

SUMMARY TABLE OF CONTENTS**Chapter 1****1.0 INTRODUCTION AND GENERAL DESCRIPTION OF PLANT**

- 1.1 Introduction
 - 1.1.1 Type of License
 - 1.1.2 Identification of Applicant
 - 1.1.3 Number of Plant Units
 - 1.1.4 Description of Location
 - 1.1.5 Type of Nuclear Steam Supply
 - 1.1.6 Type of Containment
 - 1.1.7 Core Thermal Power Levels
 - 1.1.8 Scheduled Fuel Load and Operation Data
 - 1.1.9 FSAR Organization
- 1.2 General Plant Description
 - 1.2.1 Principal Design Criteria
 - 1.2.2 Plant Description
- 1.3 Comparison Tables
 - 1.3.1 Comparison With Similar Facility Designs
 - 1.3.2 Comparison of Final and Preliminary Information
- 1.4 Identification of Agents and Contractors
 - 1.4.1 Pennsylvania Power & Light Company (Applicant)
 - 1.4.2 Architect Engineer
 - 1.4.3 Nuclear Steam Supply System
 - 1.4.4 Turbine-Generator Vendor
 - 1.4.5 Other Consultants
- 1.5 Requirements for Further Technical Information
 - 1.5.1 Development of BWR Technology
 - 1.5.2 Programs Conducted During Operations Phase
- 1.6 Material Incorporated by Reference
 - 1.6.1 General Electric Topical Reports
 - 1.6.2 Bechtel Topical Reports
 - 1.6.3 Other Topical Reports
- 1.7 Electrical, Instrumentation, and Control Drawings
- 1.8 Symbols and Terms Used in Engineering and Text
 - 1.8.1 Text Definitions and Abbreviations
 - 1.8.2 Drawing Index and Symbols
 - 1.8.3 Piping Identification
 - 1.8.4 Valve Identification
 - 1.8.5 Instrument Identification
 - 1.8.6 Electrical Component Identification

SUMMARY TABLE OF CONTENTS**Chapter 1 Tables**

1.3-1	Comparison of Nuclear Steam Supply System Design Characteristics
1.3-2	Comparison of Power Conversion System Design Characteristics
1.3-3	Comparison of Engineered Safety Features Design Characteristics
1.3-4	Comparison of Containment Design Characteristics
1.3-5	Radioactive Waste Management Systems Design Characteristics
1.3-6	Comparison of Structural Design Characteristics
1.3-7	Comparison of Electrical Power Systems Design Characteristics
1.3-8	Significant Design Changes from PSAR to FSAR
1.4-1	Commercial Nuclear Reactors Completed, Under Construction, or in Design By General Electric
1.6-1	General Electric Topical Reports
1.6-2	Bechtel Topical Reports
1.6-4	Other Topical Reports
1.7-1	Electrical Drawings
1.8-1	SSES-Project Glossary Terms
1.8-2	Acronyms
1.8-3	Technical Abbreviations
1.8-5	Drawing Abbreviations
1.8-6	Piping and Valve Class Identification

SUMMARY TABLE OF CONTENTS**Chapter 1 Figures**

1.2-1	Figure replaced by Drawing M-220, Sh. 1
1.2-2	Figure replaced by Drawing M-221, Sh. 1
1.2-3	Figure replaced by Drawing M-222, Sh. 1
1.2-4	Figure replaced by Drawing M-223, Sh. 1
1.2-5	Figure replaced by Drawing M-224, Sh. 1
1.2-6	Figure replaced by Drawing M-225, Sh. 1
1.2-7	Figure replaced by Drawing M-226, Sh. 1
1.2-8	Figure replaced by Drawing M-227, Sh. 1
1.2-9	Figure replaced by Drawing M-230, Sh. 1
1.2-10	Figure replaced by Drawing M-231, Sh. 1
1.2-11	Figure replaced by Drawing M-232, Sh. 1
1.2-12	Figure replaced by Drawing M-233, Sh. 1
1.2-13	Figure replaced by Drawing M-234, Sh. 1
1.2-14	Figure replaced by Drawing M-235, Sh. 1
1.2-15	Figure replaced by Drawing M-236, Sh. 1
1.2-16	Figure replaced by Drawing M-237, Sh. 1
1.2-17	Figure replaced by Drawing M-240, Sh. 1
1.2-18	Figure replaced by Drawing M-241, Sh. 1
1.2-19	Figure replaced by Drawing M-242, Sh. 1
1.2-20	Figure replaced by Drawing M-243, Sh. 1
1.2-21	Figure replaced by Drawing M-244, Sh. 1
1.2-22	Figure replaced by Drawing M-245, Sh. 1
1.2-23	Figure replaced by Drawing M-246, Sh. 1
1.2-24	Figure replaced by Drawing M-247, Sh. 1
1.2-25	Figure replaced by Drawing M-248, Sh. 1
1.2-26	Figure replaced by Drawing M-249, Sh. 1
1.2-27	Figure replaced by Drawing M-250, Sh. 1
1.2-28	Figure replaced by Drawing M-251, Sh. 1
1.2-29	Figure replaced by Drawing M-252, Sh. 1
1.2-30	Figure replaced by Drawing M-253, Sh. 1
1.2-31	Figure replaced by Drawing M-254, Sh. 1
1.2-32	Figure replaced by Drawing M-255, Sh. 1
1.2-33	Figure replaced by Drawing M-256, Sh. 1
1.2-34	Figure replaced by Drawing M-257, Sh. 1
1.2-35	Figure replaced by Drawing M-258, Sh. 1
1.2-36	Figure replaced by Drawing M-259, Sh. 1
1.2-37	Figure replaced by Drawing M-260, Sh. 1
1.2-38	Figure replaced by Drawing M-261, Sh. 1
1.2-39	Figure replaced by Drawing M-270, Sh. 1
1.2-40	Figure replaced by Drawing M-271, Sh. 1
1.2-41	Figure replaced by Drawing M-272, Sh. 1
1.2-42	Figure replaced by Drawing M-273, Sh. 1
1.2-43	Figure replaced by Drawing M-274, Sh. 1
1.2-44	Figure replaced by Drawing M-276, Sh. 1
1.2-45	Figure replaced by Drawing M-280, Sh. 1
1.2-46	Figure replaced by Drawing M-281, Sh. 1
1.2-47	Figure replaced by Drawing M-282, Sh. 1

SUMMARY TABLE OF CONTENTS**Chapter 1 Figures**

1.2-48	Figure replaced by Drawing M-284, Sh. 1
1.2-49	Unit 1 - Heat Balance at Rated Power with 100 x 106 LBm/hr Core Flow
1.2-49-1	Unit 1 - Heat Balance at Rated Power with 108 x 106 LBm/hr Increased Core Flow
1.2-49-2	Unit 2 - Heat Balance at Rated Power with 100 x 106 LBm/hr Core Flow
1.2-49-3	Unit 2 - Heat Balance at Rated Power with 108 x 106 LBm/hr Increased Core Flow
1.2-50	Figure replaced by Drawing M-5200, Sh. 1
1.2-51	Figure replaced by Drawing M-5200, Sh. 2
1.8-1	Piping and Instrument Symbols
1.8-2a	Figure replaced by Drawing M-100, Sh. 1
1.8-2b	Figure replaced by Drawing M-100, Sh. 2
1.8-2c	Figure replaced by Drawing M-100, Sh. 3
1.8-2d	Figure replaced by Drawing M-100, Sh. 4
1.8-3	Logic Symbols
1.8-4	Instrument Symbol

SUMMARY TABLE OF CONTENTS**Chapter 2****2.0 SITE CHARACTERISTICS**

- 2.1 Geography and Demography
 - 2.1.1 Site Location and Description
 - 2.1.2 Exclusion Area Authority and Control
 - 2.1.3 Population Distribution
 - 2.1.4 References
- 2.2 Nearby Industrial, Transportation, and Military Facilities
 - 2.2.1 Locations and Routes
 - 2.2.2 Descriptions
 - 2.2.3 Evaluation of Potential Accidents
 - 2.2.4 References
- 2.3 Meteorology
 - 2.3.1 Regional Climatology
 - 2.3.2 Local Meteorology
 - 2.3.3 On-Site Meteorological Measurements Program
 - 2.3.4 Short-Term (Accident) Diffusion Estimates
 - 2.3.5 Long Term (Routine) Diffusion Estimates
 - 2.3.6 References
- 2.4 Hydrologic Engineering
 - 2.4.1 Hydrologic Description
 - 2.4.2 Floods
 - 2.4.3 Probable Maximum Flood (PMF) on Streams and Rivers
 - 2.4.4 Potential Dam Failures Seismically Induced
 - 2.4.5 Probable Maximum Surge and Seiche Flooding
 - 2.4.6 Probable Maximum Tsunami Flooding
 - 2.4.7 Ice Effects
 - 2.4.8 Cooling Water Canals and Reservoirs
 - 2.4.9 Channel Diversions
 - 2.4.10 Flooding Protection Requirements
 - 2.4.11 Low Water Considerations
 - 2.4.12 Dispersion Dilution and Travel Time of Accidental Releases of Liquid Effluents in Surface Waters
 - 2.4.13 Groundwater
 - 2.4.14 Technical Specification and Emergency Operation Requirements
 - 2.4.15 References
- 2.5 Geology, Seismology and Geotechnical Engineering
 - 2.5.1 Basic Geologic and Seismic Information
 - 2.5.2 Vibratory Ground Motion
 - 2.5.3 Surface Faulting
 - 2.5.4 Stability of Subsurface Materials and Foundations
 - 2.5.5 Stability of Slopes
 - 2.5.6 References

SUMMARY TABLE OF CONTENTS

Chapter 2

- 2.5A U.S. Department of the Interior Report on Investigation of an Earth Disturbance at Wilkes-Barre
- 2.5B City of Wilkes-Barre Report on an Earth Disturbance
- 2.5C Boring Logs
 - 2.5C.1 Summary of Field Density Test Results
 - 2.5C.2 Listings of Boring Logs

SUMMARY TABLE OF CONTENTS**Chapter 2 Tables**

2.1-33	Past Population Changes of Counties Within 20 Miles of the Site
2.1-34	Population by Residence for Counties Within 20 Miles of the Site
2.1-35	Population Distribution 2010 0-10 Miles Distance (Miles)
2.1-36	Population Distribution 2010 0-50 Miles Distance (Miles)
2.1-37	Population Distribution 2020 0-10 Miles Distance (Miles)
2.1-38	Population Distribution 2020 0-50 Miles Distance (Miles)
2.1-39	Population Distribution 2000 0-10 Miles Distance (Miles)
2.1-40	Communities Within 10 Miles of the Site, 2000
2.1-41	Population Distribution 2000 0-50 Miles Distance (Miles)
2.1-42	Seasonal Population of Counties in Study Area, 2000
2.1-43	Industries Within 5 Miles of the Site
2.1-44	Population Projections for Berwick, Pennsylvania
2.1-45	Cumulative Populations for 1990 and 2000
2.1-46	Cumulative Populations for 1990, 2000, 2010 and 2020
2.2-1	Pipelines Within 5 Miles of the Site
2.3-1	Hurricanes Within 75 and 150 Nautical Miles of the Susquehanna Site Period of Record 1871 to 1969
2.3-2	Thunderstorm Days for Avoca, Pennsylvania Wilkes-Barre Scranton Airport, Period of Record 1956 to 1974, Values are expressed in Days
2.3-3	Total Number of Days in 5 Years Mixing Heights < 1500 m Wind Speeds < 4.0 sec-1 and No Significant Precipitation For Episodes Lasting at least 2 Days
2.3-5	Mean Monthly Values: Susquehanna Site (1973-1976)
2.3-6	Long Term Average Wind Speed and Prevailing Direction at Wilkes-Barre Scranton Airport, Period of Record: 1956-1974
2.3-7	Average Wind Speed and Prevailing Direction at the Susquehanna Site, Period of Record (1973-1976)
2.3-8	Wind Direction Persistence - Pasquill A (1973-1976)
2.3-9	Wind Direction Persistence - Pasquill B (1973-1976)
2.3-10	Wind Direction Persistence - Pasquill C (1973-1976)
2.3-11	Wind Direction Persistence - Pasquill D (1973-1976)
2.3-12	Wind Direction Persistence - Pasquill E (1973-1976)
2.3-13	Wind Direction Persistence - Pasquill F (1973-1976)
2.3-14	Wind Direction Persistence - Pasquill G (1973-1976)
2.3-15	Wind Direction Persistence - Pasquill All (1973-1976)
2.3-16	Wind Direction Persistence - Pasquill E, F, & G (1973-1976)
2.3-17	Long Term Temperature (°F) At Wilkes-Barre -Scranton Airport
2.3-18	Mean Monthly Temperature, Dew Point Temperature and Relative Humidity Wilkes-Barre Scranton Airport Period of Record: 1956-1974
2.3-19	Temperature and Moisture Data for the Susquehanna Site, Period of Record: 1973-1976
2.3-20	Statistics and Diurnal Variation of Meteorological Parameters Data Period: January 1973-1976
2.3-21	Statistics and Diurnal Variation of Meteorological Parameters Data Period: February 1973-1976

SUMMARY TABLE OF CONTENTS**Chapter 2 Tables**

2.3-22	Statistics and Diurnal Variation of Meteorological Parameters Data Period: March 1973-1976
2.3-23	Statistics and Diurnal Variation of Meteorological Parameters Data Period: April 1973-1976
2.3-24	Statistics and Diurnal Variation of Meteorological Parameters Data Period: May 1973-1976
2.3-25	Statistics and Diurnal Variation of Meteorological Parameters Data Period: June 1973-1976
2.3-26	Statistics and Diurnal Variation of Meteorological Parameters Data Period: July 1973-1976
2.3-27	Statistics and Diurnal Variation of Meteorological Parameters Data Period: August 1973-1976
2.3-28	Statistics and Diurnal Variation of Meteorological Parameters Data Period: September 1973-1976
2.3-29	Statistics and Diurnal Variation of Meteorological Parameters Data Period: October 1973-1976
2.3-30	Statistics and Diurnal Variation of Meteorological Parameters Data Period: November 1973-1976
2.3-31	Statistics and Diurnal Variation of Meteorological Parameters Data Period: December 1973-1976
2.3-32	Statistics and Diurnal Variation of Meteorological Parameters Data Period: January 1973-December 1976
2.3-33	Long Term Monthly Precipitation Data (Liquid Equivalent, In Inches) for Wilkes-Barre Scranton Airport at Avoca, PA
2.3-34	Expected Rainfall by Duration and Recurrence Interval for Vicinity of Susquehanna Site (Ref. 2.3-20) (Inches)
2.3-35	Probable Maximum Precipitation for Varying Rainfall Durations and Areas (Ref. 2.3-21) (Inches)
2.3-36	Precipitation Data for the Susquehanna Site (Inches of Water) (1973-1976)
2.3-37	Frequency Distribution of Precipitation Data Period: January 1973-1976
2.3-38	Frequency Distribution of Precipitation Data Period: February 1973-1976
2.3-39	Frequency Distribution of Precipitation Data Period: March 1973-1976
2.3-40	Frequency Distribution of Precipitation Data Period: April 1973-1976
2.3-41	Frequency Distribution of Precipitation Data Period: May 1973-1976
2.3-42	Frequency Distribution of Precipitation Data Period: June 1973-1976
2.3-43	Frequency Distribution of Precipitation Data Period: July 1973-1976
2.3-44	Frequency Distribution of Precipitation Data Period: August 1973-1976
2.3-45	Frequency Distribution of Precipitation Data Period: September 1973-1976
2.3-46	Frequency Distribution of Precipitation Data Period: October 1973-1976
2.3-47	Frequency Distribution of Precipitation Data Period: November 1973-1976
2.3-48	Frequency Distribution of Precipitation Data Period: December 1973-1976
2.3-49	Frequency Distribution of Precipitation Data Period: January 1973-December 1976
2.3-50	Precipitation Wind Rose January 1973-1976
2.3-51	Precipitation Wind Rose February 1973-1976
2.3-52	Precipitation Wind Rose March 1973-1976
2.3-53	Precipitation Wind Rose April 1973-1976
2.3-54	Precipitation Wind Rose May 1973-1976

SUMMARY TABLE OF CONTENTS**Chapter 2 Tables**

2.3-55	Precipitation Wind Rose June 1973-1976
2.3-56	Precipitation Wind Rose July 1973-1976
2.3-57	Precipitation Wind Rose August 1973-1976
2.3-58	Precipitation Wind Rose September 1973-1976
2.3-59	Precipitation Wind Rose October 1973-1976
2.3-60	Precipitation Wind Rose November 1973-1976
2.3-61	Precipitation Wind Rose December 1973-1976
2.3-62	Precipitation Wind Rose January 1973-December 1976
2.3-63	Heavy Fog (Visibility 1/4 Mile or Less) at Avoca, PA.
2.3-64	Joint Frequency (%) of Wind Direction, Wind Speed and Stability, Stability Class A
2.3-65	Joint Frequency (%) of Wind Direction, Wind Speed and Stability, Stability Class B
2.3-66	Joint Frequency (%) of Wind Direction, Wind Speed and Stability, Stability Class C
2.3-67	Joint Frequency (%) of Wind Direction, Wind Speed and Stability, Stability Class D
2.3-68	Joint Frequency (%) of Wind Direction, Wind Speed and Stability, Stability Class E
2.3-69	Joint Frequency (%) of Wind Direction, Wind Speed and Stability, Stability Class F
2.3-70	Joint Frequency (%) of Wind Direction, Wind Speed and Stability, Stability Class G
2.3-71	Joint Frequency (%) of Wind Direction, Wind Speed and Stability, All Stability Classes
2.3-72	Mixing Heights (meters)
2.3-73	Heights of Meteorological Sensors
2.3-74	Data Recovery Rates
2.3-75	Joint Wind Frequency Distribution by Stability Class, Lower Wind January 1, 1999 through December 31, 2003 Stability Class: Pasquill A
2.3-76	Joint Wind Frequency Distribution by Stability Class, Lower Wind January 1, 1999 through December 31, 2003 Stability Class: Pasquill B
2.3-77	Joint Wind Frequency Distribution by Stability Class, Lower Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill C
2.3-78	Joint Wind Frequency Distribution by Stability Class, Lower Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill D
2.3-79	Joint Wind Frequency Distribution By Stability Class, Lower Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill E
2.3-80	Joint Wind Frequency Distribution By Stability Class, Lower Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill F
2.3-81	Joint Wind Frequency Distribution by Stability Class, Lower Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill G
2.3-82	Joint Wind Frequency Distribution by Stability Class Lower Wind January 1, 1999 through December 31, 2003, All Classes
2.3-84	Joint Wind Frequency Distribution by Stability Class, Upper Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill A
2.3-85	Joint Wind Frequency Distribution by Stability Class, Upper Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill B
2.3-86	Joint Wind Frequency Distribution by Stability Class, Upper Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill C
2.3-87	Joint Wind Frequency Distribution by Stability Class, Upper Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill D
2.3-88	Joint Wind Frequency Distribution by Stability Class, Upper Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill E

SUMMARY TABLE OF CONTENTS**Chapter 2 Tables**

2.3-89	Joint Wind Frequency Distribution by Stability Class, Upper Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill F
2.3-90	Joint Wind Frequency Distribution by Stability Class, Upper Wind January 1, 1999 through December 31, 2003, Stability Class: Pasquill G
2.3-91	Joint Wind Frequency Distribution by Stability Class, Upper Wind January 1, 1999 through December 31, 2003, All Classes
2.3-92	Summary of Short-Term X/Q (SEC/M3) Results at 549M EAB
2.3-93	1999 Probability Values for 1 Hour at SSES EAB
2.3-94	2000 Probability Values for 1 Hour at SSES EAB
2.3-95	2001 Probability Values for 1 Hour at SSES EAB
2.3-96	2002 Probability Values for 1 Hour at SSES EAB
2.3-97	2003 Probability Values for 1 Hour at SSES EAB
2.3-98	1999-2003 Probability Values for 1 Hour at SSES EAB
2.3-99	1999 Probability Values for 1 Hour at SSES LPZ
2.3-100	2000 Probability Values for 1 Hour at SSES LPZ
2.3-101	2001 Probability Values for 1 Hour at SSES LPZ
2.3-102	2002 Probability Values for 1 Hour at SSES LPZ
2.3-103	2003 Probability Values for 1 Hour at SSES LPZ
2.3-104	1999-2003 Probability Values for 1 Hour at SSSS LPZ
2.3-105	Summary of Long-Term X/G (SEC/M3) Results at 4827M LPZ
2.3-106	Distances and Terrain/Recirculation Correction Factors for SSES 2003 Land Use Census Locations
2.3-107	1999 Average Relative Concentration (sec/m ³) and Disposition (m ⁻²) Estimates at the Site Boundary
2.3-108	2000 Average Relative Concentration (sec/m ³) and Deposition (m ⁻²) Estimates at the Site Boundary
2.3-109	2001 Average Relative Concentration (sec/m ³) and Deposition (m ⁻²) Estimates at the Site Boundary
2.3-110	2002 Average Relative Concentration (sec/m ³) and Deposition (m ⁻²) Estimates at the Site Boundary
2.3-111	2003 Average Relative Concentration (sec/m ³) and Deposition (m ⁻²) Estimates at the Site Boundary
2.3-112	1999-2003 Average Relative Concentration (sec/m ³) and Deposition (m ⁻²) Estimates at the Site Boundary
2.3-113	1999 Average Relative Concentration (sec/m ³) and Deposition (m ⁻²) Estimates at the Exclusion Area Boundary
2.3-114	2000 Average Relative Concentration (sec/m ³) and Deposition (m ⁻²) Estimates at the Exclusion Area Boundary
2.3-115	2001 Average Relative Concentration (sec/m ³) and Deposition (m ⁻²) Estimates at the Exclusion Area Boundary
2.3-116	2002 Average Relative Concentration (sec/m ³) and Deposition (m ⁻²) Estimates at the Exclusion Area Boundary
2.3-117	2003 Average Relative Concentration (sec/m ³) and Deposition (m ⁻²) Estimates at the Exclusion Area Boundary
2.3-118	1999-2003 Average Relative Concentration (sec/m ³) and Deposition (m ⁻²) Estimates at the Exclusion Area Boundary.

