in W.G. Atmospheric	5,000 cfm at -0.25 in W.G.
Total recirculation flow (max)	50,000	NA	NA
Exhaust flow (cfm)	2,500 (max)	10,000 (max)	10,000 (max)
System pressure at exhaust flow (in W.G.)	21.5	21.5	18
Effectiveness of fission product removal systems	Refer to Section 6.5		Refer to Section 9.4.2
Exhaust fan initiation time (sec) at rated speed	30 38	30 38	10 18

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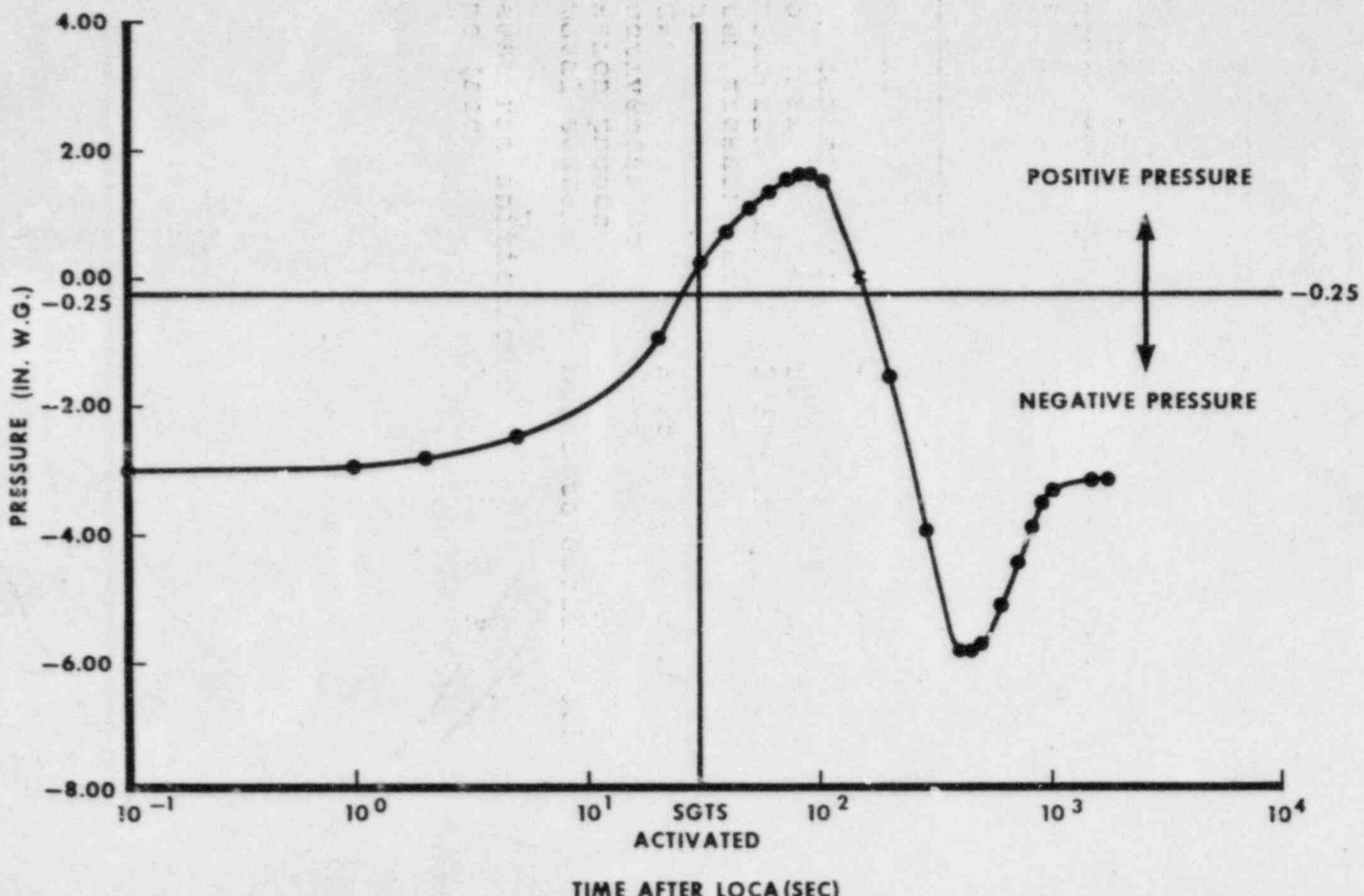

