

## 1.6 MATERIAL INCORPORATED BY REFERENCE

Within each subsection of the text, applicable supporting technical material is referenced. References are cited in a list of references at the end of a section. Most of the references are cited as a particular technical basis for BWR plant design and analysis. However, a few of the references cited in the FSAR refer to technical work performed by GE or Bechtel which is specifically applicable to the Susquehanna SES. The references in this category generally provide a full development and analysis of some aspect of plant technology. These special references are incorporated by reference into this FSAR, thereby becoming part of the license application.

### 1.6.1 GENERAL ELECTRIC TOPICAL REPORTS

Table 1.6-1 is a list of all GE topical reports and other GE reports which are incorporated in whole or in part by reference in this FSAR, and have been filed with the NRC.

### 1.6.2 BECHTEL TOPICAL REPORTS

Table 1.6-2 is a list of Bechtel topical reports which have been incorporated in whole or in part by reference in this FSAR.

### 1.6.3 OTHER TOPICAL REPORTS

Table 1.6-4 is a list of other reports which have been incorporated in whole or in part by reference in this FSAR and which have been filed with the NRC.

TABLE 1.6-1 GENERAL ELECTRIC TOPICAL REPORTS		
REPORT NUMBER	TITLE	REFERENCED IN FSAR SECTION
APED-4824	Maximum Two-Phase Vessel Blowdown from Pipes (April 1965)	6.2
APED-5286	Design Basis for Critical Heat Flux Condition in BWRs (September 1966)	1.5
APED-5458	Effectiveness of Core Standby Cooling Systems for General Electric Boiling Water Reactors (March 1968)	5.4
APED-5460	Design and Performance of General Electric BWR Jet Pumps (July 1968)	3.9
APED-5555	Impact Testing on Collet Assembly for Control Rod Drive Mechanism 7RDB144A (November 1967)	4.6
APED-5640	Xenon Considerations in Design of Large Boiling Water Reactors (June 1968)	4.1,4.3
APED-5652	Stability and Dynamic Performance of the General Electric Boiling Water Reactor	4.1
APED-5706	In-Core Neutron Monitoring System for General Electric Boiling Water Reactors (November 1968, Revised April 1969)	7.6, 7.7 7.6.2a.5
APED-5736	Guidelines for Determining Safe Test Intervals and Repair Times for Engineered Safeguards (April 1969)	Appendix
APED-5750	Design and Performance of General Electric Boiling Water Reactor Main Steam Line Isolation Valves (March 1969)	5.4
APED-5756	Analytical Methods for Evaluating the Radiological Aspects of the General Electric Boiling Water Reactor (March 1969)	15.4
GEAP-10546	Theory Report for Creep-Plast Computer Program (January 1972)	4.1
NEDE-10313	PDA-Pipe Dynamic Analysis Program for Pipe Rupture Movement (Proprietary Filing)	3.6
NEDE-11146	Design Basis for New Gas System (July 1971) (Company Proprietary)	11.3

TABLE 1.6-1 GENERAL ELECTRIC TOPICAL REPORTS		
REPORT NUMBER	TITLE	REFERENCED IN FSAR SECTION
NEDO-20944-(P) (A)	BWR/4 and BWR/5 Fuel Design (October 1976)	4.2
NEDE-21156	Supplemental Information for Plant Modification to Eliminate Significant In-Core Vibration (January 1976)	4.4
NEDE-21175-3-P	BWR/6 Fuel Assembly Evaluation of Combined Safe Shutdown Earthquake (SSE) and Loss-of-Coolant Accident (LOCA) Loadings (Amendment No. 3) (July 1982)	3.9
NEDE-21354-P	BWR Fuel Channel Mechanical Design and Deflection (September 1976)	3.9
NEDE-22290-A, Supp. 1	Safety Evaluation of the General Electric Hybrid 1 Control Rod Assembly for the BWR 4/5 C Lattice (July 1985)	4.2
NEDE-22290-A, Supp. 3	Safety Evaluation of the General Electric Duralife 230 Control Rod Assembly (May 1988)	4.2
NEDE-23014	HEX 01 User's Manual (July 1976)	15.2
NEDE-31096-A	Anticipated Transients Without Scram Response to the NRC ATWS Rule 10CFR50.62 (December 1985)	7.1, 7.2
NEDO-10173	Current State of Knowledge, High Performance BWR Zircaloy-Clad UO <sub>2</sub> Fuel (May 1970)	11.1
NEDO-10299	Core Flow Distribution in a Modern Boiling Water Reactor as Measured in Monticello (January 1971)	4.4
NEDO-10320	The General Electric Pressure Suppression Containment Analytical Model (April 1971) Supplement 1 (May 1971)	6.2
NEDO-10349	Analysis of Anticipated Transients Without Scram (March 1971)	15.8