SUMMARY TABLE OF CONTENTS**Chapter 2 Tables**

2.3-119	1999 Atmospheric Dispersion Estimates for Nearest Residence and Vegetable Garden
2.3-120	2000 Atmospheric Dispersion Estimates for Nearest Residence and Vegetable Garden
2.3-121	2001 Atmospheric Dispersion Estimates for Nearest Residence and Vegetable Garden
2.3-122	2002 Atmospheric Dispersion Estimates for Nearest Residence and Vegetable Garden
2.3-123	2003 Atmospheric Dispersion Estimates for Nearest Residence and Vegetable Garden
2.3-124	1999-2003 Atmospheric Dispersion Estimates for Nearest Residence and Vegetable Garden
2.3-125	1999 Atmospheric Dispersion Estimates for Nearest Meat Animal, Dairy Locations and Special Receptors
2.3-126	2000 Atmospheric Dispersion Estimates for Nearest Meat Animal, Dairy Locations and Special Receptors
2.3-127	2001 Atmospheric Dispersion Estimates for Nearest Meat Animal, Dairy Locations and Special Receptors
2.3-128	2002 Atmospheric Dispersion Estimates for Nearest Meat Animal, Dairy Locations and Special Receptors
2.3-129	2003 Atmospheric Dispersion Estimates for Nearest Meat Animal, Dairy Locations and Special Receptors
2.3-130	1999-2003 Atmospheric Dispersion Estimates for Nearest Meat Animal, Dairy Locations and Special Receptors
2.3-131	1999 Atmospheric Dispersion Estimates at Selected Locations
2.3-132	2000 Atmospheric Dispersion Estimates at Selected Locations
2.3-133	2001 Atmospheric Dispersion Estimates at Selected Locations
2.3-134	2002 Atmospheric Dispersion Estimates at Selected Locations
2.3-135	2003 Atmospheric Dispersion Estimates at Selected Locations
2.3-136	1999-2003 Atmospheric Dispersion Estimates at Selected Locations
2.3-137	SSES Relative Concentrations No Decay, Undepleted X/Q (sec/m^3) X/Q Accumulation for Ground Average for the Period of 01/01/99 through 12/31/03
2.3-138	SSES Relative Concentrations 2.26-Day Decay, Undepleted X/Q (sec/m^3) for Ground Decayed Sector Average for the Period of 01/01/99 through 12/31/03
2.3-139	SSES Relative Concentrations 8-Day Decay, Depleted X/Q (sec/m^3) for Ground Decayed Sector Average for the Period of 01/01/99 through 12/31/03
2.3-140	SSES Relative Deposition D/Q (m^{-2}) for the Period of 01/01/99 through 12/31/03
2.4-1	Existing and Proposed Dams Located in the Susquehanna River Basin (Chemung River Basin)
2.4-2	Minor Upstream Dams and Reservoirs
2.4-3	Water Users
2.4-4	Historic Floods in the Vicinity of the Susquehanna Steam Electric Station.
2.4-5	All-Season 24-Hour Probable Maximum Precipitation
2.4-6	Probable Maximum Precipitation for Durations Less Than 30 Min.
2.4-7	Peak Runoff Rates from and Maximum Ponding Depths on Roofs of Safety Related Structures for Local All-Season PMP

SUMMARY TABLE OF CONTENTS**Chapter 2 Tables**

2.4-8	Adopted 4-Hour Unit Hydrographs and Characteristics.
2.4-9	Susquehanna River Basin Routing Coefficients
2.4-10	Manning "N" Values Computed from 1936 Flood
2.4-11	Susquehanna River Freeze Over at Harrisburg (1870-1955)
2.4-12	Ice Jam Flooding
2.4-13	Summary of Flood Routing Studies - Spray Pond
2.4-14	Results of Wind Wave Computation
2.4-15	Maximum Loadings Resulting from Wind-Wave Activities
2.4-16	Maximum Hydrodynamic Loading Resulting from Earthquake
2.4-18	ESW Cooling Duty on Simultaneous Loss of All Auxiliary Power to Both Units
2.4-21	Regional Hydrogeologic Section (within 20-mile radius of Susquehanna SES)
2.4-22	Water Well Data Within Two Miles of the Station
2.4-23	Spring Data Within Two Miles of the Station
2.4-24	Data for Major Water Wells, Other Than Public Wells, located Between 2 and 10 Miles From the Station
2.4-25	Data for Public Supply Wells Located Between 2 and 20 Miles from the Station
2.4-26	Estimated Groundwater Withdrawal in 1976 Within Two Miles of the Station
2.4-27	Projections of Future Groundwater Withdrawal Within 2 and 20 Miles of the Station
2.4-28	Major Groundwater Withdrawal, and Population Served by Water Supply Companies Within 20-Mile Area
2.4-29	Estimation of Total Groundwater Withdrawal in 1975 Within 20 Mile Radius of the Station
2.4-30	Details of the Construction of Observation Wells at the Susquehanna SES
2.4-31	Groundwater Level Data Taken at Susquehanna SES 1972 through 1975
2.4-32	Groundwater Level Data Taken at Susquehanna SES in 1976 and 1977
2.4-33	Summary of Permeability Tests of Overburden and Upper Bedrock at the Susquehanna SES Performed During Previous Investigations
2.4-34	Summary of Permeability Tests of Overburden and Upper Bedrock at the Susquehanna SES Performed for This Investigation
2.4-35	Radionuclide Content of the Tank Postulated to Rupture – Reactor Water Cleanup (RWCU) Phase Separator Tanks-Susquehanna SES
2.4-36	Groundwater Parameter Values Used for SLUG3D Simulations Accident Analysis for Susquehanna SES
2.4-37	Range of Parameter Values used in Calibrated Numerical Model of Buried Valley Aquifer Northern Side of Susquehanna SES
2.4-38	Estimated Peak Concentration of Radionuclides in Groundwater Resulting from Postulated Rupture of RWCU Phase Separator Tank – Results of Simulations with SLUG3D Model – Susquehanna SES
2.4-39	Estimated Peak Concentration of Radionuclides in Groundwater in Buried Valley Aquifer Resulting from postulated Rupture of RWCU Phase Separator Tank – Results of Simulations with SLUG3D Model – Susquehanna SES
2.5-1	Modified Mercalli Intensity (Damage) Scale (Abridged)
2.5-2	Earthquake list
2.5-3	Unconfined Compressive Strengths of Foundation Rock (Mahantango Formation)
2.5-4	Laboratory Measurements of P-Wave Seismic Velocities on Rock Cores taken from Reactor and Turbine Building Areas

SUMMARY TABLE OF CONTENTS**Chapter 2 Tables**

2.5-5	Representative Engineering Properties of Unweathered Foundation Rock for Principal Plant Structures
2.5-6	P-Wave and S-Wave Velocities and Computed Dynamic Moduli, Spray Pond Area
2.5-7	Cross-Hole Seismic Velocities, Reactor Area
2.5-8	Results of Settlement Measurements Taken on ESSW Pumphouse Basemat
2.5-9	Spray Pond Water Level Elevations
2.5-10	Permeabilities Measured in Spray Pond
2.5-11	Permeabilities Measured Near the Railroad Bridge
2.5-12	Circulation Losses in Drill Holes in Spray Pond
2.5-13	Soil Test Results Summary
2.5-14	Spray Pond Summary of Cyclic Consolidated-Undrained Triaxial (CR) Tests
2.5-15	Design Parameters for Spray Pond Liner
2.5-16	Spray Pond, Summary of Liquefaction Analysis
2.5-17	Effect of Varying Standard Relationship of Effective Strain with Damping and Moduli for Profile 2, GWT-665
2.5-18	Spray Pond Factor of Safety as Obtained Using Different Earthquakes
2.5-19	Probable Settlement During Earthquake

SUMMARY TABLE OF CONTENTS**Chapter 2 Figures**

2.1-21	Site Vicinity Map
2.1-22	Site Area Map
2.1-23	Population Distribution 0-10 Miles, 2010
2.1-24	Population Distribution 0-50 Miles, 2010
2.1-25	Population Distribution 0-10 Miles, 2020
2.1-26	Population Distribution 0-50 Miles, 2020
2.1-27	Seasonal Population 0-10 Miles, 2000
2.1-28	Seasonal Population 0-50 Miles, 2000
2.2-1	Major Transportation Routes and Pipelines
2.2-2	Airport and Airline Route Map
2.2-3	Pipeline Break at Elevation 700', Steady State Break Flow
2.2-4	Pipeline Break at Elevation 600', Steady State Break Flow
2.3-1	Tornado Occurrence and Intensity in Susquehanna Region
2.3-2	TP25 Rainfall Intensity – Duration Frequency Curves USDC WB, 1955
2.3-3	Topography Within 5 Miles
2.3-4-1	Maximum Terrain Elevation Versus Distance By Sector
2.3-4-2	Maximum Terrain Elevation Versus Distance By Sector
2.3-4-3	Maximum Terrain Elevation Versus Distance By Sector
2.3-4-4	Maximum Terrain Elevation Versus Distance By Sector
2.3-4-5	Maximum Terrain Elevation Versus Distance By Sector
2.3-4-6	Maximum Terrain Elevation Versus Distance By Sector
2.3-4-7	Maximum Terrain Elevation Versus Distance By Sector
2.3-4-8	Maximum Terrain Elevation Versus Distance By Sector
2.3-5	Schematic of Instrumentation
2.3-6	One Hour Direction Independent X/Q at the EAB (Weighted Average of 1999, 2000, 2001, 2002 and 2003 Calculations)
2.3-7	One Hour Direction Dependent X/Q Values at the EAB (Weighted Average of 1999, 2000, 2001, 2002 and 2003 Calculations)
2.3-8	One Hour Direction Dependent X/Q Values at the LPZ (Weighted Average of 1999, 2000, 2001, 2002 and 2003 Calculations)
2.3-9	One Hour Direction Independent X/Q at the LPZ (Weighted Average of 1999, 2000, 2001, 2002 and 2003 Calculations)
2.3-10	Interpolated X/Q Values at the LPZ (Weighted Average of 1999, 2000, 2001, 2002 and 2003 Calculations)
2.4-3	Plant Complete Showing Storm Drain Pipe Layout
2.4-4	Susquehanna River Basin
2.4-5	Stage Discharge Curve at Low Flows
2.4-6	Stage Discharge Curve, Discharge Range 1000-37,000 CFS
2.4-7	Water Users on the Susquehanna River
2.4-8	Stage Discharge Curves at Plant Site
2.4-9	Flood Profiles on the Susquehanna River at the Site
2.4-10	General Site Drainage Plan
2.4-11	Site Drainage Locations A&B
2.4-12	Site Drainage Locations C&D

SUMMARY TABLE OF CONTENTS**Chapter 2 Figures**

2.4-13	Site Drainage Locations E&F
2.4-14	Probable Maximum Precipitation Storm Pattern and Outline of Sub-Basins, Susquehanna River above Wilkes-Barre, Pennsylvania
2.4-15	Probable Maximum Precipitation on Susquehanna River Basin and Probable Maximum Flood Hydrograph at Wilkes-Barre, Pennsylvania
2.4-16	Map of the Susquehanna River, River Miles 150-170
2.4-17	Stage Discharge Curve at Section 2-Berwick Bridge
2.4-18	River and Water Surface Profiles of Susquehanna River in Vicinity of Site
2.4-19	Cross Sections at the Eight River Sections Near the Site
2.4-20	Cross Section of River at the Plant Site
2.4-21	Wind Fetch, Susquehanna River PMF
2.4-22	Tioga Dam and Hammond Dam Reservoir Areas and Sections
2.4-23	Surface Drainage Patterns around the Spray Pond
2.4-24	Spray Pond Inflow and Outflow Hydrograph
2.4-25	Spray Pond Outlet Rating Curves
2.4-26	Spray Pond Elevation Area Storage Capacity Curves
2.4-27	Spray Pond Emergency Spillway Water Surface Profile
2.4-28	Spray Pond Design Spectrum for SSE
2.4-29	Spray Pond Design Spectrum for OBE
2.4-30	Duration Curves of Daily Discharge
2.4-31	Time of Travel, Susquehanna River Shickshinny to Danville
2.4-32	Map of Susquehanna SES Showing Groundwater Contours in September 1977
2.4-33	Hydrogeologic Cross Section from West to East Along Groundwater Flow Path at the Susquehanna SES
2.4-34	Bedrock Geologic Map of Area Within 20 Miles of Susquehanna SES
2.4-35	Major Pleistocene Sand and Gravel Deposits Within 20 Miles of Susquehanna SES
2.4-36	Geologic Map of Area Within Two Miles of the Station
2.4-37	Water Wells Within Two Miles of the Station
2.4-38	Springs Used for Water Supply Within Two Miles of the Station
2.4-39	Major Water Wells Two to Ten Miles from the Station, Excepting Public Supply Wells
2.4-40	Public Supply Wells Two to Twenty Miles from the Station
2.4-41	Map of Susquehanna SES Showing Isopach Contours of Overburden Thickness
2.4-42	Map of Susquehanna SES Showing Top-of-Bedrock Contours
2.4-43	Map of Susquehanna SES Showing Groundwater Contours in April 1977
2.4-44	Log of Boring and Observation Well Construction Details-1200, 1200A
2.4-45	Log of Boring and Observation Well Construction Details-1201
2.4-46	Log of Boring and Observation Well Construction Details-1204
2.4-47	Log of Boring and Observation Well Construction Details-1208
2.4-48	Log of Boring and Observation Well Construction Details-1209A
2.4-49	Log of Boring and Observation Well Construction Details-1210
2.4-50	Map of Susquehanna SES Showing Groundwater Contours in June 1971
2.4-51	Drawdown Curves from Pumping Tests of Observation Wells 1204 and 1210
2.4-52	River Intake Structure
2.4-53	River Discharge Diffuser
2.4-54	Figure replaced by Drawing A-12. Sh. 1
2.4-55	Figure replaced by Drawing FF62005, Sh. 1

SUMMARY TABLE OF CONTENTS**Chapter 2 Figures**

2.5-1	Site Location
2.5-2	Regional Physiographic Map
2.5-3	Regional Geologic Map
2.5-4	Location of Appalachian Basin
2.5-5	Regional Isopach Maps
2.5-6	Stratigraphic Columns
2.5-7	Regional Tectonic Map
2.5-8a	Earthquake Epicenters and Tectonic Province Boundaries in the Site Region
2.5-8b	Earthquake Epicenters Within 200 Miles of the Site
2.5-9	Bouguer Gravity Anomaly Map
2.5-10	Geologic Map of the Bloomsburg-Berwick Area
2.5-11	Regional Landsat Lineaments
2.5-12	Site Geologic Map
2.5-13	Photograph of Geologic Feature Found in Turbine Building Excavation
2.5-14	Site Vicinity Geologic Column
2.5-15	Geologic Map of Spray Pond Area
2.5-17	Contours on Top of Bedrock Surface
2.5-17a	Extent of Rock and Soil Foundations
2.5-18	Geologic Map of Foundation Excavation
2.5-19	Geologic Section Through Foundation Excavations
2.5-20a	Photograph of Geologic Features Exposed in Excavations
2.5-20b	Photograph of Geologic Features Exposed in Excavations
2.5-20c	Photograph of Geologic Features Exposed in Excavations
2.5-20d	Photograph of Geologic Features Exposed in Excavations
2.5-20e	Photograph of Geologic Features Exposed in Excavations
2.5-20f	Photograph of Geologic Features Exposed in Excavations
2.5-20g	Photograph of Geologic Features Exposed in Excavations
2.5-21a	Site Geologic Cross Sections
2.5-21b	Site Geologic Cross Sections
2.5-22	Plot Plan
2.5-22a	Plot Plan Details
2.5-23a	Log of Borings
2.5-23b	Log of Borings
2.5-23c	Log of Borings
2.5-23d	Log of Borings
2.5-23e	Log of Borings
2.5-23f	Log of Borings
2.5-23g	Log of Borings
2.5-23h	Log of Borings
2.5-23i	Log of Borings
2.5-23j	Log of Borings
2.5-23k	Log of Borings
2.5-23l	Log of Borings
2.5-23m	Log of Borings
2.5-23n	Log of Borings
2.5-23o	Log of Borings
2.5-23p	Log of Borings

SUMMARY TABLE OF CONTENTS**Chapter 2 Figures**

2.5-23q	Log of Borings
2.5-23r	Log of Borings
2.5-23s	Log of Borings
2.5-23t	Log of Borings
2.5-24	Final Plant Grades
2.5-25	Tectonic Map of Anthracite Region
2.5-26	Geologic Section of Anthracite Region
2.5-27	Design Response Spectra-Safe Shutdown Earthquake
2.5-28	Design Response Spectra-Operating Basis Earthquake
2.5-29	Geophysical Surveys
2.5-30	Spray Pond-Generalized Cross-Sections
2.5-30a	Diesel Generator 'E' Fuel Tank – Generalized Cross-Sections
2.5-31	Spray Pond, Range of Grain Size Curves
2.5-32	Relative Density Related to N Value at ESSW Pumphouse Site
2.5-33	"N" Value Versus Elevation at ESSW Pumphouse Site
2.5-34	Spray Pond, Consolidated Drained Triaxial Test - Mohr Circle Diagram
2.5-35	Spray Pond, Summary of Cyclic Shear Test (CR) Results
2.5-36	Spray Pond, Shear Wave Velocity Design Curves
2.5-37	Location and Limits of Excavation Fill and Backfill for Class 1 Structures
2.5-38	Location of Spray Pond with Contours on Top of Rock and Water Table
2.5-39	Lateral Soil Pressure Diagrams
2.5-40	Spray Pond, Measured and Projected Water Levels
2.5-41	Details of Settlement Pins Cast in ESSW Pumphouse Basemat
2.5-42	Spray Pond, Earthwork Plan
2.5-43	Figure replaced by Drawing C-63, Sh. 1
2.5-44	Spray Pond, Boring and Test Pits Location Plan
2.5-45	Spray Pond, Generalized Cross Sections with Laboratory Test Locations
2.5-46	Spray Pond, Relative Density Related to "N" Value
2.5-47	Spray Pond, Relationship Between Seepage Loss and Maximum Groundwater Elevation
2.5-48	Spray Pond, Soil Profiles Used in Liquefaction Analysis
2.5-49	Spray Pond, Factor of Safety Variation with Groundwater Table and Depth
2.5-50	Spray Pond, Minimum Factor of Safety Against Liquefaction At Selected Locations
2.5-50A	Variation Factor of Safety (F.S) vs Change of Damping Ratio
2.5-51	Spray Pond, Comparison of Factors of Safety for Liquefaction for the Design Earthquake and Some Real Earthquakes
2.5-52	Spray Pond, Comparison of Average Cycle Stress As Induced by Design Earthquake and Some Real Earthquakes
2.5-53	Spray Pond, Average Shear Variation with Depth
2.5-54	Spray Pond, Summary of Pore Pressure Buildup
2.5-55	Site Water Table Map (Preconstruction)
2.5-56	Profile of Slope North of Spray Pond
2.5-57	Spray Pond Relationship Between Liner Thickness, Liner Permeability and Seepage Loss
2.5-58	Damping Ratio Versus Shear Strain of Sand in Liquefaction Analysis
2.5-59	Sample Locations of Soil Density Tests
2.5-60	Statistical Analysis of Field Density Test Results

SUMMARY TABLE OF CONTENTS

Chapter 2 Figures

2.5-61	Statistical Analysis of Sand-Cement-Flyash Bedding and Backfill
2.5-62	ESSW Pumphouse Floor Plan El. 685'-6"

SUMMARY TABLE OF CONTENTS**Chapter 3****3.0 DESIGN OF STRUCTURES, COMPONENTS, EQUIPMENT SYSTEMS**

- 3.1 Conformance with NRC General Design Criteria
 - 3.1.1 Summary Description
 - 3.1.2 Criterion Conformance
- 3.2 Classification of Structures, Components and Systems
 - 3.2.1 Seismic Classification
 - 3.2.2 System Quality Group Classification
 - 3.2.3 System Safety Classifications
 - 3.2.4 Quality Assurance
 - 3.2.5 Correlation of Safety Classes with Industry Codes
- 3.3 Wind and Tornado Loadings
 - 3.3.1 Wind Loadings
 - 3.3.2 Tornado Loadings
 - 3.3.3 References
- 3.4 Water Level (Flood) Design
- 3.5 Missile Protection
 - 3.5.1 Missile Selection and Description
 - 3.5.2 Systems to be Protected
 - 3.5.3 Barrier Design Procedures
 - 3.5.4 References
- 3.6 Protection against Dynamic Effects Associated with the Postulated Rupture of Piping
 - 3.6.1 Postulated Piping Failures in Fluid Systems
 - 3.6.2 Determination of Pipe Failure Locations and Dynamic Effects Associated with the Postulated Piping Failure
 - 3.6.3 Definitions
 - 3.6.4 References
- 3.6A Pipe Break Outside Containment Summary of Analysis and Results
- 3.7A Seismic Design
 - 3.7a.1 Seismic Input
 - 3.7a.2 Seismic System Analysis
 - 3.7a.3 Seismic Subsystem Analysis
 - 3.7a.4 Seismic Instrumentation
 - 3.7a.5 References
- 3.7B Seismic Design
 - 3.7b.1 Seismic Input
 - 3.7b.2 Seismic System Analysis
 - 3.7b.3 Seismic Subsystem Analysis

SUMMARY TABLE OF CONTENTS**Chapter 3**

3.7b.4	Seismic Instrumentation
3.7b.5	References
3.8	Design of Category I Structures
3.8.1	Concrete Containment
3.8.2	ASME Class MC Steel Components of the Containment
3.8.3	Containment Internal Structures
3.8.4	Other Seismic Category I Structures
3.8.5	Foundations
3.8A	Computer Programs
3.8A.1	D/SAP
3.8A.2	ASHSD
3.8A.3	CECAP
3.8A.4	CE 668
3.8A.5	EASE
3.8A.6	EO119
3.8A.7	EO781
3.8A.8	FINEL
3.8A.9	ME620
3.8A.10	SUPERB
3.8A.11	References
3.8B	Concrete, Concrete Materials, Quality Control, and Special Construction Techniques
3.8B.1	Concrete and Concrete Materials - Qualifications
3.8B.2	Concrete and Concrete Materials - Batching, Placing, Curing and Protection
3.8B.3	Concrete and Concrete Materials - Construction Testing
3.8B.4	Concrete Reinforcement Materials - Qualifications
3.8B.5	Concrete Reinforcement Materials - Fabrication
3.8B.6	Concrete Reinforcement Materials - Construction Testing
3.8B.7	Formwork and Construction Joints
3.8C	Concrete Unit Masonry, Masonry Materials and Quality Control
3.8C.1	Concrete Unit Masonry and Masonry Materials - Qualifications
3.8C.2	Concrete Unit Masonry and Masonry Materials - Construction and Erection
3.8C.3	Concrete Unit Masonry and Masonry Materials - Construction Testing
3.9	Mechanical Systems and Components
3.9.1	Special Topics for Mechanical Components
3.9.2	Dynamic Testing and Analysis
3.9.3	ASME Code Class 1, 2, and 3 Components, Component Supports, and Core Support Structures
3.9.4	Control Rod Drive System
3.9.5	Reactor Pressure Vessel Internals
3.9.6	In-service Testing of Pumps and Valves
3.9.7	References

SUMMARY TABLE OF CONTENTS**Chapter 3**

- 3.9A Computer Programs
 - 3.9A.1 ME101
 - 3.9A.2 ME632
 - 3.9A.3 ME912
 - 3.9A.4 ME913
 - 3.9A.5 References
- 3.10 Seismic Qualifications of Category I Instrumentation and Electrical Equipment
 - 3.10A Seismic Qualification of Seismic Category I NSSS Instrumentation and Electrical Equipment
 - 3.10a.1 Seismic Qualification Criteria
 - 3.10a.2 Methods and Procedures for Qualifying Electrical Equipment and Instrumentation (Excluding Motors and Valve Mounted Equipment)
 - 3.10a.3 Methods and Procedure of Analysis or Testing of Supports of Electrical Equipment and Instrumentation
 - 3.10a.4 Operating License Review
 - 3.10a.5 Dynamic Analysis By Response Spectrum Method
 - 3.10B Seismic Qualification of Non-NSSS Supplied Seismic Category I Instrumentation
 - 3.10b.1 Seismic Qualification Criteria
 - 3.10b.2 Seismic Category I Equipment Qualification
 - 3.10b.3 Methods and Procedures of Analysis or Testing of Supports of Instrumentation
 - 3.10b.4 Operating License Review
 - 3.10C Seismic Qualification of Non-NSSS Seismic Category I Electrical Equipment
 - 3.10c.1 Seismic Qualification Criteria
 - 3.10c.2 Methods and Procedures for Qualifying Electrical Equipment
 - 3.10c.3 Methods and Procedures of Analysis or Testing of Supports of Electrical Equipment
 - 3.10c.4 Operating License Review
- 3.11 Environmental Design of Mechanical and Electrical Equipment
 - 3.11.1 Equipment Identification and Environmental Conditions
 - 3.11.2 Qualification Test and Analysis
 - 3.11.3 Qualification Test Results
 - 3.11.4 Loss of Ventilation
 - 3.11.5 Estimated Chemical, Physical, and Radiation Environment
 - 3.11.6 References
- 3.12 Separation Criteria for Safety-Related Mechanical and Electrical Equipment
 - 3.12.1 Introduction
 - 3.12.2 Mechanical Systems
 - 3.12.3 Electrical Systems and Equipment Separation Criteria