FIGURE 6.2-61a

PRESSURE IN SHIELD BUILDING ANNULUS VS TIME

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT

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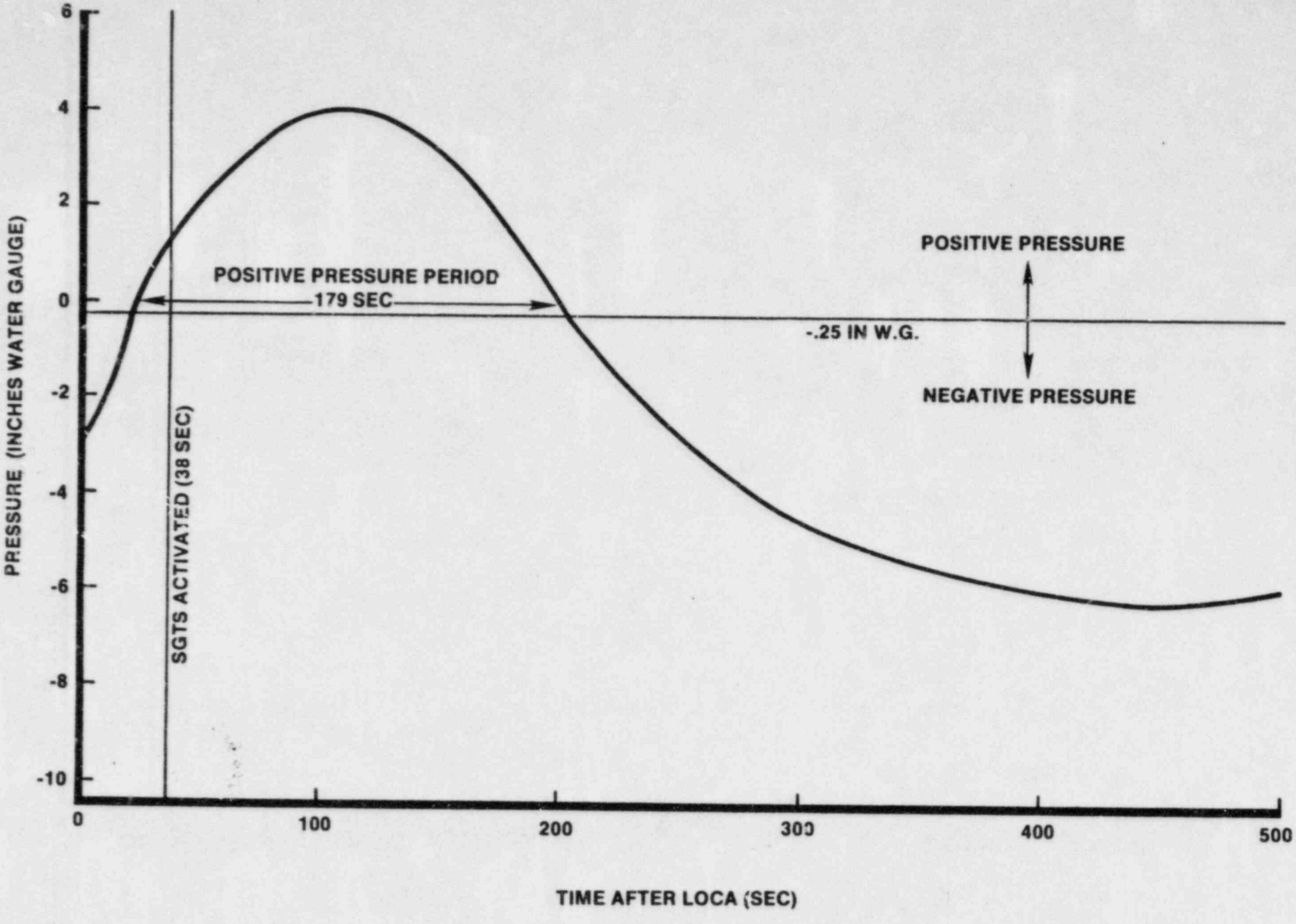