TABLE 1.6-1 GENERAL ELECTRIC TOPICAL REPORTS		
REPORT NUMBER	TITLE	REFERENCED IN FSAR SECTION
NEDO-10466	Power Generation Control Complex Design Criteria and Safety Evaluation (February 1972)	3.12.3.4.2.1 (f)
NEDO-10505	Experience with BWR Fuel Through September 1971 (May 1972)	11.1
NEDO-10527	Rod Drop Accident Analysis for Large Boiling Water Reactors (March 1972) Supplement 1 (July 1972) Supplement 2 (January 1973)	15.4
NEDO-10585	Behavior of Iodine in Reactor Water During Plant Shutdown and Startup (August 1972)	15.6
NEDO-10602	Testing of Improved Jet Pumps for the BWR/6 Nuclear System (June 1972)	3.9
NEDO-10734	A General Justification for Classification of Effluent Treatment System Equipment as Group D (February 1973)	11.3
NEDO-10739	Methods for Calculating Safe Test Intervals and Allowable Repair Times for Engineered Safeguard Systems (January 1973)	6.3
NEDO-10751	Experimental and Operational Confirmation of Offgas System Design Parameters (January 1973) (Company Proprietary)	11.3
NEDO-10801	Modeling the BWR/6 Loss-of-Coolant Accident: Core Spray and Bottom Flooding Heat Transfer Effectiveness (March 1973)	1.5
NEDO-10802	Analytical Methods of Plant Transient Evaluations for General Electric Boiling Water Reactor (February 1973)	4.4, 5.2, 15.1, 15.2, 15.3, 15.4, 15.5
NEDO-10846	BWR Core Spray Distribution (April 1973)	1.5
NEDO-10899	Chloride Control in BWR Coolants (June 1973)	5.2

TABLE 1.6-1 GENERAL ELECTRIC TOPICAL REPORTS		
REPORT NUMBER	TITLE	REFERENCED IN FSAR SECTION
NEDO-10958	General Electric BWR Thermal Analysis Basis (GETAB): Data, Correlation, and Design Application (November 1973)	4.3, 4.4, 15.0
NEDO-10958-A	General Electric BWR Thermal Analysis Basis (GETAB): Data, Correlation, and Design Application (January 1977)	1.5, 15.4, 16.1
NEDO-10959	General Electric BWR Thermal Analysis Basis (GETAB): Data, Correlation, and Design Application (November 1973)	15.0
NEDO-20231	Emergency Core Cooling Tests of an Internally Pressurized, Zircaloy-Clad, 8 x 8 Simulated BWR Fuel Bundle (December 1973)	1.5
NEDO-20360	General Electric Boiling Water Reactor Generic Reload Application for 8x8 Fuel (May 1975)	15.4
NEDO-20533	The General Electric Mark III Pressure Suppression Containment System Analytical Model (June 1974)	
NEDO-20566	General Electric Company Model for Loss-of-Coolant Accident Analysis in Accordance with 10 CFR 50, Appendix K (January 1976)	3.9
NEDO-20626	Studies of BWR Designs for Mitigation of Anticipated Transients without Scrams (October 1974)	15.8
NEDO-20626-1	Studies of BWR Designs for Mitigation of Anticipated Transients without Scrams (June 1975)	15.8
NEDO-20626-2	Studies of BWR Designs for Mitigation of Anticipated Transients without Scrams (July 1975)	15.8
NEDO-20631	Mechanical Property Surveillance of Reactor Pressure Vessels for General Electric BWR/6 Plants (March 1975)	5.3