SUMMARY TABLE OF CONTENTS

Chapter 3

- 3.13 Compliance with NRC Regulatory Guides
- 3.13.1 Division 1, Regulatory Guides - Power Reactors

- 3.14 License Renewal Programs, TLAA and Commitments
- 3.14.1 Introduction
- 3.14.2 Aging Management Program (AMP)
- 3.14.3 Evaluation of Time-Limited Aging Analysis (TLAA)
- 3.14.4 License Renewal Regulatory Commitments List
- 3.14.5 Newly Identified Items (10 CFR 54.37 (b))

SUMMARY TABLE OF CONTENTS**Chapter 3 Tables**

3.2-1	SSES Design Criteria Summary
3.2-2	Summary of Codes and Standards for Components of Water-Cooled Nuclear Power Units Supplied by AE (ordered prior to July 1, 1971 with the exception of those components located inside the RCPB, and the reactor pressure vessel)
3.2-3	Summary of Codes and Standards for Components of Water-Cooled Nuclear Power Units Supplied by AE (ordered after July 1, 1971)
3.2-4	Code Group Designations - Industry Codes and Standards for Mechanical Components Supplied by the NSSS Vendor
3.2-5	Summary of Safety Class Design Requirements (Minimum)
3.3-1	Wind Loads on Structures
3.3-2	Tornado Wind Protected Systems and Tornado Resistant Enclosures
3.5-4	Tornado-Generated Missile Parameters for All Tornado-Resistant Structures Except the Diesel Generator 'E' Building
3.5-4a	Tornado-Generated Missile Parameters for Diesel Generator 'E' Building
3.5-5	Berwick Airport Movement Summary
3.5-6	Plant Target Areas
3.5-7	Calculated Stress for Bonnet-Seal Type Valves
3.5-10	Turbine System Reliability Criteria
3.6-1	High Energy Fluid System Piping
3.6-1a	Moderate Energy Fluid System Piping (Located in Safety-Related Structures)
3.6-2	Safety Components in Close Proximity to High Energy Fluid System Piping – (Requiring Jet Impingement Protection) Primary Containment
3.6-3	Safety Components in Close Proximity to High Energy Fluid System Piping – (Requiring Jet Impingement Protection) Reactor Building
3.6-4	Restraint Data
3.6-5	Comparison of PDA and NSC Code
3.6-6a	Summary of Stress in High Energy ASME Class 1 Piping - Main Steam Line Inside Containment - Unit 1-Line "A"
3.6-6b	Summary of Stress in High Energy ASME Class 1 Piping - Main Steam Line Inside Containment - Unit 1-Line "B"
3.6-6c	Summary of Stress in High Energy ASME Class 1 Piping - Main Steam Line Inside Containment - Unit 1-Line "C"
3.6-6d	Summary of Stress in High Energy ASME Class 1 Piping - Main Steam Line Inside Containment - Unit 1-Line "D"
3.6-6e	Summary of Stress in High Energy ASME Class 1 Piping - Main Steam Line Inside Containment - Unit 2-Line "A"
3.6-6f	Summary of Stress in High Energy ASME Class 1 Piping - Main Steam Line Inside Containment - Unit 2-Line "B"
3.6-6g	Summary of Stress in High Energy ASME Class 1 Piping - Main Steam Line Inside Containment - Unit 2-Line "C"
3.6-6h	Summary of Stress in High Energy ASME Class 1 Piping - Main Steam Line Inside Containment - Unit 2-Line "D"
3.6-7	Summary of Stress in High Energy ASME Class 1 Piping - Feedwater Line Inside Containment-Unit 1

SUMMARY TABLE OF CONTENTS**Chapter 3 Tables**

3.6-7a	Summary of Stress in High Energy ASME Class 1 Piping - Feedwater Line Inside Containment-Unit 2
3.6-8	Summary of Stress in High Energy ASME Class 1 Piping - HPCI Steam Supply Line Inside Containment - Unit 1
3.6-8a	Summary of Stress in High Energy ASME Class 1 Piping - HPCI Steam Supply Line Inside Containment - Unit 2
3.6-9	Summary of Stress in High Energy ASME Class 1 Piping - RCIC Steam Supply Line Inside Containment - Unit 1
3.6-9a	Summary of Stress in High Energy ASME Class 1 Piping - RCIC Steam Supply Line Inside Containment - Unit 2
3.6-10	Summary of Stress in High Energy ASME Class 1 Piping - Core Spray Line Inside Containment-Unit 1
3.6-10a	Summary of Stress in High Energy ASME Class 1 Piping - Core Spray Line Inside Containment-Unit 2
3.6-11	Summary of Stress in High Energy ASME Class 1 Piping - RHR Supply Line Inside Containment - Unit 1
3.6-11a	Summary of Stress in High Energy ASME Class 1 Piping - RHR Supply Line Inside Containment - Unit 2
3.6-12a	Summary of Stress in High Energy ASME Class 1 Piping - RHR Return Line Inside Containment Unit 1 Loop "A"
3.6-12a.1	Summary of Stress in High Energy ASME Class 1 Piping - Reactor Water Clean Up Line Inside Containment - Unit 1
3.6-12a.2	Summary of Stress in High Energy ASME Class 1 Piping - Reactor Water Clean Up Line Inside Containment - Unit 1
3.6-12a.3	Summary of Stress in High Energy ASME Class 1 Piping - Reactor Water Clean Up Line Inside Containment - Unit 1
3.6-12a.4	Summary of Stress in High Energy ASME Class 1 Piping - Reactor Water Clean Up Line Inside Containment - Unit 2
3.6-12a.5	Summary of Stress in High Energy ASME Class 1 Piping - Reactor Water Clean Up Line Inside Containment - Unit 2
3.6-12a.6	Summary of Stress in High Energy ASME Class 1 Piping - RHR Return Line Inside Containment - Unit 2-Loop "A"
3.6-12a.7	Summary of Stress in High Energy ASME Class 1 Piping - Reactor Water Clean Up Line Inside Containment-Unit 2
3.6-12b	Summary of Stress in High Energy ASME Class 1 Piping - RHR Return Line Inside Containment Unit 1 Loop "B"
3.6-12b.1	Summary of Stress in High Energy ASME Class 1 Piping - Head Vent Line Inside Containment-Unit 1
3.6-12b.2	Summary of Stress in High Energy ASME Class 1 Piping - Head Vent Line Inside Containment-Unit 1
3.6-12b.3	Summary of Stress in High Energy ASME Class 1 Piping - RHR Return Line Inside Containment-Unit 2 - Loop "B"
3.6-12b.4	Summary of Stress in High Energy ASME Class 1 Piping - Head Vent Line Inside Containment-Unit 2
3.6-12c	Summary of Stress in High Energy ASME Class 1 Piping - Head Spray Line Inside Containment-Unit 1

SUMMARY TABLE OF CONTENTS**Chapter 3 Tables**

3.6-12c.1	Summary of Stress in High Energy ASME Class 1 Piping - Head Spray Line Inside Containment-Unit 2
3.6-12d.1	Summary of Stress in High Energy ASME Class 1 Piping - Standby Liquid Control Line Inside Containment-Unit 1
3.6-12d.3	Summary of Stress in High Energy ASME Class 1 Piping - Standby Liquid Control Line Inside Containment-Unit 2
3.6-12e.1	Summary of Stress in High Energy ASME Class 1 Piping - MSIV Drain Lines Inside Containment - Unit 1
3.6-12e.2	Summary of Stress in High Energy ASME Class 1 Piping - MSIV Drain Lines Inside Containment - Unit 1
3.6-12e.3	Summary of Stress in High Energy ASME Class 1 Piping - MSIV Drain Lines Inside Containment - Unit 2
3.6-13	High Energy Fluid Systems With and Without Sufficient Capacity to Develop a Jet Stream
3.6-14	Summary of Stress in High Energy ASME Class 1 Piping - Recirculation Piping System - Loop "A" - Unit 1
3.6-15	Summary of Stress in High Energy ASME Class 1 Piping - Recirculation Piping System - Loop "A" -Unit 2
3.6A-1	Comparison of Flow Rates Computed from the Time Dependent Momentum Equation
3.6A-2	Case A - Steam Tunnel Compartment Volumes
3.6A-3	Steam Tunnel Flow Areas Coefficients and L/A
3.6A-4	For Case A & Case B
3.6A-5	Case B - Steam Tunnel Compartment Volumes
3.6A-6	Steam Tunnel Flow Areas Coefficients and L/A
3.7a-1	Critical Damping Ratios for Different Materials
3.7a-3	Number of Dynamic Response Cycles Expected During a Seismic Event
3.7b-1	Amplification Factors for Ground Spectra
3.7b-2	Amplification Factors for Diesel Generator 'E' Building's Ground Spectra
3.7b-3	Damping Values for Non-NSSS Materials (Percent of Critical Damping)
3.7b-4	Damping Values for Diesel Generator 'E' Facility
3.7b-5	Structure Foundation Interaction Coefficients
3.7b-6	Properties of Foundation Media for Containment and ESSW Pumphouse
3.7b-7	Natural Frequencies of Containment Below 33 CPS
3.7b-8	Natural Frequencies of the Reactor and Control Building Below 33 CPS
3.7b-9	ESSW Pumphouse: Frequencies With and Without Eccentricities
3.7b-10	Diesel Generator A-D Building Frequencies With and Without Eccentricities
3.7b-11	Comparisons of Torsional Moments Between Original Design and the Values Computed from the Results of 3-D Stick Model
3.8-1	List of Applicable Codes, Standards, Recommendations, and Specifications
3.8-2	Load Combinations for Primary Containment, Drywell Floor
3.8-2a	Load Combinations for Reactor Pedestal
3.8-3	Load Combinations and Allowable Stresses For ASME Class MC Components

SUMMARY TABLE OF CONTENTS**Chapter 3 Tables**

3.8-3a	Comparison of FSAR and SRP Load Combinations and Allowable Stresses for ASME Class MC Components
3.8-4	Load Combination for the Reactor Shield Wall
3.8-5	Load Combinations for the Suppression Chamber Columns
3.8-6	Load Combinations for the Drywell Platforms
3.8-7	Load Combination for the Seismic Truss
3.8-8	Load Combinations Applicable to Reactor Building
3.8-9	Load Combinations Applicable to Seismic Category I Structures Other Than Containment, Reactor Building and Diesel Generator 'E' Building
3.8-9a	Load Combinations Applicable to Diesel Generator 'E' Building
3.8-10	Load Combinations Applicable to Turbine & Radwaste Building
3.8-11	Concrete Design Compressive Strengths
3.8-12	Allowable Stress Increase Factor for Masonry Structures
3.8A-1	Tabulation of Membrane Stress Resultants From the ASHSD Program
3.8A-2	CECAP and Hand Calculation Comparison - Thermal Gradient
3.8A-3	Comparison of CECAP and Hand Calculation Results - Real Moment
3.8A-4	CECAP and Hand Calculation Comparison - Real Moment and Real Compressive Load
3.8A-5	Comparison of Results for the Rectangular Plate with a Concentrated Load at the Center
3.8A-6	Comparison of Results for the Rectangular Plate with Various Edge Conditions
3.8A-7	Comparison of Stresses for Welding Neck Flange
3.8A-8	Comparison of Stresses for Slip-On Flange
3.8A-9	Comparison of Final Results for Hoop Force, N, and Meridional Moment, M
3.8A-10	Material Properties of the Concrete and Reinforcing Steel Used for FINEL Verification
3.8A-11	Loading History Used for the FINEL Verification
3.8A-12	Comparison of Stress Results
3.8A-13	Comparison of Stress Results
3.8A-14	Comparison of Results
3.8B-1	Minimum Testing Frequencies for Concrete Materials and Concrete (Except for the Diesel Generator 'E' Building)
3.8B-2	Testing Requirements for Concrete Materials Used in the Diesel Generator 'E' Building
3.8B-3	Testing Requirements for Concrete Used in the Diesel Generator 'E' Building
3.9-1	Transients and the Number of Associated Cycles Considered in the Design and Fatigue Analysis of the RPV Assembly and Internal Transients
3.9-2	Introduction/ Index/ Load Combination and Acceptance Criteria for ASME Code Class 1, 2, and 3 NSSS Piping and Equipment
3.9-2a	Reactor Pressure Vessel and Shroud Support Assembly
3.9-2b	Reactor Internals and Associated Equipment
3.9-2(c)	Reactor Water Cleanup Heat Exchangers
3.9-2d	ASME Code Class I Main Steam Piping and Pipe Mounted Equipment - Highest Stress Summary - Unit 1

SUMMARY TABLE OF CONTENTS**Chapter 3 Tables**

3.9-2d.1	ASME Code Class I Main Steam Piping and Pipe Mounted Equipment - Highest Stress Summary - Unit 2
3.9-2e	ASME Code Class I Recirculation Piping and Pipe Mounted Equipment - Highest Stress Summary - Unit 1
3.9-2e.1	ASME Code Class I Recirculation Piping and Pipe Mounted Equipment - Highest Stress Summary - Unit 2
3.9-2g	Safety/Relief Valves (Main Steam)
3.9-2(h)	Main Steam Isolation Valve
3.9-2i	Recirculation Pump
3.9-2(j)	Reactor Recirculation System Gate Valves, Discharge Structural & Mechanical Loading Criteria
3.9-2L	Standby Liquid Control Pump
3.9-2m	Standby Liquid Control Tank
3.9-2n	(i) RHR Pumps (ii) Core Spray Pumps
3.9-2o	RHR Heat Exchanger
3.9-2(p)	RWCU Pump
3.9-2q	RCIC Turbine
3.9-2(r)	RCIC Pump
3.9-2s	Reactor Refueling and Servicing Equipment
3.9-2t	High Pressure Coolant Injection Pump
3.9-2u	Control Rod Drive (Index Tube)
3.9-2v	Control Rod Drive Housing
3.9-2w	Jet Pumps
3.9-2aa	Control Rod Guide Tube Flange
3.9-2ab	Incore Housing
3.9-2(ac)	Reactor Vessel Support Equipment CRD Housing Support
3.9-2(ae)	HPCI Turbine Design Calculations
3.9-2(af)	High Density Spent Fuel Racks
3.9-3	NSSS Seismic Category I Active Pumps and Valves
3.9-4	Applicable Thermal Transients
3.9-5	List of Computer Programs Used in BOP Mechanical Systems and Components
3.9-6	Design Loading Combinations For ASME Code Class 1, 2, and 3 Components
3.9-7	Design Criteria for ASME Code Class I Valves
3.9-8	Design Criteria for ASME Code Class 2 and 3 Vessels Designed to NC-3300 and ND-3300
3.9-9	Design Criteria for ASME Code Class 2 Vessels Designed to Alternate Rules of NC-3200
3.9-10	Design Criteria for ASME Code Class 2 and 3 Piping
3.9-11	Design Criteria for ASME Code Class 2 and 3 Pumps
3.9-12	Design Criteria for ASME Code Class 2 and 3 Valves
3.9-14	Design Loading Combinations for Supports for ASME Code Class 1, 2 and 3 Components
3.9-15	Valve Qualification Test Range
3.9-16	Listing of Dynamically Qualified Equipment
3.9-17	Diesel Generator 'A-D' Seismic Test or Analysis Submittal Chart
3.9-18	Summary Comparison - Project Specification -10, "General Project Requirements for A Seismic Design and Analysis of Class 1 Equipment and Equipment Supports"

SUMMARY TABLE OF CONTENTS**Chapter 3 Tables**

3.9-20	BOP Piping System Power Ascension Testing
3.9A-1	Comparison Between Sample Problem and Computer Program ME 913 Results
3.9A-2	Comparison of ME912 with ME643 and Analytical Results
3.10a-1	Essential Electrical Components and Instruments
3.10a-2	Seismic Qualification Test Summary Class IE Control Panels and Local Panels and Racks
3.10a-3	Summary of Sample Seismic Static Analysis For Three Typical Cabinets
3.10a-4	Seismic Design Verification Data Sheet
3.10c-1	Secondary Unit Substations and Power Transformers
3.10c-2	Motor Control Centers
3.10c-3	Battery Monitors and Fuse Boxes
3.10c-4	DC Distribution Panels
3.10c-5	Battery Racks
3.10c-6	Electrical Cable Penetration
3.10c-7	Cable Trays "Safeguard"
3.10c-8	Battery Charger Racks and Cabinets
3.10c-9	Large Induction Motors 4000V
3.10c-10	Panels and Termination Cabinets
3.10c-11	Battery Chargers
3.10c-12	4.16 KV Switchgear
3.10c-13	DC Control and Load Centers
3.10c-14	Instrument AC Transformers
3.10c-15	Automatic Transfer Switches
3.10c-16	Load Isolation Motor-Generator Sets
3.10c-17	Non-NSSS and Non-ACR Relays Required to be Energized
3.10c-18	Inverters and 120V AC Instrument Panels
3.11-1	Normal and Maximum Plant Environmental Conditions
3.11-7	Water Quality
3.12-1	ESF Division Separation
3.12-2	Channel Separation
3.12-3	Main Control Room and Relay Panel Annunciator and Computer Interface Device
3.13-1	Comparison with Regulatory Guide 1.48
3.14-1	License Renewal Commitments
3.14-2	Newly Identified Structures, Systems, and Components (SSC)

SUMMARY TABLE OF CONTENTS**Chapter 3 Figures**

3.2-1	Code Classification of Piping Valves
3.2-2	Minimum Instrument Line Classifications
3.5-6	Figure replaced by Drawing A-17, Sh. 1
3.5-7	Figure replaced by Drawing A-21, Sh. 1
3.5-8	Figure replaced by Drawing A-5, Sh. 1
3.5-9	Typical 900# Bonnet Seal Type Valve
3.5-10	Retaining Ring Design for 900# Bonnet-Seal Type Valve
3.6-1A	Main Steam Line A
3.6-1B	Main Steam Line B
3.6-1C	Main Steam Line C
3.6-1D	Main Steam Line D
3.6-2	Feedwater System
3.6-3	HPCI Steam Supply
3.6-4	RCIC Steam Supply
3.6-5	Core Spray
3.6-6	RHR Supply
3.6-7	RHR Return Loop A
3.6-8	RHR Return Loop B
3.6-8A.1	Reactor Water Cleanup
3.6-8A.2	Reactor Water Cleanup
3.6-8A.3	Reactor Water Cleanup
3.6-8A.4	Reactor Water Cleanup
3.6-8A.5	Reactor Water Cleanup
3.6-8B	Reactor Vessel Head Vent
3.6-8C	Head Spray
3.6-8D	Standby Liquid Control
3.6-8E	MSIV Drains
3.6-10	Typical Pipe Whip Restraints
3.6-11	Pipe Whip Restraint Arrangement to Protect Feedwater Outside Containment Isolation Valves
3.6-11a	Main Feedwater Line PIPERUP Mathematical Model
3.6-12	Forcing Functions Model Associated with Pipe Whip Dynamic Analysis
3.6-12a	Forcing Functions Model Associated with Pipe Whip Dynamite Analysis
3.6-13	Typical Pipe Whip Restraint Configuration
3.6-14	Recirculation System Postulated Break Locations and Restraint Locations (LOOP A and B Same, Unless Otherwise Specified)
3.6-15	Typical Restraint Force-Deflection Curve
3.6-16	Break Locations and Restraints Analyzed, PDA Verification Program
3.6-17-1	Pipe Break Protection for High Energy Piping in the Reactor Building
3.6-17-2	Pipe Break Protection for High Energy Piping in the Reactor Building
3.6-17-3	Pipe Break Protection for High Energy Piping in the Reactor Building
3.6A-1	Case A MSLB in Reactor Building
3.6A-2	Panel and Platform Locations
3.6A-3	Case A Volume Flows

SUMMARY TABLE OF CONTENTS**Chapter 3 Figures**

3.6A-4	Case A Pressure Transient
3.6A-5	Case B MSLB in Turbine Building
3.6A-6	Case B Volume Flows
3.6A-7	Case B Pressure Transient
3.6A-8	Model for Double-Ended Guillotine MSLB
3.7a-1	Reactor Pressure Vessel and Internal Seismic Model
3.7a-2	Density of Stress Reversals
3.7b-2	Diesel Generator 'E' Building Design Response Spectra Safe Shutdown Earthquake Horizontal Component
3.7b-3	Design Response Spectra Safe Shutdown Earthquake Horizontal Component
3.7b-4	Diesel Generator 'E' Buildings Design Response Spectra Safe Shutdown Earthquake Horizontal Component
3.7b-5	Synthetic Time History Normalized to 1G
3.7b-6	Diesel Generator 'E' Building Horizontal Synthetic Time History Normalized to 0.1G
3.7b-7	Diesel Generator 'E' Building Vertical Synthetic Time History Normalized to 0.1G
3.7b-8	Comparison of Time History Response Spectra and Design Response Spectra 2% and 5% Damping (0.2-30 CPS)
3.7b-9	Comparison of Time History Response Spectra and Design Response Spectra 3% and 7% Damping (0.2-30 CPS)
3.7b-10	Comparison of Time History Response Spectra and Design Response Spectra 2% and 5% Damping (0.2-1.0 CPS)
3.7b-11	Diesel Generator 'E' Building Comparison of Horizontal Time History Response Spectrum and Horizontal Design Response Spectrum 2% Damping
3.7b-12	Diesel Generator 'E' Building Comparison of Horizontal Time History Response Spectrum and Horizontal Design Response Spectrum 5% Damping
3.7b-13	Diesel Generator 'E' Building Comparison of Horizontal Time History Response Spectrum and Horizontal Design Response Spectrum 7% Damping
3.7b-14	Diesel Generator 'E' Building Comparison of Vertical Time History Response Spectrum and Vertical Design Response Spectrum 2% Damping
3.7b-15	Diesel Generator 'E' Building Comparison of Vertical Time History Response Spectrum and Vertical Design Response Spectrum 5% Damping
3.7b-16	Diesel Generator 'E' Building Comparison of Vertical Time History Response Spectrum and Vertical Design Response Spectrum 7% Damping
3.7b-17	Horizontal Seismic Model of Containment With Flexible Base
3.7b-18	Vertical Seismic Model of Containment With Flexible Base
3.7b-19	E-W Seismic Model of Reactor and Control Building
3.7b-20	N-S Seismic Model of Reactor and Control Building
3.7b-21	Vertical Seismic Model of Reactor and Control Building
3.7b-22	Plan View of Reactor and Control Building
3.7b-23	Correlation of Vertical Seismic Model Masspoints of the Physical Structure
3.7b-24	Containment Horizontal Mode Shapes Mode 1
3.7b-25	Containment Horizontal Mode Shapes Mode 2
3.7b-26	Containment Horizontal Mode Shapes Mode 4
3.7b-27	Containment Vertical Mode Shapes Mode 1
3.7b-28	Containment Vertical Mode Shapes Mode 2

