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MILLER,J.R. Operating Reactors Branch 3

SUBJECT: Forwards Table 1."St Lucie Unit 1 LOCA/ECCS Model Summary," in response to 850329 request re Exxon Nuclear Co XN-NF-82-20.Table describes component models used in ECCS analsis.

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April 4, 1985

Office of Nuclear Reactor Regulation
Attention: Mr. James R. Miller, Chief
Operating Reactors Branch #3
Division of Licensing
U.S. Nuclear Regulatory Commission

Subject: St. Lucie Unit 1
Docket No. 50-335
Response to NRC Questions
on ECCS Analysis

Dear Mr. Miller:

At the March 29, 1985 meeting between NRC and Exxon Nuclear Company on the NRC staff review of Topical Report XN-NF-82-20, NRC staff raised questions about which component models were used in generation of the current ECCS analysis for St. Lucie Unit 1 and which component models had been used in the previous submittal. The information provided in Table 1 describes the models used by Exxon Nuclear to analyze St. Lucie Unit 1 in previously submitted analysis and a description of models used for the current analysis with all the required corrections. As shown in Table 1, the only differences in models between the prior submitted analysis and the current analysis is the elimination of the mixing vane multiplier and the local peaking multiplier.

It should be noted that XN-NF-82-98 and subsequent revisions and supplements provided the ECCS analyses for St. Lucie Unit 1 Cycle 6 with a thermal shield present. The current analysis contains the evaluated effects of the thermal shield removal as reported in our Reactor Vessel Internals and Thermal Shield Removal (Final Integrity and Stability) submittal of February 10, 1984, (L-84-29).

Very truly yours,

J. W. Williams, Jr.
Group Vice President
Nuclear Energy

JWW/ARM/cb

A001 1/1

Table 1 St. Lucie Unit 1 LOCA/ECCS Model Summary

	Prior Analysis	Current** Analysis
1) Fission Gas Release Model	WREM	WREM
2) Stored Energy Model	WREM	WREM
3) Blowdown Model	WREM	WREM
4) Containment Model	WREM	WREM
5) Clad Swelling and Rupture Model	EXEM-NUREG	EXEM-NUREG
6) Reflood Model		
a) Carryout and Quench Correlation	WREM	WREM
b) Downcomer/Upper Plenum Leakage	EXEM: Leakage used	EXEM: Leakage used
c) Break Model	CD = 0.4 Guillotine	CD = 0.4 Guillotine
d) Core Outlet Enthalpy Model	EXEM	EXEM
e) Z-Equivalent Model	OFF	OFF
7) Heatup Model		
a) Steam Cooling Model	EXEM	EXEM
b) Heat Transfer Correlation	WREM	WREM
c) Mixing Vane Multiplier	1.02*	1.00
d) Local Peaking Multiplier	1.093*+	1.00
e) Z-Equivalent Model	WREM	WREM
f) Radiation Model	ON	ON
8) Documentation of Results	XN-NF-82-98 XN-NF-82-98, Revision 1 XN-NF-82-98, Revision 1, Supp. 1	Letter, L-85-124

* These values were used at relative axial positions .9, .81.
** Analysis performed to correct error in code TOODEE2.
\+ This value is the total heat transfer augmentation due to input (1.045) and coding formulation.

Table 2 Exxon Nuclear Company ECCS Models

		Model	Reference
1.	Fission Gas Release Model		
	a. GAPEX	WREM	1
	b. GAPEX with Uncertainties	WREM-II	1, 6
	c. RODEX2	EXEM	13
2.	Stored Energy Model		
	a. GAPEX	WREM	1
	b. RODEX2	EXEM	13
	c. RODEX2 in RELAP4	EXEM	11c, 13
3.	Blowdown Model	WREM	3, 5, 7
4.	Containment Pressure Model		
	a. Dry Containment	WREM	3
	b. Ice Condenser Containment	WREM-II	6, 14
5.	Clad Swelling and Rupture Model		
	a. Exxon Model	WREM	3, 4
	b. Revised Exxon Model	WREM-II	3, 4, 6
	c. Exxon Model including NUREG-0630	EXEM	10
6.	Reflood Model		
	a. RELAP4	WREM	3
	b. REFLEX	EXEM	8
	c. Carryout and Quench Correlations		
	1) 15x15 FLECHT	WREM	2
	2) 17x17 FLECHT	EXEM	11a
	3) 15x15/17x17 FLECHT	EXEM	11b
	d. Downcomer/Upper Plenum Leakage	EXEM	11a
	e. Break Model		
	1) Split Break	EXEM	11a
	2) Guillotine Break	EXEM	11a
	f. Core Outlet Enthalpy Model	EXEM	11a
	g. Z-Equivalent Model		
	1) WREM	WREM	3
	2) EXEM	EXEM	11d

Table 2 (Continued)

7.	Fuel Rod Heatup Model		
	a. TOODEE2	WREM	3
	b. Steam Cooling Model		
	1) WREM	WREM	3, 9
	2) WREM-II	WREM-II	6, 9
	3) EXEM	EXEM	11
	c. Heat Transfer Correlation		
	1) 15x15	WREM	3
	2) 15x15	WREM-II	6
	3) 17x17	EXEM	11a
	4) 15x15/17x17	EXEM	11b
	d. Mixing Vane HTC Multipliers		
	1) Off	WREM	3
	2) EXEM	EXEM	11a
	e. Local Peaking HTC Multipliers	EXEM	11
	1) Off	WREM	3
	2) EXEM	EXEM	11a
	3) D.C. Cook 2	EXEM	16
	f. Z-Equivalent Model		
	1) WREM	WREM	3
	2) EXEM	EXEM	11d
	g. Radiation Model		
	1) WREM	WREM	3
	2) WREM Expanded New Geometries	EXEM	11d
8.	Core Wide Metal-Water Reaction	WREM	15

REFERENCES

1. XN-73-25, "GAPEXX: A Computer Program for Predicting Pellet-to-Cladding Heat Transfer Coefficients," Exxon Nuclear Company, Inc., Richland, WA 99352, August 1973.