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REPORT NUMBER	TITLE	REFERENCED IN FSAR SECTION
NEDO-20922	Experience with BWR Fuel Through September 1974 (June 1975)	11.1
NEDE-20944	BWR/4 and BWR/5 Fuel Design (October 1976)	4.3
NEDO-20953	Three-Dimensional Boiling Water Reactor Core Simulator (May 1976)	15.4
NEDO-21142	Realistic Accident Analysis for General Electric Boiling Water Reactor - The RELAC Code and User's Guide, to be issued (December 1977)	15.4, 15.6, 15.7, 15.2
NEDO-21143	Conservative Radiological Accident Evaluation - The CφNAC01 Code (March 1976)	15.4, 15.6, 15.7
NEDO-21159	Airborne Release from BWRs for Environment Impact Evaluations (March 1976)	11.1
NEDO-24548	Technical Description Annulus Pressurization Load Adequacy Evaluation	6A
NEDO-21291	Group Notch Mode of the RSCS for Cooper (June 1976)	15.4
NEDO-26453	Oyster Creek Station, FSAR Amendment 10	1.5
	"Summary Memorandum on Excursion Analysis Uncertainties," Dresden Nuclear Power Station, Unit 3, Plant Design Analysis Report Amendment 3	4.3, 15.0
	Hatch Nuclear Plant, Unit 1, PSAR Amendment 10, Appendix L	15.5
	Millstone Nuclear Power Station, PSAR Amendment 14	6.3
	Pilgrim Nuclear Power Station, PSAR, Amendment 14	6.3
APED-4827	F. J. Moody, "Maximum Two-Phase Vessel Blowdown from Pipes," Topical Report, General Electric Company, (1965)	6.2

TABLE 1.6-1 GENERAL ELECTRIC TOPICAL REPORTS		
REPORT NUMBER	TITLE	REFERENCED IN FSAR SECTION
NEDC-32071P	Diefenderfer, S. B., and D. C. Pappone, "Susquehanna Steam Electric Station Units 1 and 2 SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," General Electric Nuclear Engineering Department	5.4, 6.3
NEDC-32161P	December 1993, (General Electric Report), Power Uprate Engineering Report for Susquehanna Steam Electric Station Units 1 and 2	5.2, 5.3, 10.2, 11.1, 15.6
NEDC-32281P	SAFER/GESTR-LOCA Analysis Basis Documentation for Susquehanna Steam Electric Station Units 1 and 2, September 1993	6.3
NEDE-24131	"Basis for 8x8 Retrofit Fuel Thermal Analysis Application, General Electric Company, September 1978, Proprietary	4.4
NEDE-10813	PDA-Pipe Dynamic Analysis Program for Pipe Rupture Movement, Proprietary Filing	3.6
NEDE-21544P	R. J. Ernst and M. G. Ward, "Mark II Pressure Suppression Containment Systems: An Analytical Model of the Pool Swell Phenomenon," General Electric Co., December 1976	6.2
NEDE-23785-1-PA	"The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant, Accident, Volume III, SAFER/GESTR Application Methodology," Revision 1, October 1984	6.3
NEDE-24057-P	"Assessment of Reactor Internals Vibration in BWR/4 and BWR/5 Plants," (Class III) and NEDO-24057 (Class I), November 1977	3.9
NEDE-24154-P	F. Odar, "Safety Evaluation for General Electric Topical Report: Qualification of One-Dimensional Core Transient Model for Boiling Water Reactors," also NEDO-24154, Vols. I, II, III, dated June 1980	5.2, 15.1, 15.2, 15.5
NEDM-23842	R. C. Stirn and J. F. Klapproth, "Continuous Control Rod Withdrawal Transient in the Startup Range," April 18, 1978	15.4
NEDO-10722A	Core Flow Distribution in a Modern Boiling Water Reactor as Measured in Moniticello, August 1976	4.4
NEDO-21143-1	"Radiological Accident Evaluation – The CONOC03 Computer Code"	15.4, 15.6, 15.7