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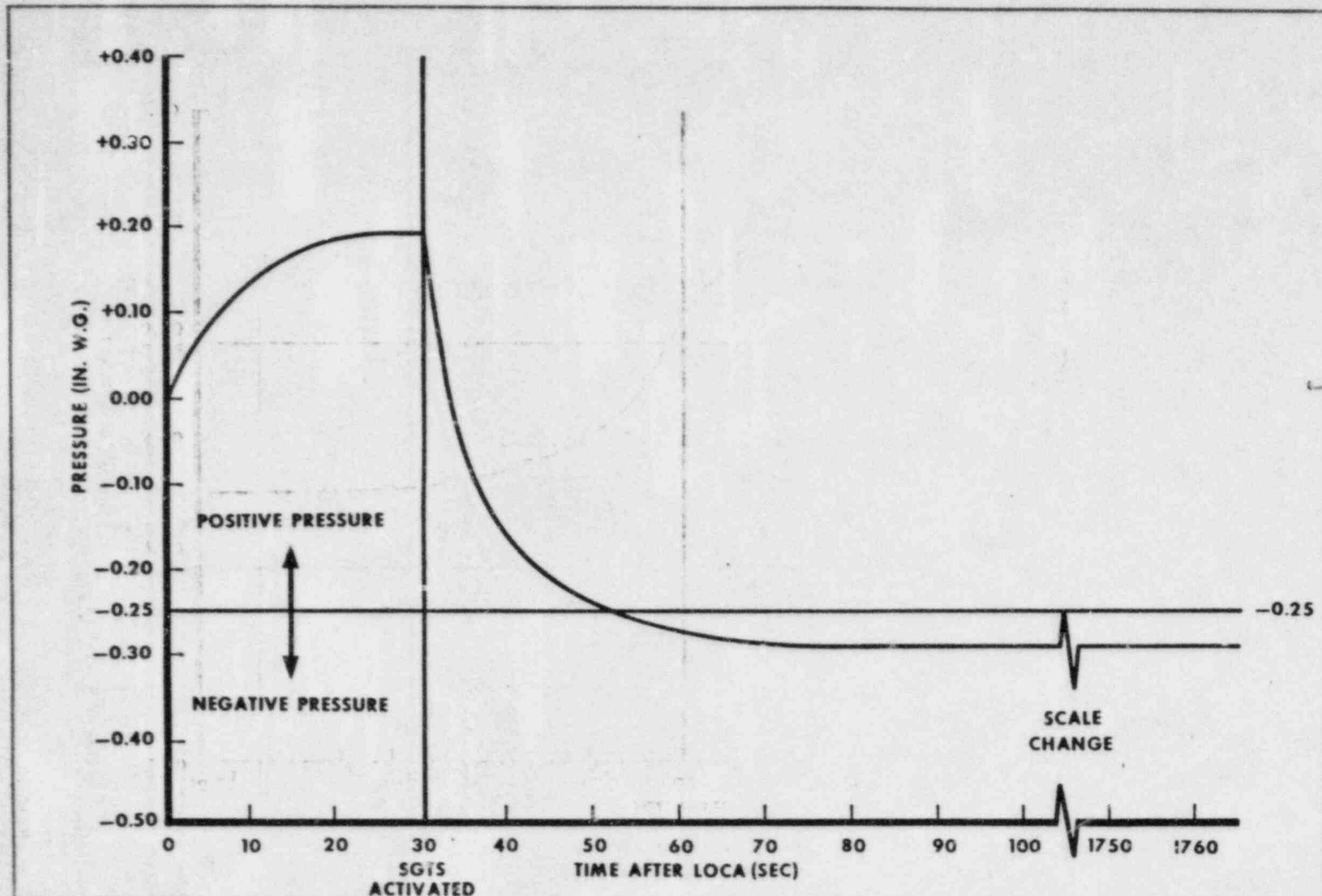