SUMMARY TABLE OF CONTENTS**Chapter 3 Figures**

3.7b-29	Containment Vertical Mode Shapes Mode 3
3.7b-30	Reactor and Control Building E-W Mode Shapes - Mode 1 (Cranes at Points 32 and 33)
3.7b-31	Reactor and Control Building E-W Mode Shapes - Mode 2
3.7b-32	Reactor and Control Building E-W Mode Shapes - Mode 3 (Cranes at Points 32 and 33)
3.7b-33	Reactor and Control Building E-W Mode Shapes - Mode 4
3.7b-34	Reactor and Control Building E-W Mode Shapes, Mode 5
3.7b-35	Reactor and Control Building N-S Mode Shapes - Mode 1
3.7b-36	Reactor and Control Building N-S Mode Shapes - Mode 3
3.7b-37	Reactor and Control Building Vertical Mode Shapes Mode 1
3.7b-38	Reactor and Control Building Vertical Mode Shapes Mode 2
3.7b-39	Reactor and Control Building Vertical Mode Shapes Mode 3
3.7b-40	Containment Horizontal Displacements OBE
3.7b-41	Containment Horizontal Displacements SSE
3.7b-42	Containment Vertical Displacements OBE
3.7b-43	Containment Vertical Displacements SSE
3.7b-44	Containment Horizontal Accelerations OBE
3.7b-45	Containment Horizontal Accelerations SSE
3.7b-46	Containment Vertical Accelerations OBE
3.7b-47	Containment Vertical Accelerations SSE
3.7b-48	Reactor and Control Building E-W Displacements OBE
3.7b-49	Reactor and Control Building E-W Displacements SSE
3.7b-50	Reactor and Control Building N-S Displacements OBE
3.7b-51	Reactor and Control Building N-S Displacements SSE
3.7b-52	Reactor and Control Building Vertical Displacements OBE
3.7b-53	Reactor and Control Building Vertical Displacements SSE
3.7b-54	Reactor and Control Building E-W Accelerations OBE
3.7b-55	Reactor and Control Building E-W Accelerations SSE
3.7b-56	Reactor and Control Building N-S Accelerations OBE
3.7b-57	Reactor and Control Building N-S Accelerations SSE
3.7b-58	Reactor and Control Building Vertical Acceleration OBE
3.7b-59	Reactor and Control Building Vertical Accelerations SSE
3.7b-60	Response Spectrum at RPV Pedestal Horizontal OBE
3.7b-61	Response Spectrum at RPV Pedestal Horizontal SSE
3.7b-62	Response Spectrum at RPV Pedestal Vertical OBE
3.7b-63	Response Spectrum at RPV Pedestal Vertical SSE
3.7b-64	Response Spectrum at Refueling Area E-W OBE
3.7b-65	Response Spectrum at Refueling Area E-W SSE
3.7b-66	Response Spectrum at Refueling Area N-S OBE
3.7b-67	Response Spectrum at Refueling Area N-S SSE
3.7b-68	Response Spectrum at Refueling Area Vertical OBE
3.7b-69	Response Spectrum at Refueling Area Vertical SSE
3.7b-70	Response Spectrum at Top of Pedestal (Diesels A-D) E-W OBE
3.7b-71	Response Spectrum at Top of Pedestal (Diesel E) E-W OBE
3.7b-72	Response Spectrum at Top of Pedestal (Diesels A-D) E-W SSE
3.7b-73	Response Spectrum at Top of Pedestal (Diesel E) E-W SSE

SUMMARY TABLE OF CONTENTS**Chapter 3 Figures**

3.7b-74	Response Spectrum at Top of Pedestal (Diesels A-D) N-S OBE
3.7b-75	Response Spectrum at Top of Pedestal (Diesel E) N-S OBE
3.7b-76	Response Spectrum at Top of Pedestal (Diesels A-D) N-S SSE
3.7b-77	Response Spectrum at Top of Pedestal (Diesel E) N-S SSE
3.7b-78	Response Spectrum at Top of Pedestal (Diesels A-D) Vertical OBE
3.7b-79	Response Spectrum at Top of Pedestal for Diesel E Vertical OBE
3.7b-80	Response Spectrum at Top of Pedestal (Diesels A-D) Vertical-SSE
3.7b-81	Response Spectrum at Top of Pedestal for Diesel 'E' Vertical SSE
3.7b-82	Response Spectrum at Operating Floor of ESSW Pumphouse E-W OBE
3.7b-83	Response Spectrum at Operating Floor of ESSW Pumphouse E-W SSE
3.7b-84	Response Spectrum at Operating Floor of ESSW Pumphouse N-S OBE
3.7b-85	Response Spectrum at Operating Floor of ESSW Pumphouse N-S SSE
3.7b-86	Response Spectrum at Operating Floor of ESSW Pumphouse Vertical OBE
3.7b-87	Response Spectrum at Operating Floor of ESSW Pumphouse Vertical SSE
3.7b-88	Comparison of Design and R.G. 1.60 Response Spectra Horizontal OBE
3.7b-89	Comparison of Design and R.G. 1.60 Response Spectra Horizontal SSE
3.7b-90	Comparison of Design and R.G. 1.60 Response Spectra Vertical OBE
3.7b-91	Comparison of Design and R.G. 1.60 Response Spectra Vertical SSE
3.7b-92	Damping V/S ZPA for Raceway System
3.7b-93	ESSW Pump House 3-D Stick Model
3.7b-94	Diesel Generator 'A-D' Building 3-D Stick Model
3.7b-95	Diesel Generator 'E' Building Seismic Models
3.8-1	Figure replaced by Drawing C-331, Sh. 1
3.8-2	Figure replaced by Drawing C-371, Sh. 1
3.8-3	Figure replaced by Drawing C-1932, Sh. 3
3.8-4	Figure replaced by Drawing C-1932, Sh. 4
3.8-5	Figure replaced by Drawing C-1932, Sh. 5
3.8-9	Primary Containment – Drywell Head Connection
3.8-10	Figure replaced by Drawing C-284, Sh. 1
3.8-11-1	Figure replaced by Drawing C-332, Sh. 1
3.8-11-2	Figure replaced by Drawing C-333, Sh. 1
3.8-12	Figure replaced by Drawing C-281, Sh. 1
3.8-13	Figure replaced by Drawing C-281, Sh. 1
3.8-14	Figure replaced by Drawing C-370, Sh. 1
3.8-15-1	Figure replaced by Drawing C-334, Sh. 1
3.8-15-2	Figure replaced by Drawing C-335, Sh. 1
3.8-15-3	Figure replaced by Drawing C-336, Sh. 1
3.8-15-4	Figure replaced by Drawing C-337, Sh. 1
3.8-15-5	Figure replaced by Drawing C-338, Sh. 1
3.8-16-1	Figure replaced by Drawing C-351, Sh. 1
3.8-16-2	Figure replaced by Drawing C-352, Sh. 1
3.8-16-3	Figure replaced by Drawing C-353, Sh. 1
3.8-16-4	Figure replaced by Drawing C-354, Sh. 1
3.8-16-5	Figure replaced by Drawing C-355, Sh. 1
3.8-16-6	Figure replaced by Drawing C-356, Sh. 1
3.8-16-7	Figure replaced by Drawing C-357, Sh. 1

SUMMARY TABLE OF CONTENTS**Chapter 3 Figures**

3.8-16-8	Figure replaced by Drawing C-358, Sh. 1
3.8-16-9	Figure replaced by Drawing C-359, Sh. 1
3.8-16-10	Figure replaced by Drawing C-360, Sh. 1
3.8-16-11	Figure replaced by Drawing C-393, Sh. 1
3.8-16-12	Figure replaced by Drawing C-394, Sh. 1
3.8-16-13	Figure replaced by Drawing C-395, Sh. 1
3.8-16-14	Figure replaced by Drawing C-396, Sh. 1
3.8-16-15	Figure replaced by Drawing C-397, Sh. 1
3.8-16-16	Figure replaced by Drawing C-398, Sh. 1
3.8-16-17	Figure replaced by Drawing C-399, Sh. 1
3.8-16-18	Figure replaced by Drawing C-400, Sh. 1
3.8-17	Figure replaced by Drawing C-282, Sh. 1
3.8-18	Figure replaced by Drawing C-285, Sh. 1
3.8-19-1	Figure replaced by Drawing C-288, Sh. 1
3.8-19-2	Figure replaced by Drawing C-287, Sh. 1
3.8-19-3	Figure replaced by Drawing C-283, Sh. 1
3.8-20-1	Suppression Chamber Electrical Penetration Details
3.8-20-2	Drywell Electrical Penetration Details
3.8-21	Figure replaced by Drawing C-286, Sh. 1
3.8-22	Figure replaced by Drawing C-291, Sh. 1
3.8-23	Figure replaced by Drawing C-278, Sh. 1
3.8-24	Containment Wall Temperature Gradients
3.8-25	Containment Wall Analytical Model for Axisymmetric Loads
3.8-26	Drywell Wall Analytical Model for Non-Axisymmetric Missile and Postulated Pipe Rupture Loads
3.8-27	Base Foundation Slab Analytical Model
3.8-28	Equipment Hatch Analytical Model
3.8-29	Structural Acceptance Test - Pressurization Sequence
3.8-30	Structural Acceptance Test - Locations of Deflection Measuring Devices for the Containment
3.8-31	Structural Acceptance Test - Locations of Deflection Measuring Devices for the Equipment Hatch
3.8-32	Figure replaced by Drawing C-384, Sh. 1
3.8-33	Figure replaced by Drawing C-387, Sh. 1
3.8-34	Structural Acceptance Test - Containment Analytical Model
3.8-35	Structural Acceptance Test - Equipment Hatch Analytical Model
3.8-36	Structural Acceptance Test - Comparison of Measured and Predicted Deflections for the Containment
3.8-37	Structural Acceptance Test - Comparison of Measured and Predicted Deflection for the Equipment Hatch
3.8-38	Structural Acceptance Test - Inside Meridional Strain at Mid-height of Suppression Chamber Wall
3.8-39	Structural Acceptance Test - Inside Hoop Strain at Mid-height of Suppression Chamber Wall
3.8-40	Structural Acceptance Test - Outside Meridional Strain at Mid-height of Suppression Chamber Wall

SUMMARY TABLE OF CONTENTS**Chapter 3 Figures**

3.8-41	Structural Acceptance Test - Outside Hoop Strain at Mid-height of Suppression Chamber Wall
3.8-42	Structural Acceptance Test - Outside Helical Strain at Mid-height of Suppression Chamber Wall
3.8-43	Structural Acceptance Test - External Concrete Surface Cracks at Mid-height of Drywell Wall
3.8-44	Drywell Head
3.8-45	Analytical Model of Drywell Head Assembly
3.8-46-1	Figure replaced by Drawing C-348, Sh. 1
3.8-46-2	Figure replaced by Drawing C-349, Sh. 1
3.8-46-3	Figure replaced by Drawing C-350, Sh. 1
3.8-47	Figure replaced by Drawing C-293, Sh. 1
3.8-48	Figure replaced by Drawing C-340, Sh. 1
3.8-49	Figure replaced by Drawing C-341, Sh. 1
3.8-50	Figure replaced by Drawing C-376, Sh. 1
3.8-51-1	Figure replaced by Drawing C-344, Sh. 1
3.8-51-2	Figure replaced by Drawing C-377, Sh. 1
3.8-52	Figure replaced by Drawing C-362, Sh. 1
3.8-53	Figure replaced by Drawing C-363, Sh. 1
3.8-54	Figure replaced by Drawing C-354, Sh. 1
3.8-55	Figure replaced by Drawing C-365, Sh. 1
3.8-56	Figure replaced by Drawing C-367, Sh. 1
3.8-57	Figure replaced by Drawing C-380, Sh. 1
3.8-58	Temperature Gradients for Drywell Floor and Reactor Pedestal
3.8-59	Reactor Shield Wall Temperature Gradients
3.8-60	Drywell Floor Analytical Model
3.8-61	Analytical Model for Reactor Pedestal Above Drywell Floor
3.8-62	Reactor Shield Wall-EASE Program Analytical Model
3.8-63	Reactor Shield Wall-Analytical Model for "FINEL" and "ASHSD" Program
3.8-64	Suppression Chamber Columns - ASHSD Program Analytical Model
3.8-65	Suppression Chamber Columns - Seismic Model
3.8-66	Suppression Chamber Columns - "CE 668" Program Analytical Model
3.8-67	Seismic Truss Analytical Model
3.8-68	Structural Acceptance Test - Comparison of Measured and Predicted Deflections for the Drywell Floor
3.8-69	Figure replaced by Drawing A-11, Sh. 1
3.8-70	Figure replaced by Drawing A-12, Sh. 1
3.8-71	Figure replaced by Drawing A-13, Sh. 1
3.8-72	Figure replaced by Drawing M-203, Sh. 1
3.8-73	Figure replaced by Drawing M-204, Sh. 1
3.8-74	Figure replaced by Drawing A-16, Sh. 1
3.8-75	Figure replaced by Drawing A-17, Sh. 1
3.8-77	Reactor, Control and Turbine Building Sections Looking North
3.8-78	Reactor Building Looking West
3.8-79	Figure replaced by Drawing M-227, Sh. 1
3.8-80	Figure replaced by Drawing M-237, Sh. 1
3.8-81	Figure replaced by Drawing M-260, Sh. 1

SUMMARY TABLE OF CONTENTS**Chapter 3 Figures**

3.8-82	Figure replaced by Drawing M-261, Sh. 1
3.8-83	Figure replaced by Drawing M-5200, Sh. 1
3.8-84	Figure replaced by Drawing M-5200, Sh. 2
3.8-85	Figure replaced by Drawing M-284, Sh. 1
3.8-86	Figure replaced by Drawing C-64, Sh. 1
3.8-87	Figure replaced by Drawing C-65, Sh. 1
3.8-88	Figure replaced by Drawing C-66, Sh. 1
3.8-89	Figure replaced by Drawing C-67, Sh. 1
3.8-90	Figure replaced by Drawing M-270, Sh. 1
3.8-91	Figure replaced by Drawing M-271, Sh. 1
3.8-92	Figure replaced by Drawing M-272, Sh. 1
3.8-93	Figure replaced by Drawing M-273, Sh. 1
3.8-94	Figure replaced by Drawing M-274, Sh. 1
3.8-95	Figure replaced by Drawing C-795, Sh. 1
3.8A-1	Thin Shell Cylinder
3.8A-2	Layered Cylinder
3.8A-3	General Layout of Cylinder
3.8A-4	Finite Element Model
3.8A-5	Axial Moment
3.8A-6	Cylinder with Hinged Ends
3.8A-7	Finite Element Model
3.8A-8-1	Comparison of Results for Cylindrical Shell Subjected to an Asymmetric Bending
3.8A-8-2	Comparison (Continued) of Results for Cylindrical Shell Subjected to Asymmetric Bending
3.8A-9	Reinforced Concrete Beam
3.8A-10	Reinforced Concrete Beam and CECAP Concrete Element Model
3.8A-11	Beam Cross-Section and Initial Stress Distribution
3.8A-12	Final Thermal Stress Distribution
3.8A-13	Reinforced Concrete Beam and CECAP Concrete Element Model
3.8A-14	Reinforced Concrete Beam and CECAP Concrete Element Model
3.8A-15	Reinforced Concrete Beam and CECAP Model
3.8A-16	Beam Cross-Section and Stress Block
3.8A-17	Plate Geometry, Loading, and Finite Element Mesh for Rectangular Plate with a Concentrated Load at the Center
3.8A-18	Plate Geometry, Loading, and Finite Element Mesh for Rectangular Plate with Various Edge Conditions
3.8A-19	Welding Neck Flange Detail
3.8A-20	Slip-On Flange Detail
3.8A-21	Geometry of Torispherical and Ellipsoidal Heads (Fit to Correspond to Geometry of Ellipsoidal Head in Reference 3.8A-9)
3.8A-22	Measured Thickness Variation in Experimental Head No. 1 (From Reference 3.8A-10, Page 18)
3.8A-23	Thickness Variation in Cylinder No. 1 (From Reference 3.8A-11 Fig. 4)
3.8A-24	Analytical Model with Boundary Conditions
3.8A-25	Plot of Hoop Force and Longitudinal Movement from E0781 Output

SUMMARY TABLE OF CONTENTS**Chapter 3 Figures**

3.8A-26	Plot of Stress in the Θ (Hoop) Direction on the Inside Surface ($\Theta = 0^\circ$) (Ref. 3.8A-12 Page G-14)
3.8A-27	Plot of Stress in the Θ (Hoop) Direction on the Outside Surface ($\Theta = 0^\circ$) (Ref. 3.8A-12 Page G-11)
3.8A-28	Plot of Stress in the ϕ (Longitudinal) Direction on the Inside Surface ($\Theta = 0^\circ$) (Ref. 3.8A-12 Page G-20)
3.8A-29	Plot of Stress in the ϕ (Longitudinal) Direction on the Outside Surface ($\phi = 0^\circ$) (Ref. 3.8A-12 Page G-17)
3.8A-30	Plot of Membrane Stress ($\phi = 0^\circ$) (Ref. 3.8A-12 Page G-23)
3.8A-31	Dimensions of Cylindrical Water Tank
3.8A-32	Experimental Beam Dimensions
3.8A-33	Reference 3.8A-14 Mesh
3.8A-34	Finel Finite Element Mesh
3.8A-35-1	Regions of Cracking
3.8A-35-2	Regions of Cracking (Cont.)
3.8A-36	Load-Displacement Curves from Finel Verification Using a Simply Supported Beam
3.8A-37	Finite Element Model
3.8A-38	Finite Element Model
3.8A-39	Temperature Distribution
3.8A-40	Schematic of Test Problem
3.8A-41	Finite Element Layout
3.8A-42	Comparison of Results
3.8A-43	Steel Sphere
3.8A-44	Finite Element Model
3.9-1	Transient Pressure Differentials following a Steam Line Break at 105% Rated Steam Flow, 100% Recirculation
3.9-2	Typical Relief Valve Transient
3.9-3	Reactor Vessel Cutaway
3.9-4	Reactor Internals Flow Paths
3.9-5	Fuel Support Pieces
3.9-6	Jet Pump
3.9-7	Pressure Nodes Used for Depressurization Analysis
3.9A-1	Transient Temperature Response
3.10a-1	Typical Vertical Board
3.10a-2	Instrument Rack
3.10a-3	Typical Local Rack
3.10a-4	NEMA Type-12 Enclosure
3.10a-5-1	Cabinet Installation for Seismic and Hydrodynamic Loads- Sample Calculation (Cabinet H12-P608)
3.10a-5-2	Cabinet Installation for Seismic and Hydrodynamic Loads- Sample Calculation (Cabinet H12-P608)
3.10a-5-3	Cabinet Installation for Seismic and Hydrodynamic Loads- Sample Calculation (Cabinet H12-P608)
3.10a-6	Corner Post
3.10a-7	Plan View of Panel

SUMMARY TABLE OF CONTENTS**Chapter 3 Figures**

3.10a-8	Barrier With Two End Plates
3.10a-9	Panel Deflections
3.11-1	Figure replaced by Drawing C-1815, Sh. 1
3.11-2	Figure replaced by Drawing C-1815, Sh. 2
3.11-3	Figure replaced by Drawing C-1815, Sh. 3
3.11-4	Figure replaced by Drawing C-1815, Sh. 4
3.11-5	Figure replaced by Drawing C-1815, Sh. 5
3.11-6	Figure replaced by Drawing C-1815, Sh. 6
3.11-7	Figure replaced by Drawing C-1815, Sh. 7
3.11-8	Figure replaced by Drawing C-1815, Sh. 8
3.11-9	Figure replaced by Drawing C-1815, Sh. 9
3.11-10	Figure replaced by Drawing C-1815, Sh. 10
3.11-11	Figure replaced by Drawing C-1815, Sh. 11
3.11-12	Figure replaced by Drawing C-1815, Sh. 12
3.13-1	One line diagram illustrating relationship of loads, penetration assemblies, and protective devices for curves presented as Figures 3.13-2A, 3.13-2B & 3.13-3
3.13-2	Figure replaced by Figure 3.13-2A and Figure 3.13-2B
3.13-2A	Time-Current Characteristic Curves For Overcurrent Protection Of #10 Copper, Containment Penetrations
3.13-2B	Time-Current Characteristic Curves For Overcurrent Protection Of #10 Copper, Containment Penetrations
3.13-3	Relationship Of Loads, Penetration Assemblies & Protective Devices for Curves Presented in Figures 3.13-2, 3.13-3, & 3.18-8
3.13-4	120 Volt AC Control Circuits
3.13-5	125 Volt DC Control Circuits
3.13-6	208/120 Lighting Circuits
3.13-7	React Recir Pump - Max Short Circuit Capability

SUMMARY TABLE OF CONTENTS**Chapter 4****4.0 REACTOR**

- 4.1 Summary Description
 - 4.1.1 Reactor Vessel
 - 4.1.2 Reactor Internal Components
 - 4.1.3 Reactivity Control Systems
 - 4.1.4 Analysis Techniques
 - 4.1.5 References
- 4.2 Fuel System Design
 - 4.2.1 Design Bases
 - 4.2.2 General Design Description
 - 4.2.3 Design Evaluations
 - 4.2.4 Testing and Inspection
 - 4.2.5 Operating and Developmental Experience
 - 4.2.6 References
- 4.3 Nuclear Design
 - 4.3.1 Design Bases
 - 4.3.2 Description
 - 4.3.3 Analytical Methods
 - 4.3.4 Changes
 - 4.3.5 References
- 4.4 Thermal and Hydraulic Design
 - 4.4.1 Design Basis
 - 4.4.2 Description of Thermal-Hydraulic Design of the Reactor Core
 - 4.4.3 Description of the Thermal and Hydraulic Design of the Reactor Coolant System
 - 4.4.4 Evaluation
 - 4.4.5 Testing and Verification
 - 4.4.6 Instrumentation Requirements
- 4.5 Reactor Materials
 - 4.5.1 Control Rod System Structural Materials
 - 4.5.2 Reactor Internal Materials
 - 4.5.3 Control Rod Drive Housing Supports
- 4.6 Functional Design of Reactivity Control Systems
 - 4.6.1 Information for CRDS
 - 4.6.2 Evaluations of the CRDS
 - 4.6.3 Testing and Verification of the CRDs
 - 4.6.4 Information for Combined Performance of Reactivity Systems
 - 4.6.5 Evaluation of Combined Performance
 - 4.6-6 References

SUMMARY TABLE OF CONTENTS**Chapter 4 - Tables**

4.2-14	Fuel Design Characteristics (Nominal)	
4.3-1	Reactor Core Characteristics	
4.3-4	Typical Core Reactivity Coefficients	
4.3-5	Fast Neutron Fluences >1 MEV 54 EFPY Fluence	
4.4-1	Typical Thermal and Hydraulic Design Characteristics of the Reactor Core	
4.4-2	Typical Void Distribution	
4.4-2a	Axial Power Distribution Used to Generate Typical Void and Quality Distributions	
4.4-3	Typical Flow Quality Distribution	
4.4-4	Typical Core Flow Distribution	
4.4-6	Uncertainties Considered in MCPR Safety Limit	
4.4-7	Bypass Flow Paths	
4.4-8	Plant Configuration Data	
4.4-9	Lengths of Safety Injection Line	

NOTE: Additional tables are presented in NEDE 20944/20944-P.