TABLE 1.6-1 GENERAL ELECTRIC TOPICAL REPORTS		
REPORT NUMBER	TITLE	REFERENCED IN FSAR SECTION
NEDO-21231	C. J. Paone, "Bank Position Withdrawal Sequence," September 1976	15.4
NEDO-21506	"Stability and Dynamic Performance of the General Electric Boiling Water Reactor," January 1977	4.4
NEDO-21985	"Functional Capability Criteria for Essential Mark II Piping," 78 NED174 (Class I), September 1978	3.9
CHASTE05	Letter, A. J. Levine (GE) to D. F. Ross (NRC) dated January 27, 1977, "General Electric (GE) Loss-of-Coolant Accident (LOCA) Analysis Model Revisions – Core Heatup Code CHASTE05"	6.3
REFLOOD05	Letter, A. J. Levine (GE) to D. B. Vassallo (NRC) dated March 14, 1977, "Request for Approval for Use of Loss-of-Coolant Accident (LOCA) Evaluations Model Code REFLOOD05"	6.3
NEDO-20566A	"General Electric Company Analytical Model for Loss-of-Coolant Analysis in Accordance with 10CFR50, Appendix K," September 1986	6.3
NEDE-32417P	"GE 12 Compliance with Amendment 22 of NEDE-24011-P-A (GESTAR 11)," GE Nuclear Energy, December 1994	3.9
NEDE-22290-A	Supplement 1, "Safety Evaluation of the General Electric Hybrid I Control Rod Assembly for the BWR 4/5 C Lattice," General Electric Company, July 1985	4.2
NEDE-22290-A	Supplement 3, Safety Evaluation of the General Electric Duralife 230 Control Rod Assembly," General Electric Company, May 1988	4.2
NEDE-31758P-A	"GE Marathon Control Rod Assembly" GE Nuclear Energy, October 1991	4.1, 4.2
NEDO-31960-A	"BWR Owners' Group Long-Term Stability Solutions Licensing Methodology"	3.1, 7.1
NEDO-31960-A, Supplement 1	"BWR Owners' Group Long-Term Stability Solutions Licensing Methodology (Supplement 1)"	3.1, 7.1
NEDO-32465-A	Reactor Stability Detect and Suppress Solution Licensing Basis Methodology for Reload Applications"	3.1, 4.1, 7.1



TABLE 1.6-1 GENERAL ELECTRIC TOPICAL REPORTS		
REPORT NUMBER	TITLE	REFERENCED IN FSAR SECTION
NEDC-32410P-A	"Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC-PRNM) Retrofit Plus Option III Stability Trip Function", October 1995.	3.1, 7.6
NECD-32410P-A Supplement 1	"Nuclear (Measurement Analysis and Control Power Range Neutron Monitor (NUMAC-PRNM) Retrofit Plus Option III Stability Trip Function, Supplement 1", November 1997.	3.1, 7.6

TABLE 1.6-2 BECHTEL TOPICAL REPORTS		
(1)	BC-TOP-1, Rev. 1 (12-72), Containment Building Liner Plate Design	3.8
(2)	BC-TOP-4-A, Rev. 3 (11-74) Seismic Analysis of Structures and Equipment for Nuclear Power Plants	3.7B
(3)	BC-TOP-9-A, Rev. 2 (9-74) Design of Structures for Missile Impact	3.6
(4)	BN-TOP-1, Rev. 1 (11-72) Testing Criteria for Integrated Leak Rate Testing of Primary Containment Structures for Nuclear Power Plants	3.9
(5)	BN-TOP-2, Rev. 2 (5-74) Design for Pipe Break Effects	3.6
(6)	BP-TOP-1, Rev. 2 (1-75) Seismic Analysis Piping Systems (Except as noted on Table 3.9-15)	3.7B 3.9
(7)	BN-TOP-4, Rev. 1 (10-77) Subcompartment Pressure and Temperature Transient Analysis. (This report was approved by the NRC in February, 1979.	6B