2. XN-75-19, "Carryout Rate Fraction Correlation for Pressurized Water Reactors," Exxon Nuclear Company, Inc., Richland, WA 99352; (a) March 24, 1975; (b) Supplement 1, "Statistical Evaluation of the Carryout Rate Fraction," June 1975.

3. XN-75-41, "Exxon Nuclear Company WREM-Based Generic PWR ECCS Evaluation Model," Exxon Nuclear Company, Inc., Richland, WA 99352.

   a. Volume 1, July 25, 1975.

   b. Volume 2, "Model Justification," August 1, 1975.

   c. Supplement 1, "Further Definitions and Justifications to Reflood Heat Transfer Models," August 14, 1975.

   d. Supplement 2, "Supplementary Information Related to Blowdown and Reflood Analysis," August 14, 1975.

   e. Supplement 3, "Supplementary Information Related to Blowdown and Heatup Analysis," August 16, 1975.

   f. Supplement 4, "Supplementary Information Related to Blowdown and Heatup Analysis," August 20, 1975.

   g. Supplement 5, "Supplementary Information Related to Blowdown and Heatup Analysis," October 3, 1975.

   h. Supplement 6, "Supplementary Information Related to Blowdown and Heatup Analysis," October 27, 1975.

   i. Supplement 7, "Supplementary Information," November 9, 1975.

   j. Volume II Appendix A and B, "3-Loop Westinghouse Sample Problem," August 1, 1975.

   k. Volume II Appendix C, "Yankee Rowe Example Problem," August 22, 1975.

   l. Volume II Appendix D, "3-Loop Westinghouse Large Break Example Problem (Using September 26, 1975 Model)," October 2, 1975.

   m. Volume III Revision 2, "Small Break Model," August 20, 1975.

REFERENCES (Continued)

4. XN-75-6, "Flow Blockage Model for LOCA Analysis," Exxon Nuclear Company, Inc., Richland, WA 99352, April 1, 1975.

5. XN-75-43, "Core Physics Methods and Data Used as Input to LOCA Analysis," Exxon Nuclear Company, Inc., Richland, WA 99352, August 1975.

6. XN-76-27(A), "Exxon Nuclear Company WREM-Based Generic PWR ECCS Evaluation Model Update ENC WREM-II," Exxon Nuclear Company, Inc., Richland, WA 99352; (a) March 1977; (b) Supplement 1(A), "Supplementary Information Relating to," March 1977; and (c) Supplement 2(A), "Supplementary Information Relating to," March 1977.

7. XN-76-44, "Revised Nucleate Boiling Lockout for ENC WREM-Based ECCS Evaluation Model," Exxon Nuclear Company, Inc., Richland, WA 99352, September 1976.

8. XN-NF-78-30(A), "Exxon Nuclear Company WREM-Based Generic PWR ECCS Model Updates ENC WREM-IIA," Exxon Nuclear Company, Inc., Richland, WA 99352, May 1979.

9. Letter, G.F. Owsley (Exxon Nuclear Company) to D.F. Ross (USNRC), Subject: TOODEE2 Updates; Letter No. GFO:077:80 dated April 1, 1980.

10. XN-NF-82-07(P)(A), Rev. 1, "Exxon Nuclear Company ECCS Cladding Swelling and Rupture Model," Exxon Nuclear Company, Inc., Richland, WA 99352, November 1982.

11. XN-NF-82-20(P), "Exxon Nuclear Company Evaluation Model EXEM/PWR ECCS Model Updates," Exxon Nuclear Company, Inc., Richland, WA 99352; (a) Revision 1, August 1982; (b) Revision 1, Supp. 1, "Revised FLECHT-Based Reflood Carryover and Heat Transfer Correlations," June 1983; (c) Revision 1, Supp. 2(A), February 1985; (d) Revision 1, Supp. 3, "Response to NRC Request for Additional Information," Draft; (e) Revision 1, Supp. 4(A), "Adjustments to FLECHT-Based Heat Transfer Correlations," July 1984.

12. XN-NF-82-49(P), "Exxon Nuclear Company Evaluation Model - EXEM/PWR Small Break Model," Exxon Nuclear Company, Inc., Richland, WA 99352; (a) June 1982; (b) Supp. 1, "Supplement 1: Responses to NRC Questions," March 1985.

13. XN-NF-81-58(P)(A), Revision 2, Supps. 1 & 2, "RODEX2 Fuel Rod Thermal Response Evaluation Model," Exxon Nuclear Company, Inc., Richland, WA 99352, March 1984.

14. XN-CC-39, Rev. 1, "ICECON: A Computer Program Used to Calculate Containment Back Pressure for LOCA Analysis (Including Ice Condenser Plants)," Exxon Nuclear Company, Inc., Richland, WA 99352, November 1978.

REFERENCES (Continued)

15. XN-CC-36, "Exxon Nuclear Procedure for Calculating Core-Wide Metal-Water Reaction During a Loss-of-Coolant Accident," Exxon Nuclear Company, Inc., Richland, WA 99352, December 1975.

16. Letter, J.C. Chandler (Exxon Nuclear Company) to H.R. Denton (USNRC), Subject: Local Peaking Multiplier for Reflood Heat Transfer Coefficient; Letter No. JCC:076:84 dated May 7, 1984.