SUMMARY TABLE OF CONTENTS**Chapter 4 - Figures**

4.1-2	Steam Dryer Panel
4.1-3	Steam Dryer
4.2-15	Core Cell (ATRIUM™-10 Fuel with Duralife 60C Control Rod)
4.2-15A	Core Cell (ATRIUM-10 Fuel with MARATHON Control Rod)
4.2-15B	Core Cell (ATRIUM-10 Fuel with Ultra-HD Control Rod)
4.2-15C	Core Cell (ATRIUM-10 Fuel with Westinghouse CR 99 Control Rod)
4.2-16A	Typical Core Cell (ATRIUM-11 Fuel with GE Hitachi Control Rod)
4.2-16B	Typical Core Cell (ATRIUM-11 Fuel with Westinghouse Control Rod)
4.2-17	Fuel Bundle FANP ATRIUM-10
4.2-17-1	Representative ATRIUM-11 Fuel Bundle (Not to Scale)
4.2-18	80 MIL Fuel Channel
4.2-18-1	80 MIL Fuel Channel
4.2-18-2	100 MIL Fuel Channel
4.2-18-3	Advanced Fuel Channel
4.2-18-4	ATRIUM-11 Advanced Fuel Channel
4.2-19	Correct Fuel Assembly Orientation
4.2-20	Control Rod Assembly Original Equipment
4.2-21	Control Rod Assembly Duralife 160-C (D-160C)
4.2-22	Control Rod Assembly Marathon
4.2-23	Control Rod Assembly Westinghouse CR 99
4.3-1	Core Loading Map Typical of Unit 1
4.3-2	Core Loading Map Typical of Unit 2
4.3-3	Uranium Depletion as a Function of Exposure, 40% Voids (Typical)
4.3-4	Plutonium Buildup as a Function of Exposure, 40% Voids (Typical)
4.3-5	Fission Fraction as a Function of Exposure, 40% Voids (Typical)
4.3-6	Delayed Neutron Fraction as a Function of Exposure, 40% Voids (Typical)
4.3-7	Neutron Lifetime as a Functions of Exposure, 40% Voids (Typical)
4.3-8-46	ATRIUM™-10 Fuel Axial Enrichment (Nominal) Typical Assemblies
4.3-8-47	ATRIUM-11 Fuel Axial Enrichment (Nominal) Typical Assemblies
4.3-9-123	ATRIUM™-10 Fuel Radial Enrichment (Nominal) Typical Lattice A
4.3-9-124	ATRIUM™-10 Fuel Radial Enrichment (Nominal) Typical Lattice B
4.3-9-125	ATRIUM™-10 Fuel Radial Enrichment (Nominal) Typical Lattice C
4.3-9-126	ATRIUM™-10 Fuel Radial Enrichment (Nominal) Typical Lattice D
4.3-9-127	ATRIUM™-10 Fuel Radial Enrichment (Nominal) Typical Lattice E
4.3-9-128	ATRIUM™-10 Fuel Radial Enrichment (Nominal) Typical Lattice F
4.3-9-129	ATRIUM™-10 Fuel Radial Enrichment (Nominal) Typical Lattice G
4.3-9-130	ATRIUM™-10 Fuel Radial Enrichment (Nominal) Typical Lattice H
4.3-9-131	ATRIUM™-10 Fuel Radial Enrichment (Nominal) Typical Lattice I
4.3-9-132	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice A
4.3-9-133	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice B
4.3-9-134	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice C
4.3-9-135	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice D
4.3-9-136	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice E
4.3-9-137	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice F
4.3-9-138	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice G

SUMMARY TABLE OF CONTENTS**Chapter 4 - Figures**

4.3-9-139	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice H
4.3-9-140	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice I
4.3-9-141	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice J
4.3-9-142	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice K
4.3-9-143	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice L
4.3-9-144	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice M
4.3-9-145	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice N
4.3-9-146	ATRIUM-11 Fuel Radial Enrichment (Nominal) Typical Lattice O
4.3-11-1	FANP ATRIUM 10 Fuel Dominant Lattice Hot-Uncontrolled K-Infinity vs Exposure (Typical)
4.3-11-2	FANP ATRIUM 10 Fuel Dominant Lattice Local Peaking, Unrodded, 40% Voids 0 MWD/MTU (Typical)
4.3-11-3	FANP ATRIUM 10 Fuel Dominant Lattice Local Peaking, Unrodded, 40% Voids 15000 MWD/MTU (Typical)
4.3-11-4	FANP ATRIUM 10 Fuel Dominant Lattice Local Peaking, Unrodded, 40% Voids 40000 MWD/MTU (Typical)
4.3-11-5	FANP ATRIUM 10 Fuel Dominant Lattice Local Peaking, Unrodded, 0% Voids 0 MWD/MTU (Typical)
4.3-11-6	FANP ATRIUM 10 Fuel Dominant Lattice Local Peaking, Unrodded, 80% Voids 0 MWD/MTU (Typical)
4.3-11-7	FANP ATRIUM 10 Fuel Dominant Lattice Maximum Hot-Uncontrolled Local Peaking Factor vs Exposure (Typical)
4.3-11-8	ATRIUM 11 Fuel Dominant Lattice Hot-Uncontrolled K-Infinity vs Exposure (Typical)
4.3-11-9	ATRIUM 11 Fuel Dominant Lattice Local Peaking, Unrodded, 40% Voids 0 MWD/MTU (Typical)
4.3-11-10	ATRIUM 11 Fuel Dominant Lattice Local Peaking, Unrodded, 40% Voids 15000 MWD/MTU (Typical)
4.3-11-11	ATRIUM 11 Fuel Dominant Lattice Local Peaking, Unrodded, 40% Voids 40000 MWD/MTU (Typical)
4.3-11-12	ATRIUM 11 Fuel Dominant Lattice Local Peaking, Unrodded, 0% Voids 0 MWD/MTU (Typical)
4.3-11-13	ATRIUM 11 Fuel Dominant Lattice Local Peaking, Unrodded, 80% Voids 0 MWD/MTU (Typical)
4.3-11-14	ATRIUM 11 Fuel Dominant Lattice Maximum Hot-Uncontrolled Local Peaking Factor vs. Exposure (Typical)
4.3-12	Hot Excess Reactivity vs Exposure (Typical)
4.3-13	Shutdown Margin vs Exposure (Typical)
4.3-14	Vessel Fluence (R,0) Model for Azimuthal Flux Distribution
4.4-1	Schematic of Reactor Assembly Showing the Bypass Flow Paths
4.4-2	Damping Coefficient Versus Decay Ratio (Second Order Systems)
4.4-3	Hydrodynamic and Core Stability Model for Initial Core
4.4-5	Power-Flow Operating Map
4.4-7a	10 Cent Rod Reactivity Step at 51.5% Rated Power (Natural Circulation)
4.4-7b	10 psi Pressure Regulator Setpoint Step at 51.5% Rated Power (Natural Circulation)

SUMMARY TABLE OF CONTENTS**Chapter 4 - Figures**

4.4-7c	6-9 Inch Level Setpoint Step at 51.5% Rated Power (Natural Circulation)
4.4-8a	10 Cent Rod Reactivity Step at 105% Rated Power and 100% Rated Flow
4.4-8b	10 psi Pressure Regulator Setpoint Step at 105% Rated Power and 100% Rated Flow
4.4-8c	6-inch Level Setpoint Step at 105% Rated Power and 100% Rated Flow
4.4-8d	10% Load Demand Step at 105% Rated Power and 100% Rated Flow
4.4-9a	10 Cent Rod Reactivity Step at 68% Rated Power and 51.5% Rated Flow
4.4-9b	10 psi Pressure Regulator Step at 68% Rated Power and 51.5% Rated Flow
4.4-9c	6-inch Water Level Setpoint Step at 60% Rated Power and 51.5% Rated Flow
4.4-9d	10% Load Demand Step at 68% Rated Power and 51.5% Rated Flow
4.6-1	Control Rod to Control Rod Drive Coupling
4.6-2	Control Rod Drive Unit
4.6-3	Control Rod Drive Schematic
4.6-4	Control Rod Drive (Cutaway)
4.6-5a	Figured replaced by Drawing M-146, Sh. 1
4.6-5b	Figured replaced by Drawing M-147, Sh. 1
4.6-6	Figured replaced by Drawing M1-C12-8, Sh. 1
4.6-7	Control Rod Drive Hydraulic Control Unit
4.6-8	Control Rod Drive Housing Support

NOTE: Additional Figures are presented in NEDE 20944/20944-P.

SUMMARY TABLE OF CONTENTS**Chapter 5****5.0 REACTOR COOLANT SYSTEM AND CONNECTED SYSTEMS**

- 5.1 Summary Description
 - 5.1.1 Schematic Flow Diagram
 - 5.1.2 Piping and Instrumentation Diagram
 - 5.1.3 Plan and Elevation Drawings
- 5.2 Integrity of Reactor Coolant Pressure Boundary
 - 5.2.1 Compliance with Codes and Code Cases
 - 5.2.2 Overpressure Protection
 - 5.2.3 Reactor Coolant Pressure Boundary Materials
 - 5.2.4 In-Service Inspection and Testing of Reactor Coolant Pressure Boundary
 - 5.2.5 Detection of Leakage Through Reactor Coolant Pressure Boundary
 - 5.2.6 References
- 5.3 Reactor Vessel
 - 5.3.1 Reactor Vessel Materials
 - 5.3.2 Pressure-Temperature Limits
 - 5.3.3 Reactor Vessel Integrity
 - 5.3.4 References
- 5.4 Component and Subsystem Design
 - 5.4.1 Reactor Recirculation Pumps
 - 5.4.2 Steam Generators (PWR)
 - 5.4.3 Reactor Coolant Piping
 - 5.4.4 Main Steamline Flow Restrictors
 - 5.4.5 Main Steamline Isolation System
 - 5.4.6 Reactor Core Isolation Cooling System
 - 5.4.7 Residual Heat Removal System
 - 5.4.8 Reactor Water Cleanup System
 - 5.4.9 Main Steam Lines and Feedwater Piping
 - 5.4.10 Pressurizer
 - 5.4.11 Pressurizer Relief Discharge System
 - 5.4.12 Valves
 - 5.4.13 Safety and Relief Valves
 - 5.4.14 Component Supports
 - 5.4.15 High Pressure Coolant Injection (HPCI) System
 - 5.4.16 Core Spray (CS) System
 - 5.4.17 Standby Liquid Control (SLC) System
 - 5.4.18 References

SUMMARY TABLE OF CONTENTS**Chapter 5 - Tables**

5.1-1	Design and Performance Characteristics of the Reactor Coolant System and Its Components
5.2-1	Reactor Coolant Pressure Boundary Components Code Case Interpretations
5.2-2	Nuclear System Safety/Relief Set Points Units 1 and 2
5.2-3	Design Temperature, Pressure and Maximum Test Pressure for RCPB Components
5.2-4	Reactor Coolant Pressure Boundary Materials
5.2-5	BWR Water Chemistry
5.2-6	Systems Which May Initiate During Overpressure Event
5.2-7	Water Sample Locations
5.2-8	Summary of Isolation/Alarm of System Monitored and Leak Detection Methods Used
5.2-9	Sequence of Events for MSIV Isolation Closure Unit 1 Typical and Unit 2 Typical
5.2-10	RCPB Components in Compliance with 10CFR50.55(a) (2) (ii)
5.2-11	Identified Leakages into the Drywell Equipment Drain Tank
5.2-12	Unidentified Leakages into the Drywell Floor Drain Sump
5.2-13	Estimated Monitor Responses
5.2-14	RCPB Leak Detection Monitors Inside Primary Containment Drywell
5.3-1a	Appendix G Matrix For Susquehanna Unit 1
5.3-1b	Appendix H Matrix For Susquehanna SES Unit 1
5.3-2a	Appendix G Matrix For Susquehanna SES Unit 2
5.3-2b	Appendix H Matrix For Susquehanna SES Unit 2
5.3-3	Reactor Vessel Material Surveillance Program - Withdrawal Schedule
5.4-2	Reactor Water Cleanup System Equipment Design Data
5.4-3	RHR Relief Valve Data
5.4-4	RCPB Component Description

SUMMARY TABLE OF CONTENTS**Chapter 5 - Figures**

5.1-2	Coolant Volumes of the Boiling Water Reactor
5.1-3A-1	Figure replaced by Drawing M-141, Sh. 1
5.1-3A-2	Figure replaced by Drawing M-141, Sh. 2
5.1-3B	Figure replaced by Drawing M-142, Sh. 1
5.1-4-1	Reactor Coolant System Plan
5.1-4-2	Reactor Coolant System Elevation
5.1-4-3	Reactor Coolant System Elevation
5.2-2	Simulated Safety/Relief Valve Spring Mode Characteristic Used for Capacity Sizing Analysis
5.2-2A	Simulated Safety/Relief Valve Spring Mode Characteristic
5.2-6	Safety Valve Lift Versus Time Characteristic
5.2-7	Schematic of Safety Valve with Auxiliary Actuating Device
5.2-8	Typical BWR Feedwater Cycle
5.2-9	Conductance vs. pH as a Function of Chloride Concentration of Aqueous Solution at 25°C
5.2-10	Calculated Leak Rate Versus Crack Length as a Function of Applied Hoop Stress
5.2-11	Axial Through-Wall Crack Length Data Correlation
5.2-12	Region for Spring Safety Mode Nominal Setpoint
5.2-13	Overpressure Protection Analysis (MSIV Closure with High Flux Scram Trip) Typical of Unit 1
5.2-14	Overpressure Protection Analysis (MSIV Closure with High Flux Scram Trip) Typical of Unit 2
5.3-1	Reactor Vessel
5.3-3	Bracket for Holing Surveillance Capsule
5.3-4c	Unit 1 Predicted Adjusted Reference Temperature vs. Effective Full Power Years of Operation
5.3-4d	Unit 2 Predicted Adjusted Reference Temperature vs. Effective Full Power Years of Operation
5.4-1	Recirculation System Elevation and Isometric
5.4-2b-1	Figure replaced by Drawing M-143, Sh. 1
5.4-2b-2	Figure replaced by Drawing M-143, Sh. 2
5.4-2c	Figure replaced by Drawing M1-B31-13, Sh. 3
5.4-3	Recirculation Pump Head, NPSH, Flow and Efficiency Curves
5.4-4a	RHR Suction Strainer Details
5.4-4b	RHR Suction Strainer Details
5.4-5	Operating Principle of Jet Pump
5.4-6	Core Flooding Capability of Recirculation System
5.4-7	Main Steam Line Flow Restrictor Location
5.4-9a	Figure replaced by Drawing M-149, Sh. 1
5.4-9b	Figure replaced by Drawing M-150, Sh. 1
5.4-10	Figure replaced by Drawing M1-E51-81, Sh. 1
5.4-13-1	Figure replaced by Drawing M-151, Sh. 1
5.4-13-2	Figure replaced by Drawing M-151, Sh. 2
5.4-13-3	Figure replaced by Drawing M-151, Sh. 3

SUMMARY TABLE OF CONTENTS

Chapter 5 - Figures

5.4-13-4	Figure replaced by Drawing M-151, Sh. 4
5.4-14-1	Figure replaced by Drawing M1-E11-3, Sh. 1
5.4-14-2	Figure replaced by Drawing M1-E11-3, Sh. 2
5.4-15A	Figure replaced by Drawing M1-G33-16, Sh. 1
5.4-15B	Figure replaced by Drawing M1-G33-18, Sh. 1
5.4-16-1	Figure replaced by Drawing M1-144, Sh. 1
5.4-16-2	Figure replaced by Drawing M1-144, Sh. 2
5.4-16-3	Figure replaced by Drawing M1-144, Sh. 3
5.4-18	Figure replaced by Drawing M-145, Sh. 1

SUMMARY TABLE OF CONTENTS**Chapter 6****6.0 ENGINEERED SAFETY FEATURES**

- 6.1 Engineered Safety Feature Materials
 - 6.1.1 Metallic Materials
 - 6.1.2 Organic Materials
 - 6.1.3 Post-Accident Chemistry
- 6.2 Containment Systems
 - 6.2.1 Primary Containment Functional Design
 - 6.2.2 Containment Heat Removal System
 - 6.2.3 Secondary Containment Functional Design
 - 6.2.4 Containment Isolation System
 - 6.2.5 Combustible Gas Control in Containment
 - 6.2.6 Primary Reactor Containment Leakage Rate Testing
 - 6.2.7 References
- 6.3 Emergency Core Cooling Systems
 - 6.3.1 Design Bases and Summary Description
 - 6.3.2 System Design
 - 6.3.3 ECCS Performance Evaluation
 - 6.3.4 Tests and Inspections
 - 6.3.5 Instrumentation Requirements
 - 6.3.6 NPSHA Margin and Vortex Formation After a Passive Failure in a Water Tight ECCS Pump Room
 - 6.3.7 References
- 6.4 Habitability Systems
 - 6.4.1 Design Bases
 - 6.4.2 System Design
 - 6.4.3 System Operational Procedures
 - 6.4.4 Design Evaluations
 - 6.4.5 Testing and Inspection
 - 6.4.6 Instrumentation Requirements
- 6.5 Fission Product Removal and Control Systems
 - 6.5.1 Engineered Safety Feature (ESF) Filter Systems
 - 6.5.2 Containment Spray Systems
 - 6.5.3 Fission Product Control System
 - 6.5.4 Ice Condenser as a Fission Product Cleanup System
 - 6.5.5 References
- 6.6 Inservice Inspection of Class 2 and 3 Components
 - 6.6.1 Components Subject to Examination
 - 6.6.2 Accessibility
 - 6.6.3 Examination Techniques and Procedures
 - 6.6.4 Inspection Intervals
 - 6.6.5 Examination Categories and Requirements

SUMMARY TABLE OF CONTENTS**Chapter 6**

6.6.6	Evaluation of Examination Results
6.6.7	System Pressure Tests
6.6-8	Augmented Inservice Inspection to Protect Against Postulated Piping Failures
6.6-9	Containment Inspections
6.7	Main Steam Isolation Valve Leakage Isolated Condenser Treatment Method
6.7.1	Design Bases
6.7.2	System Description
6.7.3	System Evaluation
6.7.4	Instrumentation Requirements
6.7.5	Inspection and Testing
6A	Subcompartment Differential Pressure Considerations
6B	Compartment Differential Pressure Analysis Description
6B.1	FLUD Calculational Procedure
6B.1.1	Equation of State
6B.1.2	Compartment Thermodynamic State
6B.1.3	Compartment Initial Conditions
6B.1.4	Air and Vapor Component Flow Rates
6B.2	Energy Transfer Mechanisms
6B.2.1	Blowdown Energy
6B.2.2	Enthalpy Flow
6B.2.3	Compartment Heat Loads
6B.2.4	Unit Coolers
6B.2.5	Energy Balance
6B.2.6	Blowout Panel Activation
6B.2.7	Energy and Mass Conversion
6B.2.8	Eulerian Integration
6B.3	Thermodynamic Properties of Steam, Water, and Air
6B.4	References

SUMMARY TABLE OF CONTENTS**Chapter 6 Tables**

6.1-1a	NSSS Supplied Engineered Safety Features Component Materials
6.1-1b	Engineered Safety Features Materials
6.1-2	Containment Components-Coating Schedule
6.1-3	Inventory of Qualified and Unqualified Containment Coatings
6.2-1	Containment Design Parameters
6.2-2	Engineered Safety Systems Inputs and Assumptions for Containment Response Analyses
6.2-3a	Initial Plant Conditions for DBA-LOCA Containment Response
6.2-4a	Input and Assumptions for the Short-Term DBA-LOCA Analysis
6.2-5a	Input and Assumptions for the Long-Term DBA-LOCA Analysis
6.2-6a	Containment Performance for DBA-LOCA
6.2-9	RPV Break Flow Data For Recirculation Line Break (102% P / 100% F)
6.2-10	RPV Break Flow Data For Main Steam Line Break (102% P / 100% F)
6.2-11	Core Decay Heat Following LOCA for Containment Analysis
6.2-12	Containment Penetration Data
6.2-12a	Data on Instrument Lines Penetrating Containment
6.2-13	Parameters Used for the Evaluation of Combustible Gases in the Containment After a LOCA (HISTORICAL)
6.2-14	Primary Containment Atmosphere Monitoring System (Hydrogen/Oxygen Analyzer) System Level, Failure Mode and Effect Analysis
6.2-15	Evaluation of Potential Secondary Containment Bypass Leakage Pathways
6.2-17	Information for the SSES Secondary Containment
6.2-19	Type A Test Data
6.2-21	System Venting and Draining for Primary Containment Integrated Leakage Rate Test
6.2-22	Leakage Rate Test List
6.2-23	Initial and Boundary Conditions for Inadvertent Spray Actuation Study
6.2-24	Initial and Boundary Conditions For Drywell- Wetwell Bypass Leakage Study
6.2-25	Blowdown Data and Bypass Leakage
6.2-26	Long-term Blowdown Data for a Recirculation Line Break (Case D)
6.3-1B-2	Event Times for the Highest PCT Case from the TLO Recirculation Line Break Spectrum Analysis
6.3-2B	Significant Input Parameters to the Loss-of-Coolant Accident Analysis
6.3-3B-2	Results for Limiting Two Loop Operation Recirculation Line Break 1.0 Deg Pump Suction SF-LPCI Top-Peaked Axial 102% Power (4031 MWt) 80 Mlbs/HR Flow
6.3-3C	Recirculation Line Break Results Highest PCT Cases
6.3-5	Single Failures And Available Systems For Susquehanna
6.3-8	HPCI System Design Parameters
6.3-9	Manual Valves in the ECCS
6.3-10	Safety-Related Valves in the Drywell Subject to Spray Impingement
6.4-1	Control Structure Isolation Damper Leakage Characteristics and Closure Times
6.5-1	Engineered Safety Feature Filter System Design Parameters
6.5-2	Engineered Safety Feature Filter Systems Compliance with Recommendations of Regulatory Guide 1.52

SUMMARY TABLE OF CONTENTS**Chapter 6 Tables**

6.5-3	Standby Gas Treatment System Failure Mode and Effect Analysis
6.5-4	Recirculation System Failure Mode and Effect Analysis
6.5-5	List of Materials Used in the Standby Gas Treatment System
6.5-6	List of Materials Used in the Emergency Outside Air Supply System
6.5-7	Zone Volumes and Their Estimated Recirculation Airflow Rates
6A-1(a)	Reactor Primary System Blowdown Flow Rates and Fluid Enthalpy-Recirculation Outlet Line Break
6A-1(b)	Recirc. Outlet Line Break Blowdown Mass Flux Time History
6A-1(c)	Reactor Primary System Blowdown Flow Rates and Fluid Enthalpy – Feedwater Line Break
6A-1(d)	Feedwater Line Break Blowdown Mass Flux Time History
6A-2	Head Spray Line Break
6A-3	Susquehanna-Compartment Volumes Used in Reactor Vessel Shield Annulus Subcompartment Analysis
6A-4	Susquehanna-Flow Area and Coefficients Used in Reactor Vessel Shield Annulus Subcompartment Analysis
6A-5	Geometry Node Locations
6A-6	RPV Geometry Node Areas for Recirculation Outlet Line Break
6A-7	RPV Geometry Node Areas for Feedwater Line Break
6A-8	Reactor Primary System Blowdown Flow Rates And Fluid Enthalpy - Recirculation Outlet Line Break

SUMMARY TABLE OF CONTENTS**Chapter 6 Figures**

6.2-1	Diagram of the Recirculation Line Break Location
6.2-2	Pressure Response for Recirculation Line Break
6.2-3	Temperature Response for Recirculation Line Break
6.2-4	Floor Differential Pressure For Recirculation Line Breaks
6.2-5	Vent Flow for Recirculation Line Break
6.2-6	Containment Pressure Response Long-Term
6.2-7	Drywell Temperature Response - Long-Term
6.2-8	Suppression Pool Temperature Response - Long-Term
6.2-9	RHR Heat Removal Rate
6.2-11	Pressure Response for Main Steamline Break
6.2-12	Temperature Response for Main Steamline Break
6.2-16	Schematic of ECCS Loop
6.2-17	Allowable Leakage Capacity
6.2-18	Vessel Blowdown Rate for Recirculation Line Break
6.2-20	Vessel Blowdown Rate for Main Steamline Break
6.2-24	Secondary Containment Boundary Outline – Unit 1 EL. 645'-0"
6.2-25	Secondary Containment Boundary Outline – Unit 1 EL. 670'-0"
6.2-26	Secondary Containment Boundary Outline – Unit 1 EL. 683'-0"
6.2-27	Secondary Containment Boundary Outline – Unit 1 EL. 719'-0"
6.2-28	Secondary Containment Boundary Outline – Unit 1 EL. 749'-1"
6.2-29	Secondary Containment Boundary Outline – Unit 1 EL. 779'-1"
6.2-30	Secondary Containment Boundary Outline – Unit 1 EL. 818'-1"
6.2-31	Secondary Containment Boundary Outline – Unit 1 Section A-A
6.2-32	Secondary Containment Boundary Outline – Unit 1 Section B-B
6.2-33	Secondary Containment Boundary Outline – Unit 1 EL. 799'-1"
6.2-34	Secondary Containment Boundary Outline – Unit 2 EL. 645'-0"
6.2-35	Secondary Containment Boundary Outline – Unit 2 EL. 670'-0"
6.2-36	Secondary Containment Boundary Outline – Unit 2 EL. 683'-0"
6.2-37	Secondary Containment Boundary Outline – Unit 2 EL. 719'-0"
6.2-38	Secondary Containment Boundary Outline – Unit 2 EL. 749'-1"
6.2-39	Secondary Containment Boundary Outline – Unit 2 EL. 779'-1"
6.2-40	Secondary Containment Boundary Outline – Unit 2 EL. 818'-1"
6.2-41	Secondary Containment Boundary Outline – Unit 2 Section A-A
6.2-42	Secondary Containment Boundary Outline – Unit 2 Section B-B
6.2-43	Secondary Containment Boundary Outline – Unit 2 EL. 799'-1"
6.2-44	Containment Penetration Details
6.2-44A	Containment Penetration Details
6.2-44B	Containment Penetration Details
6.2-44C	Containment Penetration Details
6.2-44D	Containment Penetration Details
6.2-44E	Containment Penetration Details
6.2-44F	Containment Penetration Details
6.2-44g	Containment Penetration Details
6.2-44H	Containment Penetration Details
6.2-44i	Containment Penetration Details
6.2-44J	Containment Penetration Details
6.2-44K	Containment Penetration Details