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TABLE 1.6-4

## OTHER TOPICAL REPORTS

REPORT NUMBER	TITLE	REFERENCED IN FSAR SECTION
AE-RTL-788	Void Measurements in the Region of Subcooled and Low Quality Boiling (April 1966)	4.4
ANL-5621	Boiling Density in Vertical Rectangular Multichannel Sections with Natural Circulation (November 1956)	4.4
ANL-6385	Power-to-Void Transfer Functions (July 1961)	4.4
BHR/DER 70-1	Radiological Surveillance Studies at a Boiling Water Nuclear Power Reactor (March 1970)	11.1
BMI-1163	Vapor Formation and Behavior in Boiling Heat Transfer (February 1957)	4.4
CF 59-6-47 (ORNL)	Removal of Fission Product Gases From Reactor Off Gas Streams by Adsorption (June 11, 1959)	11.3
ST1-372-38	Kinetic Studies of Heterogeneous Water Reactors (April 1966)	4.4
TID-4500	Relap 3 - A Computer Program for Reactor Blowdown Analysis IN-1321 (June 1970)	3.6
UCRL-50451	Improving Availability and Readiness of Field Equipment Through Periodic Inspection, p. 10 (July 16, 1968)	18.3
WAPD-BT-19	A Method of Predicting Steady-Boiling Vapor Fractions in Reactor Coolant Channels (June 1960)	4.4
ANF-524(P)(A)	Advanced Nuclear Fuels Corporation Critical Power Methodology for Boiling Water Reactors, Revision 2, Supplement 1 Revision 2 and Supplement 2, Advanced Nuclear Fuels Corporation, Richland WA 99352, November 1990	4.1, 4.4, 15.3
ANF-913(P)(A)	Volume 1 Revision 1 and Volume 1 Supplements 2, 3 and 4, "COTRANSA2: A Computer Program for Boiling Water Reactor Transient Analyses," August 1990	5.2, 15.0, 15.1, 15.2, 15.3, 15.5
NE-092-001A	"SSES Power Uprate Licensing Topical Report," and NRC letter dated November 30, 1993, from Thomas E. Murley to Robert G. Byram (PP&L). Subject: Licensing Topical Report for Power Uprate with Increased Core Flow, Rev. 0, Susquehanna Steam Electric Station, Units 1 and 2 (PLA-3788) (TAC NOS. M83426 and M83427) with enclosed Safety Evaluation Report	10.2, 15.6