FIGURE 6.2-61b

PRESSURE IN AUXILIARY
BUILDING VS TIME

RIVER BEND STATION
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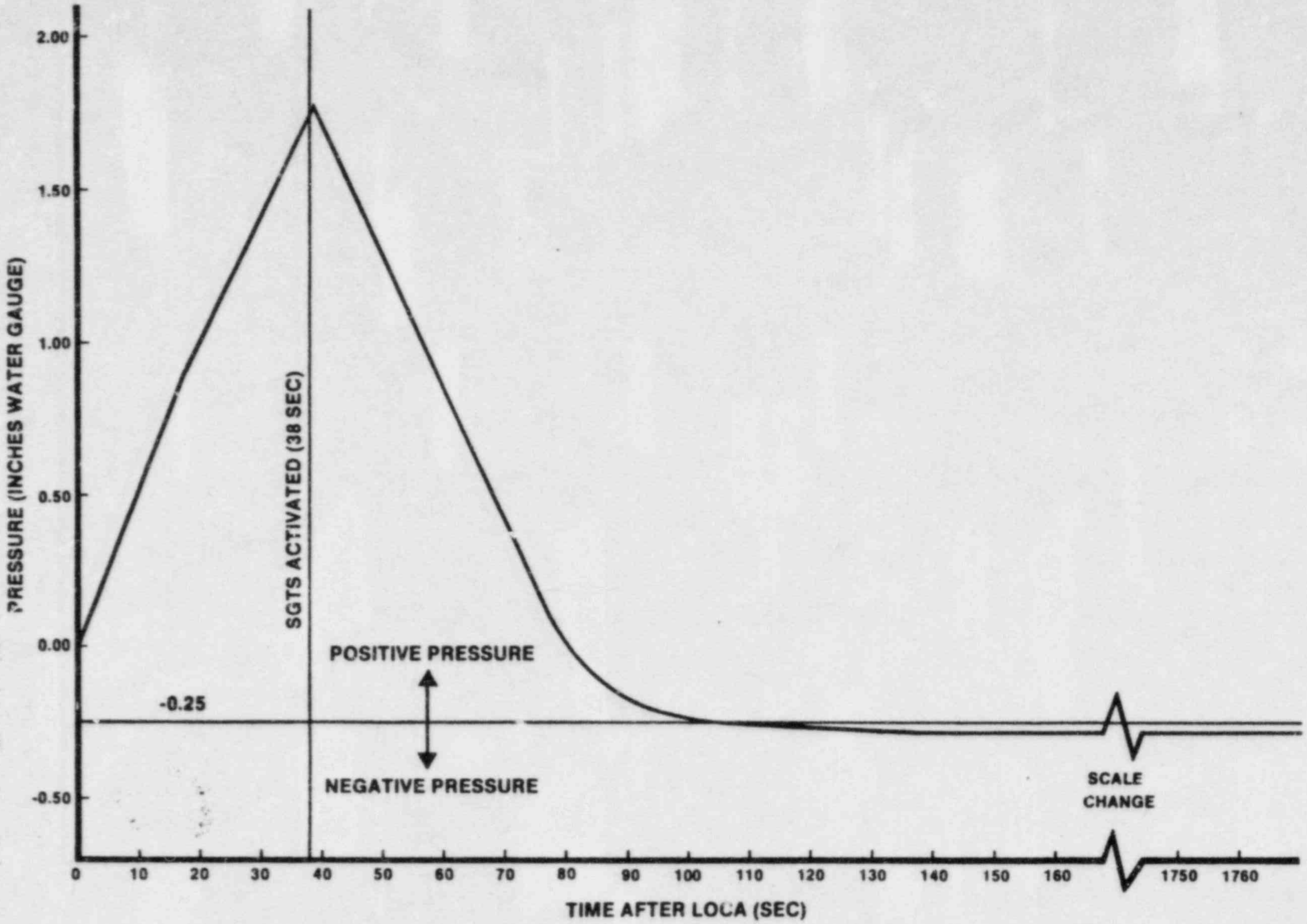