SUMMARY TABLE OF CONTENTS**Chapter 6 Figures**

6.2-44L	Containment Penetration Details
6.2-44M	Containment Penetration Details
6.2-46	Energy Absorption Rate By the Coolant vs. Time After LOCA
6.2-47	Integrated Energy Absorbed By Coolant vs. Time After LOCA
6.2-52	Reactor Building Ventilation Recirculation and Standby Gas Treatment Systems Zone I and Zone III Isolation
6.2-53	Reactor Building Ventilation Recirculation and Standby Gas Treatment Systems Normal Plant Operation
6.2-54	Reactor Building Ventilation Recirculation and Standby Gas Treatment Systems Zone III Isolation
6.2-55A	Figure replaced by Drawing M-157, Sh. 1
6.2-55B	Figure replaced by Drawing M-157, Sh. 2
6.2-55C	Figure replaced by Drawing M-157, Sh. 3
6.2-56	Drywell to Wetwell Downcomers
6.2-57-1	Vacuum Breaker – DISC/ARM Assembly Unit 1
6.2-57-2	Vacuum Breaker - DISC/ARM Assembly Unit 2
6.2-57a-1	Containment Personnel Lock Door Penetrations
6.2-57a-2	Containment Personnel Lock Door Penetrations
6.2-57a-3	Containment Personnel Lock Penetrations
6.2-58-1	Containment Personnel Lock Door Seals
6.2-58-2	Containment Personnel Lock Door Seals
6.2-59	Personnel Lock Inner Door Tie Downs
6.2-60	Secondary Containment Pressure Transient Post-LOCA
6.2-61	Model for Inadvertent Spray Actuation
6.2-62	Thermal Heat Removal Efficiency of Containment Atmosphere Spray
6.2-63	Drywell Pressure Response For Inadvertent Spray Actuation
6.2-64	Drywell Temperature Response For Inadvertent Spray Actuation
6.2-65	Differential Pressure Experienced Across the Diaphragm Slab During Inadvertent Actuation of the Drywell Spray
6.2-66B	RWCU Line Penetration
6.2-66C	Suppression Pool Purification Line Penetration
6.2-66F	Reactor Building Closed Cooling Water Line Penetration
6.2-66G	Reactor Building Control Rod Drive Seismic Island
6.2-66H	RBCCW Supply/Return lines at the Reactor Building to Turbine Building Interface
6.2-67	Figure replaced by Drawing M-159, Sh. 1
6.2-70	Long-Term Energy Release Rate for a Recirculation Line Break
6.2-72	TIP Guide Tube Isolation Control
6.3-1A	Figure replaced by Drawing M-155, Sh. 1
6.3-1B	Figure replaced by Drawing M-156, Sh. 1
6.3-2	Figure replaced by Drawing M1-E41-4, Sh. 1
6.3-3A	High Pressure Coolant Injection Pump Speed Characteristics
6.3-4	Figure replaced by Drawing M-152, Sh. 1
6.3-5	Figure replaced by Drawing M1-E21-15, Sh. 1
6.3-77	Pump Characteristic Curves For HPCI Pumps
6.3-79C	Low Pressure Core Spray Flow vs. Head Used in LOCA Analysis
6.3-80C	RHR (LPCI) Flow vs. Head Characteristics Use in LOCA Analysis

SUMMARY TABLE OF CONTENTS**Chapter 6 Figures**

6.3-118	Characteristic Curves for Core Spray Pump
6.3-119	Characteristic Curves for LPCI Pump
6.3-120	Speed Characteristic Curves for HPCI Pumps - Unit 1
6.3-121	Speed Characteristic Curves for HPCI Pumps - Unit 2
6.3-201	Limiting TLO Recirculation Line Break Upper Plenum Pressure (Lower)
6.3-202	Limiting TLO Recirculation Line Break Total Break Flow Rate
6.3-203	Limiting TLO Recirculation Line Break Core Inlet Flow Rate
6.3-204	Limiting TLO Recirculation Line Break Core Inlet Flow Rate
6.3-205	Limiting TLO Recirculation Line Break Broken Loop Jet Pump Drive Flow Rate
6.3-206	Limiting TLO Recirculation Line Break Ads Flow Rate
6.3-207	Limiting TLO Recirculation Line Break HPCI Flow Rate
6.3-208	Limiting TLO Recirculation Line Break LPCS Flow Rate
6.3-209	Limiting TLO Recirculation Line Break Intact Loop LPCI Flow Rate
6.3-210	Limiting TLO Recirculation Line Break Broken Loop LPCI Flow Rate
6.3-211	Limiting TLO Recirculation Line Break Upper Downcomer Mixture Level
6.3-212	Limiting TLO Recirculation Line Break Lower Downcomer Mixture Level
6.3-213	Limiting TLO Recirculation Line Break Lower Downcomer Liquid Mass
6.3-214	Limiting TLO Recirculation Line Break Upper Plenum Liquid Mass
6.3-215	Limiting TLO Recirculation Line Break Lower Plenum Liquid Mass
6.3-216	Limiting TLO Recirculation Line Break Hot Channel Inlet Flow Rate
6.3-217	Limiting TLO Recirculation Line Break Hot Channel Outlet Flow Rate
6.3-218	Limiting TLO Recirculation Line Break Hot Channel Coolant Temperature At The Limiting Node
6.3-219	Limiting TLO Recirculation Line Break Hot Channel Quality At The Limiting Node
6.3-220	Limiting TLO Recirculation Line Break Hot Channel Heat Transfer Coeff. at The Limiting Node
6.3-221	Limiting TLO Recirculation Line Break Cladding Temperatures
6.4-1A	Control Structure Elevation
6.4-1B	Control Structure Envelope Plan - El. 697'-0" and 714'-0"
6.4-1C	Control Structure Envelope Control Room Floor Plan EL. 729'-0" Technical Support Center EL. 741'-1"
6.4-1D	Control Structure Envelope Plan EL. 753'-0" & 771'-0"
6.4-1E	Control Structure Envelope Plan EL. 783'-0"
6.4-2	Control Room Location Intake and Exhaust Location
6A-1(a)	Reactor Shield Annulus Arrangement
6A-1(b)	RPV Shield Wall and Pedestal
6A-2	RPV Shield Annulus Subcompartment Model Schematic
6A-3a	Pressure Transient in Shield Annulus Following a Recirculation Line Break at the Nozzle Safe End
6A-3b	Pressure Transient in Shield Annulus Following a Recirculation Line Break at the Nozzle Safe End
6A-3c	Pressure Transient in Shield Annulus Following a Recirculation Line Break at the Nozzle Safe End
6A-3d	Pressure Transient in Shield Annulus Following a Recirculation Line Break at the Nozzle Safe End

SUMMARY TABLE OF CONTENTS**Chapter 6 Figures**

6A-3e	Pressure Transient in Shield Annulus Following a Recirculation Line Break at the Nozzle Safe End
6A-3f	Pressure Transient in Shield Annulus Following a Recirculation Line Break at the Nozzle Safe End
6A-3g	Pressure Transient in Shield Annulus Following a Feedwater Line Break at the Nozzle Safe End
6A-3h	Pressure Transient in Shield Annulus Following a Feedwater Line Break at the Nozzle Safe End
6A-3i	Pressure Transient in Shield Annulus Following a Feedwater Line Break at the Nozzle Safe End
6A-3j	Pressure Transient in Shield Annulus Following a Feedwater Line Break at the Nozzle Safe End
6A-3k	Pressure Transient in Shield Annulus Following a Feedwater Line Break at the Nozzle Safe End
6A-3l	Pressure Transient in Shield Annulus Following a Feedwater Line Break at the Nozzle Safe End
6A-4	Drywell Head Arrangement
6A-5	Head Spray Line Break Geometry
6A-6	Pressure Response in the Drywell Head For a Head Spray Line Break
6A-7	Force Transient on Reactor Pressure Vessel Following A Recirculation Line Break at the Nozzle Safe End
6A-8	Force Transient on Reactor Shield Wall Following A Recirculation Line Break at the Nozzle Safe End
6A-9	Resultant Force Transient on RPV Following a Feedwater Line Break at the Nozzle
6A-10	Resultant Force Transient on RPV Following a Feedwater Line Break at the Nozzle
6B-1	Basic FLUD Calculation Flowchart

SUMMARY TABLE OF CONTENTS**Chapter 7****7.0 INSTRUMENTATION AND CONTROLS**

- 7.1 Introduction
 - 7.1.1 Identification of Safety-Related Systems
 - 7.1.2 Identification of Safety Criteria
- 7.2 Reactor Trip System-(Reactor Protection System)Instrumentation and Controls
 - 7.2.1 Description
 - 7.2.2 Analysis
 - 7.2.3 Alternate Rod Injection System
 - 7.2.4 ARI Analysis
- 7.3 Engineered Safety Feature Systems
 - 7.3.1 Description
 - 7.3.2 Analysis
 - 7.3.2a Analysis of ESFAS Supplied with the NSSS
 - 7.3.2b Analysis for Non-NSSS Systems
- 7.4 Systems Required for Safe Shutdown
 - 7.4.1 Description
 - 7.4.2 Analysis
 - 7.4.3 References
- 7.5 Safety Related Display Instrumentation (SRDI)
 - 7.5.1a Description
 - 7.5.1b Description of Non-NSSS Safety-Related Displays
 - 7.5.2a Analysis of NSSS Safety-Related Displays
 - 7.5.2b Analysis of Non-NSSS Safety-Related Display Instrumentation
- 7.6 All Other Instrumentation Systems Required for Safety
 - 7.6.1a Description
 - 7.6.1b Description
 - 7.6.2a Analysis for NSSS - Systems
 - 7.6.2b Analysis for Non-NSSS Systems
 - 7.6.3 References
- 7.7 Control Systems Not Required for Safety
 - 7.7.1 Description
 - 7.7.2 Analysis
 - 7.7.3 References

SUMMARY TABLE OF CONTENTS**Chapter 7 Tables**

7.1-1	Responsibility
7.1-2	Similarity to Licensed Reactors
7.1-3	Codes and Standards Applicability Matrix
7.1-4	Reactor Protection System Codes and Standards
7.1-5	Primary Containment and Reactor Vessel Isolation Control System Codes and Standards
7.1-6	High Pressure ECCS (HPCI, ADS A, ADS B Network) Codes and Standards
7.1-7	Low Pressure ECCS (CS, RHR Network) Codes and Standards
7.1-8	Process Radiation Monitoring Codes and Standards
7.1-9	Leak Detection System Codes and Standards
7.1-10	Reactor Protection System Sensor Suffix Letters and Division Allocation
7.1-11	Four Division Grouping for Neutron Monitoring System
7.1-12	Emergency Core Cooling System and RCIC Sensor Suffix Letters and Division Allocation
7.2-1	Reactor Protection System Instrumentation Specifications
7.2-2	Channels Required for Functional Performance of RPS
7.2-3	ATWS Recirculation Pump Trip and Alternate Rod Injection Instrumentation Specifications
7.2-4	Channels Required for Functional Performance of ARI
7.3-1	High Pressure Coolant Injection System-Instrument Specifications and Channels
7.3-2	Automatic Depressurization System-Instrument Specifications and Channels
7.3-3	Core Spray System-Instrument Specifications and Channels
7.3-4	Low Pressure Coolant Injection-Instrument Specification and Channels
7.3-5	Primary Containment and Reactor Vessel Isolation Control System Instrumentation Specifications
7.3-13	ESFAS Actuated Equipment Standby Gas Treatment System
7.3-14	ESFAS Actuated Equipment Recirculation System, Reactor Building Isolation Dampers, and Reactor Building Non-Safety Related Equipment
7.3-15	ESFAS Actuated Equipment Control Structure Emergency Outside Air Supply System
7.3-16	ESFAS Actuated Equipment Battery Rooms Exhaust System
7.3-17	General Notes for Tables 7.3-13 Through 7.3-16
7.3-18	Standby Gas Treatment System (SGTS) Failure Mode and Effects Analysis
7.3-19	Reactor Building Recirculation System Failure Mode and Effects Analysis
7.3-20	Failure Mode and Effects Analysis Primary Containment Isolation Control System Fan Non-NSS Systems
7.3-21	Emergency Outside Air Supply System (EOASS) Failure Mode and Effects Analysis
7.3-22	Computer Room Cooling System (CRCS) Failure Mode and Effects Analysis
7.3-23	Control Structure H&V System (CSHVS) Failure Mode and Effects Analysis
7.3-24	Control Structure Chilled Water System (CSCWS) Failure Mode and Effects Analysis
7.3-25	Battery Rooms Exhaust System Failure Mode and Effects Analysis
7.3-26	Control Room Floor Cooling System (CRFCS) Failure Mode and Effects Analysis
7.3-28	Reactor Protection System Response Times
7.3-29	Isolation System Instrumentation Response Time
7.3-30	Emergency Core Cooling System Response Times

SUMMARY TABLE OF CONTENTS**Chapter 7 Tables**

7.4-2	RHRS Shutdown Cooling Bypasses and Interlocks
7.4-3	Remote Shutdown Panel Instrumentation
7.4-4	Alternate Control Structure HVAC Control Panel
7.5-1	Safety Related Display Instrumentation
7.5-2	Safety Related Display Instrumentation-Habitability (Emergency Outside Air System/Control Structure HVAC)
7.5-3	Safety Related Display Instrumentation-Containment and Suppression Pool Instrumentation
7.5-4	Safety Related Display Instrumentation-Standby Gas Treatment System, RX Building Recirculation and Isolation System
7.5-5	Safety Related Display Instrumentation-Emergency Service Water System
7.5-6	Safety Related Display Instrumentation-RHR Service Water System and Spray Pond
7.5-7	Safety Related Display Instrumentation-Containment Instrument Gas System
7.5-7a	Safety Related Display Instrumentation Standby Liquid Control System
7.5-8	Bypass Indication System for Non-NSSS Systems
7.6-3	IRM Trips
7.6-4	LPRM System Trips
7.6-5	APRM System Trips
7.6-7	OPRM System Trip
7.6-9	Suppression Pool Temperature Sensor Locations
7.6-10	End-of-Cycle Recirculation Pump Trip System Response Time
7.7-1	CRD Hydraulic System Process Indicators
7.7-2	Refueling Interlock Effectiveness
7.7-3	RBM System Trips
7.7-4	IRM Trips

SUMMARY TABLE OF CONTENTS**Chapter 7 Figures**

7.2-1-1	Figure replaced by Drawing M1-C72-2, Sh. 1
7.2-1-2	Figure replaced by Drawing M1-C72-2, Sh. 2
7.2-1-3	Figure replaced by Drawing M1-C72-2, Sh. 3
7.2-1-4	Figure replaced by Drawing M1-C72-2, Sh. 4
7.2-2	Reactor Protection System Scram Functions
7.2-3	Arrangement of Channels and Logics
7.2-4	Actuators and Actuator Logics
7.2-5	Logic in One Trip System
7.2-6	Relationship Between Neutron Monitoring System and Reactor Protection System
7.2-7	Configuration for Turbine Stop Valve Closure Reactor Trip
7.2-8	Configuration for Main Steamline Isolation Reactor Trip
7.2-9	Block Diagram - RPS Protective Circuit – Electrical Protection Assembly (EPA)
7.2-10	ARI Trip System Logic
7.3-2	Isolation Control System for Main Steamline Isolation Valves
7.3-3	Isolation Control System Using Motor-Operated Valves
7.3-4	Main Steamline Isolation Valve Schematic
7.3-5-1	Initiation Logic – ADS, CS, RHR
7.3-5-2	ADS Initiation Logic
7.3-5-3	Unit 2 ADS Initiation Logic
7.3-6	Initiation Logic – HPCI, RCIC
7.3-7-1	Figure replaced by Drawing M1-E41-65, Sh. 1
7.3-7-2	Figure replaced by Drawing M1-E41-65, Sh. 2
7.3-7-3	Figure replaced by Drawing M1-E41-65, Sh. 3
7.3-7-4	Figure replaced by Drawing M1-E41-65, Sh. 4
7.3-7-5	Figure replaced by Drawing M1-E41-65, Sh. 5
7.3-8-1	Figure replaced by Drawing M1-B21-92, Sh. 1
7.3-8-2	Figure replaced by Drawing M1-B21-92, Sh. 2
7.3-8-3	Figure replaced by Drawing M1-B21-92, Sh. 3
7.3-8-4	Figure replaced by Drawing M1-B21-92, Sh. 4
7.3-8-5	Figure replaced by Drawing M1-B21-92, Sh. 5
7.3-8-6	Figure replaced by Drawing M1-B21-92, Sh. 6
7.3-9-1	Figure replaced by Drawing M1-E21-3, Sh. 1
7.3-9-2	Figure replaced by Drawing M1-E21-3, Sh. 2
7.3-9-3	Figure replaced by Drawing M1-E21-3, Sh. 3
7.3-10-1	Figure replaced by Drawing M1-E11-51, Sh. 1
7.3-10-2	Figure replaced by Drawing M1-E11-51, Sh. 2
7.3-10-3	Figure replaced by Drawing M1-E11-51, Sh. 3
7.3-10-4	Figure replaced by Drawing M1-E11-51, Sh. 4
7.3-10-5	Figure replaced by Drawing M1-E11-51, Sh. 5
7.3-11-1	Figure replaced by Drawing M1-D12-1, Sh. 1
7.3-11-2	Figure replaced by Drawing M1-D12-1, Sh. 2
7.3-11-3	Figure replaced by Drawing M1-D12-1, Sh. 3
7.3-11-4	Figure replaced by Drawing M1-D12-1, Sh. 4
7.3-11-5	Figure replaced by Drawing M1-D12-1, Sh. 5
7.4-1	Figure replaced by Drawing M-149, Sh. 1 & M-150, Sh. 1

SUMMARY TABLE OF CONTENTS**Chapter 7 Figures**

7.4-2-1	Figure replaced by Drawing M1-E51-80, Sh. 1
7.4-2-2	Figure replaced by Drawing M1-E51-80, Sh. 2
7.4-2-3	Figure replaced by Drawing M1-E51-80, Sh. 3
7.4-2-4	Figure replaced by Drawing M1-E51-80, Sh. 4
7.4-3	Figure replaced by Drawing M-148, Sh. 1
7.4-4	Figure replaced by Drawing M1-C41-31, Sh. 1
7.5-3	Neutron Flux at Primary Shield
7.6-1	Recirculation Pump Leak Detection Block Diagram
7.6-2	RHR Area Temperature Monitoring System Block Diagram
7.6-3	Vessel Penetrations for Nuclear Instrumentation
7.6-4-1	Figure replaced by Drawing M1-C51-35, Sh. 1
7.6-4-2	Figure replaced by Drawing M1-C51-35, Sh. 2
7.6-5	SRM/IRM Neutron Monitoring Unit
7.6-6	Detector Drive System Schematic
7.6-7-1	Figure replaced by Drawing M1-C51-2, Sh. 1
7.6-7-2	Figure replaced by Drawing M1-C51-2, Sh. 2
7.6-7-3	Figure replaced by Drawing M1-C51-2, Sh. 3
7.6-7-4	Figure replaced by Drawing M1-C51-2, Sh. 4
7.6-7-5	Figure replaced by Drawing M1-C51-2, Sh. 5
7.6-7-6	Figure replaced by Drawing M1-C51-2, Sh. 6
7.6-7-7	Figure replaced by Drawing M1-C51-2, Sh. 7
7.6-8	Functional Block Diagram of SRM Channel
7.6-9	Functional Block Diagram of IRM Channel
7.6-10	Power Range Monitor Detector Assembly Location
7.6-11-1	Refer to Figure 5.4-2A
7.6-11-2	Figure replaced by Drawing M1-B31-13, Sh. 2
7.6-11-3	Figure replaced by Drawing M1-B31-13, Sh. 3
7.6-12	APRM Circuit Arrangement for Reactor Protection System Input
7.6-13	Ranges of Neutron Monitoring System
7.7-1	Water Level Range Definition
7.7-2-1	Control Rod Drive Hydraulic System - FCD
7.7-2-2	Control Rod Drive Hydraulic System - FCD
7.7-2-3	Control Rod Drive Hydraulic System - FCD
7.7-2-4	Control Rod Drive Hydraulic System - FCD
7.7-2-5	Control Rod Drive Hydraulic System - FCD
7.7-2-6	Control Rod Drive Hydraulic System - FCD
7.7-2-7	Control Rod Drive Hydraulic System - FCD
7.7-3-1	Figure replaced by Drawing M1-C12-90, Sh. 4
7.7-3-2	Figure replaced by Drawing M1-C12-110, Sh. 8
7.7-4	Reactor Manual Control System Operation
7.7-5	Reactor Manual Control Self-Test Provisions
7.7-6	Eleven-Wire Position Probe
7.7-7-1	Figure replaced by Drawing M1-B31-189, Sh. 1
7.7-7-2	Figure replaced by Drawing M1-B31-189, Sh. 2

SUMMARY TABLE OF CONTENTS**Chapter 7 Figures**

7.7-7-3	Figure replaced by Drawing M1-B31-189, Sh. 3
7.7-7-4	Figure replaced by Drawing M1-B31-189, Sh. 4
7.7-7-5	Figure replaced by Drawing M1-B31-189, Sh. 5
7.7-7-6	ATWS Recirculation Pump Trip Logic
7.7-8	Recirculation Flow Control Illustration
7.7-9	Figure replaced by Drawing M1-C32-3, Sh. 1
7.7-10	Detector Drive System Schematic
7.7-11	Figure replaced by Drawing M1-G33-143, Sh. 1
7.7-13	Figure replaced by Drawing A-105, Sh. 1
7.7-13a	Control room Panel Safety Related Display Instr. Plant Operator Interface
7.7-14	Traversing In-Core Probe Assembly
7.7-15	Main Turbine Control System Block Diagram
7.7-16	Assignment of LPRM Input to RBM System
7.7-19	Unit 2, Typical RBM Channel Responses, Old Versus New LPRM Assignment (No Failed LPRMS)