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TABLE 1.6-4

## OTHER TOPICAL REPORTS

REPORT NUMBER	TITLE	REFERENCED IN FSAR SECTION
PL-NF-89-005-A	"Qualification of Transient Analysis Methods for BWR Design and Analysis," Issue Date: July 1992.	15.1
XN-NF-80-19(P)(A)	Volume 1, Supplement 3, "Advanced Nuclear Fuels Methodology for Boiling Water Reactors-Benchmark Results for the CASMO-3G/MICROBURN-B Calculation Methodology," EXXON Nuclear Company, Richland, WA 99352, November 1990	15.1
XN-NF-80-19(P)(A)	"Exxon Nuclear Methodology for Boiling Water Reactors; Neutronic Methods for Design and Analysis," Volume 1, and Volume 1 Supplements 1 and 2, March 1983.	15.0, 15.4
XN-NF-84-105(P)(A)	Volume 1 and Volume 1 Supplements 1 and 2, "XCOBRA-T: A Computer Code for BWR Transient Thermal-Hydraulic Core Analysis," February 1987	15.0, 15.3
XN-NF-84-105(P)(A)	Volume 1 Supplement 4, "XCOBRA-T: A Computer Code for BWR Transient Thermal-Hydraulic Core Analysis, Void Fraction Model Comparison to Experimental Data," June 1988	15.3
ANF-91-048(P)(A)	"Advanced Nuclear Fuels Corporation Methodology for Boiling Water Reactors EXEM BWR Evaluation Model," and Correspondence, January 1993.	6.3
XN-NF-80-19(P)(A)	Volume 3, Revision 2, "Exxon Nuclear Methodology for Boiling Water Reactors, THERMEX: Thermal Limits Methodology Summary Description," Siemens Power Corporation, January 1987	4.1, 15.0
XN-NF-79-59(P)(A)	"Methodology for Calculation of Pressure Drop in BWR Fuel Assemblies," November 1983	4.1
EMF-CC-074(P)(A)	Volume 1, 2 and 4 "STAIF – A Computer Program for BWR Stability Analysis in the Frequency Domain"	4.1, 4.4
ANF-89-98(P)(A)	Rev. 1 and Rev. 1 Supplement 1, "Generic Mechanical Design Criteria for BWR Fuel Designs," Advanced Nuclear Fuels Corporation, May 1995	4.2
CENPD-400-P-A	"Generic Topical Report for the ABB Option III Oscillation Power Range Monitor (OPRM)"	3.1, 4.4, 7.6
EMF-93-177 (P)(A), SUPPLEMENTS 1 & 2	"Mechanical Design for BWR Fuel Channels" Siemens Power Corporation, August 2005	4.2
EMF-2209 (P)(A)	"SPCB Critical Power Correlation," September 2003	4.1, 4.4
EMF-2158(P)(A)	"Siemens Power Corporation Methodology For Boiling Water Reactors – Evaluation and Validation of CASMO-4/Microburn-B2" Rev. 0, October 1999	4.1, 4.3, 4.4, 15.4, 15.5
XN-NF-80-19(P)(A)	"Volume 4 Revision 1, Exxon Nuclear Methodology for	5.2, 15.0, 15.1,

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TABLE 1.6-4

## OTHER TOPICAL REPORTS

REPORT NUMBER	TITLE	REFERENCED IN FSAR SECTION
	Boiling Water Reactors: Application of the ENC Methodology to BWR Reloads”, Exxon Nuclear Company, June 1986	15.2, 15.4, 15.5
EMF-2361(P)(A)	EXEM BWR-2000 ECCS Evaluation Model”, Framatome ANP, May 2001	6.3
ANF-1358(P)(A)	“The Loss of Feedwater Heating Transient in Boiling Water Reactors”, Advanced Nuclear Fuels Corporation, September 2005	15.1
XN-NF-85-74(P)(A)	“RODEX2A(BWR) Fuel Thermal-Mechanical Evaluation Model”, Exxon-Nuclear Company, Inc., August 1986	4.1
BAW-10247(P)(A) & SUPPLEMENT 2P-A	Realistic Thermal Mechanical Fuel Rod Methodology for Boiling Water Reactors	4.1, 4.2, 4.3, 6.3
ANP-10335(P)(A)	ACE/ATRIUM 11 Critical Power Correlation	4.1, 4.4
ANP-10307(P)(A)	AREVA MCPR Safety Limit Methodology for Boiling Water Reactors	4.1, 4.4
ANP-10300P-A Rev. 1	“AURORA-B: An Evaluation Model for Boiling Water Reactors; Application to Transient and Accident Scenarios,” January 2018	5.2, 15.0, 15.1, 15.2, 15.3, 15.5, 15.8
ANP-10332P-A	“AURORA-B: An Evaluation Model for Boiling Water Reactors; Application to Loss of Coolant Accident Scenarios.”	6.3
XN-NF-82-07(P)(A), Rev. 1	“Exxon Nuclear Company ECCS Cladding Swelling and Rupture Model,” November 1982	6.3
ANP-10333P-A, Rev. 0	“AURORA-B: An Evaluation Model for Boiling Water Reactors; Application to Control Rod Drop Accident (CRDA),” March 2018	15.4