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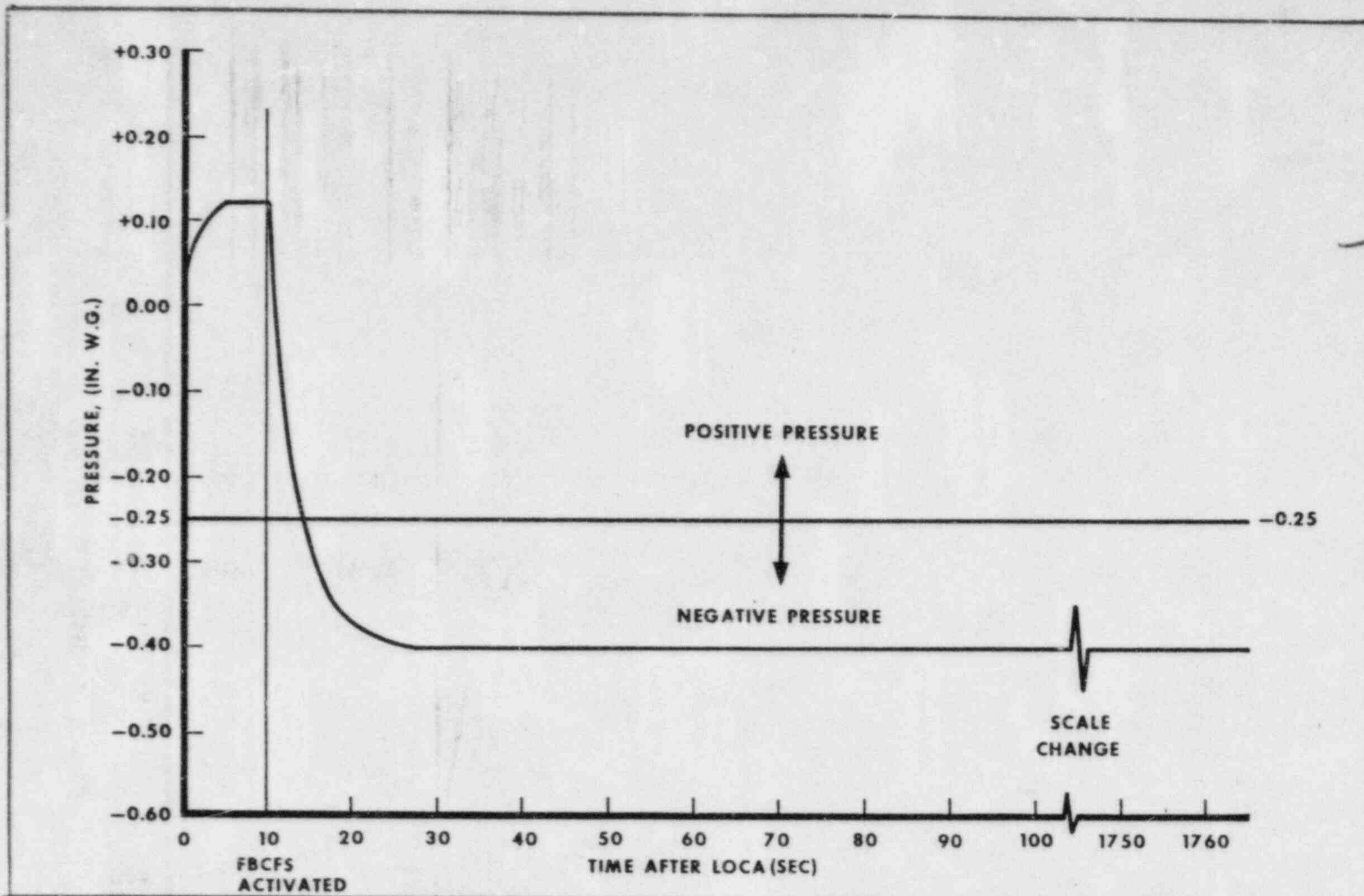

FIGURE 6.2-62

PRESSURE IN FUEL BUILDING VS TIME

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT

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