SUMMARY TABLE OF CONTENTS

Chapter 8

8.0 ELECTRIC POWER

- 8.1 Introduction
 - 8.1.1 General
 - 8.1.2 Utility Power Grid and Offsite Power Systems
 - 8.1.3 Onsite Power Systems
 - 8.1.4 Safety Related Loads
 - 8.1.5 Design Bases
 - 8.1.6 Regulatory Guides and IEEE Standards
- 8.2 Offsite Power System
 - 8.2.1 Description
 - 8.2.2 Analysis
- 8.2A Reliability Principles and Standards for Planning Bulk Electric Supply System of MAAC Group
- 8.3 Onsite Power Systems
 - 8.3.1 AC Power Systems
 - 8.3.2 DC Power Systems
 - 8.3.3 Fire Protection for Cable Systems

SUMMARY TABLE OF CONTENTS**Chapter 8 Tables**

8.1-1	Motor Operated Valves With Thermal Overload Continuously Bypassed During Plant Operation
8.1-2	Affiliated and Non-Class 1E Circuits That Connect to Class 1E Power Supplies
8.1-3	Non-Class 1E Annunciator and Computer Interface Devices
8.1-4	Divisional or Affiliated Loads Supplied From Class 1E Channel C or D 4.16 kV Buss
8.1-5	Containment Radiation Monitors Supplied from Class 1E System
8.2-1	Susquehanna Unit #1 & #2 Stability Case List (Summer Light Load Conditions)
8.3-1	Assignment of ESF and Selected Non-ESF Loads to Diesel Generators and ESS Buses
8.3-1a	Diesel Generator Loading (Note 1), Diesel Generators A, B, C and D In Service, Unit - Design Basis Accident; Unit 2-Forced Shutdown
8.3-1b	Supplement to Table 8.3-1
8.3-1c	Diesel Generator E Loading, Diesel Generator E In Service for A or B or C or D, Unit 1-Design Basis Accident; Unit 2-Forced Shutdown
8.3-2	Diesel Generator Loading, Diesel A Unavailable, Unit 1-Design Basis Accident; Unit 2-Forced Shutdown
8.3-2a	Diesel Generator E Loading, Diesel A Unavailable, Diesel Generator E Substituted for Diesel B or C or D, Unit 1-Design Basis Accident; Unit 2-Forced Shutdown
8.3-3	Diesel Generator Loading, Diesel B Unavailable, Unit 1-Design Basis Accident; Unit 2-Forced Shutdown
8.3-3a	Diesel Generator Loading E, Diesel B Unavailable, Diesel Generator E Substituted for Diesel A or C or D, Unit 1-Design Basis Accident; Unit 2-Forced Shutdown
8.3-4	Diesel Generator Loading, Diesel C Unavailable, Unit 1-Design Basis Accident; Unit 2-Forced Shutdown
8.3-4a	Diesel Generator E Loading, Diesel C Unavailable, Diesel Generator E Substituted for Diesel A or B or D, Unit 1-Design Basis Accident; Unit 2-Forced Shutdown
8.3-5	Diesel Generator Loading, Diesel D Unavailable, Unit 1-Design Basis Accident; Unit 2-Forced Shutdown
8.3-5a	Diesel Generator E Loading, Diesel D Unavailable, Diesel Generator E Substituted for Diesel A or B or C, Unit 1-Design Basis Accident; Unit 2-Forced Shutdown
8.3-6A	125 Volt DC Load Cycle 1D610
8.3-6B	125 Volt DC Load Cycle 1D620
8.3-6C	125 Volt DC Load Cycle 1D630
8.3-6D	125 Volt DC Load Cycle 1D640
8.3-6E	125 Volt DC Load Cycle 2D610
8.3-6F	125 Volt DC Load Cycle 2D620
8.3-6G	125 Volt DC Load Cycle 2D630
8.3-6H	125 Volt DC Load Cycle 2D640
8.3-6I	125 Volt DC Load Cycle Channel H 0D597
8.3-6J	125V DC Battery Duty Load Profiles
8.3-7A	Unit 1 250V DC Load Cycle Div. I (1D650)
8.3-7B	Unit 1 250V DC Load Cycle Div. II (1D660)
8.3-7C	Unit 2 250V DC Load Cycle Div. I (2D650)
8.3-7D	Unit 2 250V DC Load Cycle Div. II (2D660)
8.3-7E	250V DC Battery Duty Load Profiles

SUMMARY TABLE OF CONTENTS**Chapter 8 Tables**

8.3-7F	Unit 1 250V DC Load Cycl Div I (1D650) SBO Profile
8.3-7G	Unit 1 250V DC Load Cycl Div II (1D660) SBO Profile
8.3-7H	Unit 2 250V DC Load Cycl Div I (2D650) SBO Profile
8.3-7I	Unit 2 250V DC Load Cycl Div II (2D660) SBO Profile
8.3-8	±24 Volt DC Load Cycle
8.3-9	AC Power Failure Mode Effects Analysis
8.3-10	Routing Table
8.3-16	Diesel Generator Auto Start Circuit Failure Effects Analysis (1)
8.3-17	125V DC Control Power Source for Non-Class 1E 13.8 kV and 4.16 kV Switchgear
8.3-18	125V DC Control Power Source For Non-Class 1E 480V L.C.
8.3-19	125V DC Control Power Source For Class 1E 4.16 kV Switchgear
8.3-20	125V DC Control Power Source For Class 1E 480V LC
8.3-21	Failure Mode and Effect Analysis-125V DC System (4 Channels)
8.3-22	Failure Mode and Effect Analysis-250V DC System (2 Divisions)
8.3-23	Failure Mode and Effect Analysis-24V DC System (2 Divisions)
8.3-24	Common Mode-Common Cause Failure Analysis-Auto Transfer Switch Separation Methods and Requirements Within Junction Boxes and Field Installed Pull Boxes
8.3-25	Separation Methods and Requirements Within Junction Boxes and Field Installed Pull Boxes

SUMMARY TABLE OF CONTENTS**Chapter 8 Figures**

8.2-1	Figure replaced by Drawing D159760, Sh. 1
8.2-2	Figure replaced by Drawing D159760, Sh. 2
8.2-3	Figure replaced by Drawing D159760, Sh. 3
8.2-4	Figure replaced by Drawing D159760, Sh. 4
8.3-1-1	Figure replaced by Drawing E-1, Sh. 1
8.3-1-2	Figure replaced by Drawing E-1, Sh. 1A
8.3-1-2a	Figure replaced by Drawing E-1, Sh. 2
8.3-2	Figure replaced by Drawing E-4, Sh. 2
8.3-2A	Preferred Power Supplies to Diesel Generator E Class 1E Power System
8.3-3	Figure replaced by Drawing E-5, Sh. 1
8.3-4	Figure replaced by Drawing E-5, Sh. 2
8.3-4A	Figure replaced by Drawing E-5, Sh. 5
8.3-5	Figure replaced by Drawing E-11, Sh. 1
8.3-5A	Figure replaced by Drawing E-11, Sh. 11
8.3-6	Figure replaced by Drawing E-13, Sh. 1
8.3-7	Figure replaced by Drawing E-8, Sh. 4
8.3-8	Figure replaced by Drawing E-8, Sh. 8
8.3-9	480 Volt Swing Buses
8.3-10	Figure replaced by Drawing M-260, Sh. 1
8.3-10A	Figure replaced by Drawing M-261, Sh. 1
8.3-10B	Figure replaced by Drawing M-5200, Sh. 1
8.3-11	Figure replaced by Drawing E-31, Sh. 8
8.3-12	Figure replaced by Drawing E-31, Sh. 9
8.3-13	Single Line Diagram for 480 Volt Swing Bus System
8.3-14	Swing Bus Auto Trans for Switch Control Schematic
8.3-15	Figure replaced by Drawing E-31, Sh. 5

SUMMARY TABLE OF CONTENTS**Chapter 9****9.0 AUXILIARY SYSTEMS**

- 9.1 Fuel Storage and Handling
 - 9.1.1 New Fuel Storage
 - 9.1.2 Spent Fuel Storage
 - 9.1.3 Spent Fuel Pool Cooling and Cleanup System
 - 9.1.4 Fuel Handling System and Reactor Servicing Equipment
 - 9.1.5 Reactor Building Cranes
 - 9.1.6 References
- 9.2 Water Systems
 - 9.2.1 Service Water System
 - 9.2.2 Reactor Building Closed Cooling Water System
 - 9.2.3 Turbine Building Closed Cooling Water System
 - 9.2.4 Gaseous Radwaste Recombiner Closed Cooling Water System
 - 9.2.5 Emergency Service Water System
 - 9.2.6 RHR Service Water System
 - 9.2.7 Ultimate Heat Sink
 - 9.2.8 Raw Water Treatment System
 - 9.2.9 Makeup Demineralizer System
 - 9.2.10 Condensate Storage and Transfer System
 - 9.2.11 Potable Water and Sanitary Water Systems
 - 9.2.12 Chilled Water Systems
 - 9.2.13 References
- 9.3 Process Auxiliaries
 - 9.3.1 Compressed Air Systems
 - 9.3.2 Process Sampling System
 - 9.3.3 Equipment and Floor Drainage System
 - 9.3.4 Chemical and Volume Control System
 - 9.3.5 Standby Liquid Control System
- 9.4 Air Conditioning, Heating, Cooling and Ventilation Systems
 - 9.4.1 Control Room and Control Structure HVAC Systems
 - 9.4.2 Reactor Building Ventilation System
 - 9.4.3 Radwaste Building Ventilation System
 - 9.4.4 Turbine Building Ventilation System
 - 9.4.5 Primary Containment Atmosphere Recirculation and Cooling System
 - 9.4.6 Refueling and Spent Fuel Area Ventilation System
 - 9.4.7 Diesel Generator Buildings Ventilation System
 - 9.4.8 Engineered Safeguard Service Water Pumphouse Ventilation System
 - 9.4.9 Circulating Water Pumphouse and Water Treatment Building HVAC
- 9.5 Other Auxiliary Systems
 - 9.5.1 Fire Protection System
 - 9.5.2 Communication Systems
 - 9.5.3 Lighting System

SUMMARY TABLE OF CONTENTS

Chapter 9

9.5.4	Diesel Generator Fuel Oil Storage and Transfer System
9.5.5	Diesel Generator Cooling Water System
9.5.6	Diesel Generator Starting System
9.5.7	Diesel Generator Lubrication System
9.5.8	Diesel Generator Combustion Air Intake and Exhaust System
9.5-9	Hydrogen Water Chemistry (HWC) System
9.5-10	Passive Zinc Injection System
9.5-11	References
9A	Analysis for Non-Seismic Spent Fuel Pool Cooling Systems
9B	Compliance with NRC Branch Technical Position ASB 9-1 Susquehanna Steam Electric Station Unit 1 Reactor Building Crane

SUMMARY TABLE OF CONTENTS**Chapter 9 Tables**

9.1-1	Spent Fuel Pool Cooling and Cleanup System Component Description
9.1-2	Fuel Servicing Equipment Classification
9.1-2a	Original Design Basis - Decay Heat Output Under Normal Fuel Storage Conditions
9.1-2b	Original Design Basis - Decay Heat Output Under Normal Fuel Storage Conditions
9.1-2c	Original Design Basis - Decay Heat Output Under Full Core Unload Conditions
9.1-2d	Original Design Basis - Decay Heat Output Under Full Core Unload Conditions
9.1-2e	Updated Design Basis - Decay Heat Output Under Normal Fuel Storage Conditions
9.1-2f	Updated Design Basis - Decay Heat Output Under Full Core Unload Conditions
9.1-3	Reactor Vessel Servicing Equipment Classification
9.1-4	Under-Reactor Vessel Servicing Equipment and Tools Classification
9.1-5	Tools and Services Equipment
9.1-6a	Unit 1 Reactor Building Crane Failure Modes and Effect Analysis
9.1-6b	Unit 2 Reactor Building Crane Failure Modes and Effect Analysis
9.1-7a	Load Combinations & Factored Allowable Stress Limits
9.1-7b	Load Definitions
9.2-1	List of Coolers Supplied Cooling Water by the Service Water System
9.2-3	Definition of ESW Flows for Units 1 & 2
9.2-4	ESW Cooling Duty Following DBA for Minimum Heat Transfer Case (Loss of Auxiliary Power Followed by a Single Unit LOCA)
9.2-5	ESW Cooling Duty Following DBA for Maximum Water Loss Case (Loss of All Auxiliary Power Followed by a Single Unit LOCA)
9.2-6	Ultimate Heat Sink Components
9.2-7	Spray Pond Design Data
9.2-8	Susquehanna Pond Water Allowances
9.2-9	Minimum Heat Transfer Meteorology - Site Data First of the Two Worst Consecutive Days - August 2, 1975
9.2-10	Maximum Water Loss Meteorology Avoca Airport Data - Hourly Average Data For Worst 30 Days - March 6, 1951 Through April 4, 1951
9.2-12	Summary of Peak Temperature Values and Final Pond Water Inventory
9.2-13	Condensate and Refueling Water Storage Flow Paths
9.2-14	Control Structure Chilled Water System Design Data
9.2-15	Control Structure Chilled Water Systems Failure Mode and Effect Analysis
9.2-16	Turbine Building Chilled Water System Design Data
9.2-17	Reactor Building Chilled Water System Design Data
9.2-18	Radwaste Building Chilled Water System Design Data
9.2-19	Decay Heat Generation Branch Technical Position ASB 9-2 for One Core
9.2-20	Emergency Service Water System Heat Loads (Both Units) ($\times 10^6$ BTU/HR)
9.2-21	RHR and RHR Service Water System Flow Rates (GPM) Minimum Heat Transfer Case
9.2-21a	RHR and RHR Service Water System Flow Rates (GPM) Maximum Heat Transfer Case
9.2-22	Emergency Service Water System Flow Rates (GPM)
9.2-23	Initial Conditions
9.2-27	Size Comparison of Spray Ponds Investigated
9.2-28	Performance Comparison of CANADYS Station and Model Results
9.2-29	Performance Comparison of RANCHO SECO Test Results and Model Results

SUMMARY TABLE OF CONTENTS**Chapter 9 Tables**

9.3-1	Instrument Air System Design Parameters (Typical for Units 1 & 2)
9.3-2	Instrument Air System Pneumatically Operated Valves Which Have a Safety Function
9.3-3	Instrument Air Compressors Failure Mode and Effect Analysis
9.3-4	Service Air System Design Parameters (Typical for Units 1 & 2)
9.3-5	Low Pressure Air System Design Parameters (Common to Units 1 & 2)
9.3-6	River Intake Structure Compressed Air System Design Parameters (Common for Units 1 & 2)
9.3-7	List of Instrument Gas Operated Devices
9.3-8	Containment Instrument Gas System Design Parameters (Typical for Units 1 & 2)
9.3-9	Containment Instrument Gas System Failure Mode and Effect Analysis
9.3-10	Equipment and Floor Drainage System Component Description
9.3-11	Standby Liquid Control System Operating Pressure/Temperature Conditions
9.4-1	Ventilation Systems Tests and Inspections
9.4-2	Control Structure HVAC Systems Design Parameters
9.4-3	Reactor Building HVAC Systems Design Parameters
9.4-4	Reactor Building - Safety Related and RCIC Air Cooling System Design Parameters
9.4-5	Reactor Building HVAC Systems Failure Mode and Effect Analysis
9.4-6	Radwaste Building HVAC Systems Design Parameters
9.4-7	Turbine Building HVAC Systems Design Parameters
9.4-8	Unit 1 and 2 Primary Containment Unit Coolers and Ventilation Fans' Design Parameters
9.4-9	Drywell Unit Coolers' and Recirculation Fans' Operating Modes
9.4-10	Primary Containment Atmosphere Recirculation and Cooling System Failure Mode and Effect Analysis
9.4-11	Diesel Generator A, B, C and D Building HVAC Systems Design Parameters
9.4-11A	Diesel Generator 'E' Building HVAC System Design Parameters
9.4-11B	Diesel Generator 'E' Building Ventilation System Design Temperature Parameters
9.4-12	Diesel Generator Building H&V Failure Mode and Effect Analysis
9.4-13	ESSW Pumphouse HVAC Systems Design Parameters
9.4-14	Engineered Safeguard Service Water Pumphouse H&V Systems Failure Mode and Effect Analysis
9.4-15	Circulating Water Pumphouse HVAC Systems Design Parameters
9.4-16	Control Room and Control Structure HVAC Systems Control Room Floor Cooling Systems Failure Mode and Effect Analysis
9.4-17	Control Room and Control Structure HVAC Systems Computer Room Floor Cooling Systems Failure Mode and Effect Analysis
9.4-18	Control Room and Control Structure HVAC Systems Control Structure H&V Systems Failure Mode and Effect Analysis
9.4-19	Control Room and Control Structure HVAC Systems Emergency Outside Air Supply Systems Failure Mode and Effect Analysis
9.4-20	Control Room and Control Structure HVAC Systems SGTS Equipment Room H&V Systems Failure Mode and Effect Analysis
9.4-21	Control Room and Control Structure HVAC Systems Battery Room Exhaust Systems Failure Mode and Effect Analysis

SUMMARY TABLE OF CONTENTS

Chapter 9 Tables

9.5-3	Emergency Lighting System in Susquehanna SES
9.5-4	Communication Systems
9A-1	Results of Boiling Spent Fuel Pool Analysis
9B-1	Comparison of Unit 1 Reactor Building Crane Design with BTP ASB 9-1

SUMMARY TABLE OF CONTENTS**Chapter 9 Figures**

9.1-1	New Fuel Storage
9.1-2	New Fuel Vault Cover Details
9.1-3	Spent Fuel Rack Isometric
9.1-4	Spent Fuel Rack Arrangement
9.1-5	Spent Fuel Rack Detail
9.1-6	Reference Case Fuel Storage Poison Can
9.1-7-1	Figure replaced by Drawing M-153, Sh. 1
9.1-7-2	Figure replaced by Drawing M-153, Sh. 2
9.1-8	Figure replaced by Drawing M-154, Sh. 1
9.1-9	Fuel Preparation Machine
9.1-10	New Fuel Inspection Stand
9.1-11	Channel Bolt Wrench
9.1-12	Channel Handling Tool
9.1-13	Fuel Pool Sipper
9.1-14	Fuel Inspection Fixture
9.1-15	Channel Gauging Fixture
9.1-16	General Purpose Grapple
9.1-18	Figure replaced by Drawing C-1807, Sh. 1
9.1-19	Figure replaced by Drawing C-1807, Sh. 2
9.1-20	Simplified Section of New Fuel Handling Facilities (Section X-X, Figure 9.1-18)
9.1-21	Simplified Section of Refueling Facilities (Section Y-Y, Figure 9.1-18)
9.1-22	Simplified Section of Fuel Shipping Facilities (Section Z-Z, Figure 9.1-19)
9.1-23	Unit 2 Refueling Mast and Grapple Outline
9.1-23-1	Unit 1 Refueling Mast and Grapple Outline
9.1-24	Fuel Transfer Stand
9.1-25	Air Operated General Purpose Grapple BWR 6
9.1-26	New Fuel Channel Up Ender
9.1-27	New Fuel Up Ending Stand
9.1-28	New Fuel Inspection Equipment General Arrangement
9.2-1A-1	Figure replaced by Drawing M-109, Sh. 1
9.2.1A-2	Figure replaced by Drawing M-109, Sh. 2
9.2.1A-3	Figure replaced by Drawing M-109, Sh. 3
9.2-1B	Figure replaced by Drawing M-110, Sh. 1
9.2-1C	Figure replaced by Drawing M-2110, Sh. 1
9.2-2	Figure replaced by Drawing M-113, Sh. 1
9.2-3	Figure replaced by Drawing M-114, Sh. 1
9.2-4	Figure replaced by Drawing M-131, Sh. 1
9.2-5a	Figure replaced by Drawing M-111, Sh. 1
9.2-5b	Figure replaced by Drawing M-111, Sh. 2
9.2-5c	Figure replaced by Drawing M-111, Sh. 3
9.2-5d	Figure replaced by Drawing M-111, Sh. 4
9.2-6	Figure replaced by Drawing M-112, Sh. 1
9.2-7-1	Figure replaced by Drawing M-117, Sh. 1
9.2-7-2	Figure replaced by Drawing M-117, Sh. 2
9.2-7-3	Figure replaced by Drawing M-117, Sh. 3
9.2-7-4	Figure replaced by Drawing M-117, Sh. 4

SUMMARY TABLE OF CONTENTS**Chapter 9 Figures**

9.2-7-5	Figure replaced by Drawing M-117, Sh. 5
9.2-8-1	Figure replaced by Drawing M-118, Sh. 1
9.2-8-2	Figure replaced by Drawing M-118, Sh. 2
9.2-8-3	Figure replaced by Drawing M-118, Sh. 3
9.2-9	Figure replaced by Drawing M-108, Sh. 1
9.2-10	Sewage Treatment Plant Flowsheet
9.2-11-1	Figure replaced by Drawing M-186, Sh. 1
9.2-11-2	Figure replaced by Drawing M-186, Sh. 3
9.2-12	Figure replaced by Drawing M-188, Sh. 1
9.2-13a	Figure replaced by Drawing M-187, Sh. 1
9.2-13b	Figure replaced by Drawing M-187, Sh. 2
9.2-14-1	Figure replaced by Drawing M-189, Sh. 1
9.2-14-2	Figure replaced by Drawing M-189, Sh. 2
9.2-14-3	Figure replaced by Drawing M-189, Sh. 3
9.2-14-4	Figure replaced by Drawing M-189, Sh. 4
9.2-15	Drift Loss vs. Wind Speed
9.2-16	Drift Loss vs. Perimeter Distance
9.2-17	Spray Pond Incremental Mass and Energy Flow Schematic
9.2-18	Spray Pond Droplet Trajectory Parameters
9.2-21	Spray Pond Temperature Transient Minimum Heat Transfer Case
9.2-22	Spray Pond Water Inventory Maximum Water Loss Case
9.2-23	Spray Pond Spray Nozzle
9.2-24-1	Spray Pond Plan
9.2-24-2	ESSW Spray Pond Network A1 & B1 Plan, Section & Details
9.2-24-3	ESSW Spray Pond Network A2 & B2 Plan, Section & Details
9.3-1	Figure replaced by Drawing M-125, Sh. 1
9.3-2	Figure replaced by Drawing M-125, Sh. 2
9.3-2A	Figure replaced by Drawing M-125, Sh. 6
9.3-3	Figure replaced by Drawing M-125, Sh. 30
9.3-3-4	Figure replaced by Drawing M-2125, Sh. 16
9.3-4	Figure replaced by Drawing M-125, Sh. 5
9.3-5-1	Figure replaced by Drawing M-126, Sh. 1
9.3-5-2	Figure replaced by Drawing M-126, Sh. 2
9.3-6-1	Figure replaced by Drawing M-123, Sh. 1
9.3-6-2	Figure replaced by Drawing M-123, Sh. 2
9.3-6-3	Figure replaced by Drawing M-123, Sh. 3
9.3-6-4	Figure replaced by Drawing M-123, Sh. 4
9.3-6-5	Figure replaced by Drawing M-123, Sh. 5
9.3-6-6	Figure replaced by Drawing M-123, Sh. 6
9.3-6-7	Figure replaced by Drawing M-123, Sh. 7
9.3-6-8	Figure replaced by Drawing M-123, Sh. 8
9.3-6-9	Figure replaced by Drawing M-123, Sh. 9
9.3-6-9A	Figure replaced by Drawing M-123, Sh. 12
9.3-6-10	Figure replaced by Drawing M-123, Sh. 10
9.3-6-11	Figure replaced by Drawing M-123, Sh. 11
9.3-6-12	Figure replaced by Drawing M-123, Sh. 13

SUMMARY TABLE OF CONTENTS**Chapter 9 Figures**

9.3-10-1	Figure replaced by Drawing M-161, Sh. 1
9.3-10-2	Figure replaced by Drawing M-161, Sh. 2
9.3-10-3	Figure replaced by Drawing M-161, Sh. 3
9.3-12	Figure replaced by Drawing M-160, Sh. 1
9.3-12A	Figure replaced by Drawing M-160, Sh. 2
9.3-14	Sodium Pentaborate Volume-Concentration Requirements
9.3-15	Saturation Temperature of Sodium Pentaborate Solution
9.4-1-1	Figure replaced by Drawing M-178, Sh. 1
9.4-1-2	Figure replaced by Drawing M-178, Sh. 2
9.4-2-1	Figure replaced by Drawing VC-178, Sh. 1
9.4-2-2	Figure replaced by Drawing VC-178, Sh. 2
9.4-2-3	Figure replaced by Drawing VC-178, Sh. 3
9.4-2-4	Figure replaced by Drawing VC-178, Sh. 4
9.4-4a	Figure replaced by Drawing M-176, Sh. 1
9.4-4b	Figure replaced by Drawing M-2176, Sh. 1
9.4-5a	Figure replaced by Drawing M-175, Sh. 1
9.4-5b	Figure replaced by Drawing M-175, Sh. 2
9.4-5c	Figure replaced by Drawing M-2175, Sh. 1
9.4-6a	Figure replaced by Drawing VC-176, Sh. 1
9.4-6b	Figure replaced by Drawing VC-2176, Sh. 1
9.4-7	Figure replaced by Drawing VC-175, Sh. 1
9.4-8	Figure replaced by Drawing VC-175, Sh. 2
9.4-9	Figure replaced by Drawing VC-175, Sh. 3
9.4-10	Figure replaced by Drawing M-179, Sh. 1
9.4-11	Figure replaced by Drawing M-179, Sh. 2
9.4-12	Figure replaced by Drawing VC-179, Sh. 1
9.4-13a	Figure replaced by Drawing M-174, Sh. 1
9.4-13b	Figure replaced by Drawing M-174, Sh. 2
9.4-14	Figure replaced by Drawing VC-174, Sh. 1
9.4-15	Figure replaced by Drawing M-177, Sh. 1
9.4-16a-1	Figure replaced by Drawing VC-177, Sh. 1
9.4-16a-2	Figure replaced by Drawing VC-177, Sh. 2
9.4-17	Exhaust Registers Refueling Floor
9.4-18	Figure replaced by Drawing VC-182, Sh. 1
9.4-18A	Figure replaced by Drawing V-182, Sh. 8
9.4-18B	Figure replaced by Drawing V-182, Sh. 8A
9.4-19	Figure replaced by Drawing M-182, Sh. 1
9.4-19A	Figure replaced by Drawing M-182, Sh. 2
9.4-20	Figure replaced by Drawing M-173, Sh. 1
9.4-21	Figure replaced by Drawing VC-173, Sh. 1
9.4-22-1	Figure replaced by Drawing V-26-2, Sh. 1
9.4-22-2	Figure replaced by Drawing V-26-3, Sh. 1
9.4-22-3	Figure replaced by Drawing V-26-4, Sh. 1
9.4-22-4	Figure replaced by Drawing V-26-5, Sh. 1
9.4-22-5	Figure replaced by Drawing V-26-6, Sh. 1
9.4-22-6	Figure replaced by Drawing V-26-10, Sh. 1

SUMMARY TABLE OF CONTENTS**Chapter 9 Figures**

9.4-22-7	Figure replaced by Drawing V-26-11, Sh. 1
9.4-22-8	Figure replaced by Drawing V-26-12, Sh. 1
9.4-22-9	Figure replaced by Drawing V-26-13, Sh. 1
9.4-22-10	Figure replaced by Drawing V-26-14, Sh. 1
9.4-22-11	Figure replaced by Drawing V-26-15, Sh. 1
9.4-22-12	Figure replaced by Drawing V-34-2, Sh. 1
9.4-22-13	Figure replaced by Drawing V-34-3, Sh. 1
9.5-13	Figure replaced by Drawing E-408, Sh. 1
9.5-14	Figure replaced by Drawing E-408, Sh. 2
9.5-15	Figure replaced by Drawing E-409, Sh. 1
9.5-16	Figure replaced by Drawing E-409, Sh. 2
9.5-16A	Figure replaced by Drawing E-409, Sh. 3
9.5-16B	Figure replaced by Drawing E-409, Sh. 4
9.5-16C	Figure replaced by Drawing E-409, Sh. 5
9.5-16D	Figure replaced by Drawing E-409, Sh. 6
9.5-16E	Figure replaced by Drawing E-409, Sh. 7
9.5-17	Figure replaced by Drawing E-411, Sh. 1
9.5-18	Figure replaced by Drawing E-411, Sh. 2
9.5-19	Figure replaced by Drawing M-120, Sh. 1
9.5-19A	Figure replaced by Drawing M-120, Sh. 2
9.5-19B	Figure replaced by Drawing M-120, Sh. 3
9.5-20	Figure replaced by Drawing M-134, Sh. 1
9.5-20A	Figure replaced by Drawing M-134, Sh. 5
9.5-20B	Figure replaced by Drawing M-134, Sh. 6
9.5-20C	Figure replaced by Drawing M-134, Sh. 7
9.5-21	Figure replaced by Drawing M30-69, Sh. 1
9.5-22	Figure replaced by Drawing M30-71, Sh. 1
9.5-22A	Figure replaced by Drawing FF61604, Sh. 7
9.5-23	Figure replaced by Drawing M-738, Sh. 1
9.5-24	Figure replaced by Drawing FF61604, Sh. 3
9.5-26	Diesel Generator Building Area 44 Plan on El. 677'-0" Intake & Exhaust
9.5-26A	Diesel Generator E Building Intake & Exhaust Piping
9.5-26B	Diesel Generator E Building Area 81 Plan of El. 656'-6"
9.5-27	Diesel Generator Building
9.5-28	Figure replaced by Drawing C-1006, Sh. 1
9.5-29	Figure replaced by Drawing C-1007, Sh. 1
9.5-29-1	Figure replaced by Drawing C-1007, Sh. 2
9.5-30	Figure replaced by Drawing C-1032, Sh. 1
9.5-30A	Figure replaced by Drawing C-5028, Sh. 1
9.5-31	Figure replaced by Drawing EC-1, Sh. 1
9.5-32	Figure replaced by Drawing EC-2, Sh. 1
9.5-33	Figure replaced by Drawing EC-3, Sh. 1
9.5-34	Figure replaced by Drawing EC-4, Sh. 1
9.5-35	Figure replaced by Drawing EC-5, Sh. 1
9.5-36	Figure replaced by Drawing EC-6, Sh. 1
9.5-37	Figure replaced by Drawing EC-7, Sh. 1

SUMMARY TABLE OF CONTENTS**Chapter 9 Figures**

9.5-38	Figure replaced by Drawing EC-8, Sh. 1
9.5-39	Figure replaced by Drawing C-46, Sh. 1
9.5-40	Figure replaced by Drawing C-901, Sh. 1
9.5-40A	Figure replaced by Drawing C-5012, Sh. 1
9.5-41	Figure replaced by Drawing C-904, Sh. 1
9.5-41A	Figure replaced by Drawing C-5013, Sh. 1
9.5-42	Figure replaced by Drawing C-905, Sh. 1
9.5-42A	Figure replaced by Drawing C-5014, Sh. 1
9.5-42B	Figure replaced by Drawing C-5015, Sh. 1
9.5-43-1	Figure replaced by Drawing C-1029, Sh. 1
9.5-43-2	Figure replaced by Drawing C-1029, Sh. 2
9.5-47	Figure replaced by Drawing E-412, Sh. 1

SUMMARY TABLE OF CONTENTS**Chapter 10****10.0 STEAM AND POWER CONVERSION SYSTEM**

- 10.1 Summary Description
- 10.2 Turbine-Generator
 - 10.2.1 Design Bases
 - 10.2.2 Description
 - 10.2.3 Turbine Disk Integrity
 - 10.2.4 Evaluation
 - 10.2.5 References
- 10.3 Main Steam Supply System
 - 10.3.1 Design Bases
 - 10.3.2 Description
 - 10.3.3 Evaluation
 - 10.3.4 Inspection and Testing Requirements
 - 10.3.5 Water Chemistry (PWR)
 - 10.3.6 Steam and Feedwater System Materials
- 10.4 Other Features of the Steam and Power Conversion System
 - 10.4.1 Main Condenser
 - 10.4.2 Main Condenser Evacuation System
 - 10.4.3 Steam Seal System
 - 10.4.4 Turbine Bypass System
 - 10.4.5 Circulating Water System
 - 10.4.6 Condensate Cleanup System
 - 10.4.7 Condensate and Feedwater
 - 10.4.8 Steam Generator Blowdown System (PWR)
 - 10.4.9 Auxiliary Feedwater System (PWR)
 - 10.4.10 Extraction Steam and Feedwater Heater Drain and Vent System
 - 10.4.11 Auxiliary Steam System

SUMMARY TABLE OF CONTENTS

Chapter 10 Tables

10.1-1	Unit 1 - Summary of Typical Design and Performance Characteristics of Power Conversion System
10.1-1a	Unit 2 - Summary of Typical Design and Performance Characteristics of Power Conversion System
10.2-1	Turbine Overspeed Protection
10.4-1	Condenser Design Parameters
10.4-3	Circulating Water Quality Design Parameters Used for the Condensate Cleanup
10.4-6	Design Conditions for Feedwater Heaters

SUMMARY TABLE OF CONTENTS**Chapter 10 Figures**

10.1-1a	Guaranteed Flow Unit 1
10.1-1b	Guaranteed Flow Unit 2
10.1-2a	Valves Wide Open (VWO) Unit 1
10.1-2b	Valves Wide Open (VWO) Unit 2
10.2-1	Turbine Stop Valve Closure Characteristic
10.2-2	Turbine Control Valve Fast Closure Characteristic
10.2-3	Mechanical Overspeed Trip
10.2-4	Figure replaced by Drawing M2H-54, Sh. 1
10.2-5	Figure replaced by Drawing M2J-101, Sh. 5
10.2-6	Rate Sensitive Power/Load Unbalance Circuit
10.2-11	Figure replaced by Drawing M-133, Sh. 1
10.4-1-1	Figure replaced by Drawing M-101, Sh. 1
10.4-1-1a	Figure replaced by Drawing M-2101, Sh. 1
10.4-1-2	Figure replaced by Drawing M-101, Sh. 2
10.4-1-2a	Figure replaced by Drawing M-2101, Sh. 2
10.4-1-3	Figure replaced by Drawing M-101, Sh. 3
10.4-1-3a	Figure replaced by Drawing M-2101, Sh. 3
10.4-2-1	Figure replaced by Drawing M-116, Sh. 1
10.4-2-2	Figure replaced by Drawing M-116, Sh. 2
10.4-2-3	Figure replaced by Drawing M-116, Sh. 3
10.4-4-1	Figure replaced by Drawing M-105, Sh. 1
10.4-4-2	Figure replaced by Drawing M-105, Sh. 2
10.4-4-3	Figure replaced by Drawing M-105, Sh. 3
10.4-4-4	Figure replaced by Drawing M-105, Sh. 4
10.4-5-1	Figure replaced by Drawing M-106, Sh. 1
10.4-5-2	Figure replaced by Drawing M-106, Sh. 2
10.4-5-2A	Figure replaced by Drawing M-2106, Sh. 2
10.4-5-3	Figure replaced by Drawing M-106, Sh. 3
10.4-5-3A	Figure replaced by Drawing M-2106, Sh. 3
10.4-5-4	Figure replaced by Drawing M-106, Sh. 4
10.4-5-4A	Figure replaced by Drawing M-2106, Sh. 4
10.4-5-5	Figure replaced by Drawing M-106, Sh. 5
10.4-6-1	Figure replaced by Drawing M-102, Sh. 1
10.4-6-1a	Figure replaced by Drawing M-2102, Sh. 1
10.4-6-2	Figure replaced by Drawing M-102, Sh. 2
10.4-6-2a	Figure replaced by Drawing M-2102, Sh. 2
10.4-6-3	Figure replaced by Drawing M-102, Sh. 3
10.4-6-3a	Figure replaced by Drawing M-2102, Sh. 3
10.4-7	Figure replaced by Drawing M-103, Sh. 1
10.4-8	Figure replaced by Drawing M-104, Sh. 1
10.4-9-1	Figure replaced by Drawing M-107, Sh. 1
10.4-9-2	Figure replaced by Drawing M-107, Sh. 2
10.4-9-3	Figure replaced by Drawing M-107, Sh. 3
10.4-9-4	Figure replaced by Drawing M-107, Sh. 4

SUMMARY TABLE OF CONTENTS**Chapter 11****11.0 RADIATION WASTE MANAGEMENT**

- 11.1 Source Terms
 - 11.1.1 Fission Products
 - 11.1.2 Activation Products
 - 11.1.3 Tritium
 - 11.1.4 Core Inventory, Fuel Experience and Depressurization Spiking
 - 11.1.5 Process Leakage Sources
 - 11.1.6 Other Releases
 - 11.1.7 References
- 11.2 Liquid Waste Management Systems
 - 11.2.1 Design Bases
 - 11.2.2 System Descriptions
 - 11.2.3 Radioactive Releases
 - 11.2.4 Estimated Doses
- 11.3 Gaseous Waste Management Systems
 - 11.3.1 Design Bases
 - 11.3.2 System Descriptions
 - 11.3.3 Radioactive Releases
 - 11.3.4 Estimated Doses
 - 11.3.5 References
- 11.4 Solid Waste Management System
 - 11.4.1 Design Bases
 - 11.4.2 System Description
 - 11.4.3 References
- 11.5 Process and Effluent Radiological Monitoring And Sampling Systems
 - 11.5.1 Design Bases
 - 11.5.2 Process and Effluent Radiological Monitoring System Description
 - 11.5.3 Effluent Monitoring and Sampling
 - 11.5.4 Process Monitoring and Sampling
- 11.6 Low Level Radwaste Holding Facility (LLRWHF)
 - 11.6.1 Design Basis
 - 11.6.2 Low Level Radwaste Holding Facility Description
 - 11.6.3 LLRWHF Waste Description and Capacity
 - 11.6.4 LLRWHF Source Term
 - 11.6.5 Containers
 - 11.6.6 Container Shielding for Transport and Storage
 - 11.6.7 Crane Loading and Unloading System
 - 11.6.8 Health and Safety Requirements
 - 11.6.9 Floor Drain System
 - 11.6.10 LLRWHF HVAC System
 - 11.6.11 Effluent Monitoring

SUMMARY TABLE OF CONTENTS**Chapter 11**

11.6.12	Electrical Systems
11.6.13	Control Panels
11.6.14	Radiation Zoning
11.6.15	Radiation Monitoring System
11.6.16	Shielding
11.6.17	Security
11.6.18	Fire Protection System Operating Description
11.6.19	Exposure to Operating Personnel
11.6.20	Environmental Consequences of Operation of the Low-Level Radioactive Waste Holding Facility
11.6.21	Liner Inspections
11.6.22	Safety Analysis
11.6-23	References
11.7	Independent Spent Fuel Storage Installation (ISFSI)
11.7.1	Design Basis
11.7.2	NUHOMS® Horizontal Modular Dry Storage System Description (NUHOMS® System)
11.7.3	ISFSI Source Terms
11.7.4	Dry Shielded Canister (DSC)
11.7.5	Horizontal Storage Module (HSM)
11.7.6	Transport Equipment
11.7.7	NUHOMS® System Operation
11.7.8	Radiological Assessment
11.7.9	Site Specific Evaluations
11.7.10	Heavy Loads
11.7.11	Auxiliary Systems
11.7.12	Dry Fuel Storage Aging Management Program (AMP)

SUMMARY TABLE OF CONTENTS**Chapter 11 Tables**

11.1-1	Noble Radiogas Source Terms
11.1-2	Halogen Radioisotopes in Reactor Water and Steam
11.1-3	Other Fission Product Radioisotopes in Reactor Water
11.1-4	Coolant Activation Products in Reactor Water and Steam
11.1-5	Noncoolant Activation Products in Reactor Water
11.1-6	Depressurization Spiking Activity 95th Percentile Cumulative Probability
11.2-1	Expected Daily Inputs and Activities to the Liquid Waste Management System From Two Units
11.2-2	Expected Batched Inputs to the Liquid Radwaste System From the Solid Radwaste System For Normal Operation of Two Units
11.2-3	Liquid Waste Management System Component Description
11.2-4	Liquid Radwaste System Flows (Refer to Fig. 11.2-8)
11.2-5	Expected Radionuclide Activity Inventories of Liquid Radwaste System Components (Curies Per Component)
11.2-6	Design Basis Radionuclide Activity Inventories of Liquid Radwaste System Components (Curies Per Component)
11.2-8	Assumptions and Parameters Used For Evaluation of Radioactive Releases
11.2-9	Expected Radionuclide Activity Concentrations In Reactor Coolant and Main Steam Used For Evaluation of Radioactive Releases
11.2-10	Radwaste System Flow Rates and Stream Activities Used for Evaluation of Radioactive Releases
11.2-11	Expected Holdup Times For Collection, Processing, and Discharge Used for Evaluation of Radioactive Releases
11.2-12	Decontamination Factors Used For Evaluation of Radioactive Releases
11.2-13	Expected Yearly Activity Released From Liquid Radwaste Management Systems Used For Evaluation of Compliance With Appendix I of 10CFR50 (Ci/yr/site)
11.2-14	Calculated Expected Effluent Activity Concentrations for Evaluation of Radioactive Releases to the Susquehanna River
11.2-15	Input Data for Aquatic Dose Calculations
11.2-16	Tanks Outside Primary Containment Which Contain Potentially Radioactive Liquids
11.3-1	Annual Gaseous Releases Per Unit
11.3-2	Assumptions and Parameters Used For Evaluation of Gaseous Releases
11.3-4	Filter Trains Used to Control Gaseous Effluents
11.3-5	Off Gas System Major Equipment Description
11.3-6	Off Gas System Equipment Malfunction Analysis
11.3-7	Input Data For Atmospheric Dose Calculations
11.3-8	Off Gas System Flows (Refer to Fig. 11.3-1) (PPH 1 SCFM)
11.3-10	Comparison of Individual Doses from Expected Gaseous Effluent Releases with 10CFR50, Appendix I Design Objectives
11.3-11	Comparison of Expected Radionuclide Concentrations in the Environment from Routine Atmospheric Releases to 10CFR20 Limits
11.4-1	Inputs to the Solid Radwaste Collection System For Both Units
11.4-2	Dry Solid Waste Amount From Gas, Laundry Drain Filters, and Maintenance Activities
11.4-3	Solid Waste Management System Component Description

SUMMARY TABLE OF CONTENTS**Chapter 11 Tables**

11.4-4	Solid Waste Management System Flows (Refer to Fig. 11.4-3)
11.4-5	Expected Inventories of Radioactive Materials in Components of the Solid Radwaste System
11.4-6	Design Inventories of Radioactive Materials in Components of the Solid Waste Management System (Curies)
11.4-9	Expected Inventories Of Radioactive Materials In Waste Shipping Casks
11.4-10	Design Inventories Of Radioactive Materials In Waste Shipping Casks ¹
11.5-1	Process and Effluent Radiation Monitoring Systems
11.5-2	Radiological Analysis Summary of Routine Effluent Sampling
11.5-3	Composition and Concentration of Nuclides in Routine Effluent Samples
11.6-1	Design Basis Sources and Assumptions Used to Calculate the Off-Site Radiological Consequences Due to a Container Drop from a Transport Vehicle (Reference 11.6-7)
11.6-2	Design Basis Sources and Assumptions Used to Calculate the Off-Site Radiological Consequences Due to Dropping a Heavy Component Onto the Solidified Waste Storage Vault (Reference 11.6-11)
11.6-3	Design Basis Sources and Assumptions Used to Calculate the Off-Site Radiological Consequences Due to an Unspecified Incendiary Event Involving 100% of DAW (Reference 11.6-4)
11.6-4	Design Basis Sources and Assumptions Used to Calculate the Off-Site Radiological Consequences Due to Loss of Off-Site Power to the LLRWHF (Reference 11.6-5)
11.6-5	Design Basis Sources and Assumptions Used to Calculate the Off-Site Radiological Consequences Due to Mobile Shielded Storage Module Without Lid (Reference 11.6-6)

SUMMARY TABLE OF CONTENTS**Chapter 11 Figures**

11.1-1	Noble Radiogas Decay Constant Exponent Frequency Histogram
11.1-2	Radiohalogen Decay Constant Exponent Frequency Histogram
11.1-3	Nobel Radiogas Versus I-131 Leakage
11.2-1	Figure replaced by Drawing M-270, Sh. 1
11.2-2	Figure replaced by Drawing M-271, Sh. 1
11.2-3	Figure replaced by Drawing M-272, Sh. 1
11.2-4	Figure replaced by Drawing M-273, Sh. 1
11.2-5	Figure replaced by Drawing M-274, Sh. 1
11.2-6	Figure replaced by Drawing M-220, Sh. 1
11.2-7	Figure replaced by Drawing M-230, Sh. 1
11.2-8	Liquid Radwaste Management System Flow Diagram
11.2-9-1	This Figure has been replaced by Dwg. M-162, Sh. 1
11.2-9-2	This Figure has been replaced by Dwg. M-162, Sh. 2
11.2-9-3	This Figure has been replaced by Dwg. M-162, Sh. 3
11.2-11-1	Figure replaced by Drawing M-163, Sh. 1
11.2-11-2	Figure replaced by Drawing M-163, Sh. 2
11.2-11-3	Figure replaced by Drawing M-163, Sh. 3
11.2-12	Figure replaced by Drawing M-164, Sh. 1
11.2-13	Liquid Waste Management Scheme
11.2-14	Typical Mobile Processing System Flow Diagram
11.3-1	Offgas System Process Flow Diagram
11.3-2A-1	Figure replaced by Drawing M-169, Sh. 1
11.3-2A-2	Figure replaced by Drawing M-169, Sh. 2
11.3-2A-3	Figure replaced by Drawing M-169, Sh. 3
11.3-2A-4	Figure replaced by Drawing M-169, Sh. 4
11.3-2C-1	Figure replaced by Drawing M-2169, Sh. 1
11.3-2C-2	Figure replaced by Drawing M-2169, Sh. 2
11.3-2D-1	Figure replaced by Drawing M-2171, Sh. 1
11.3-2D-2	Figure replaced by Drawing M-2171, Sh. 2
11.3-3-1	Figure replaced by Drawing M-171, Sh. 1
11.3-3-2	Figure replaced by Drawing M-171, Sh. 2
11.3-4	Release Points Locations and Details
11.4-1-1	Figure replaced by Drawing M-166, Sh. 1
11.4-1-2	Figure replaced by Drawing M-166, Sh. 2
11.4-2-1	Figure replaced by Drawing M-167, Sh. 1
11.4-2-2	Figure replaced by Drawing M-167, Sh. 2
11.4-3	Solid Waste Management System Flow Diagram
11.6-1	Figure replaced by Drawing B1P-005, Sh. 1
11.6-2	Figure replaced by Drawing B1N-100, Sh. 1
11.6-3	Shield Bell Assembly

SUMMARY TABLE OF CONTENTS**Chapter 12****12.0 RADIATION PROTECTION**

- 12.1 Ensuring that Occupational Radiation Exposures Are As Low As Reasonably Achievable (ALARA)
 - 12.1.1 Policy Considerations
 - 12.1.2 Design Considerations
 - 12.1.3 Operational Considerations
 - 12.1.4 References
- 12.2 Radiation Sources
 - 12.2.1 Contained Sources
 - 12.2.2 Airborne Radioactive Material Sources
- 12.3 Radiation Protection Design Features
 - 12.3.1 Facility Design Features
 - 12.3.2 Shielding
 - 12.3.3 Ventilation
 - 12.3.4 Area Radiation and Airborne Radioactivity Monitoring Instrumentation
 - 12.3.5 References
- 12.4 Dose Assessment
 - 12.4.1 Direct Radiation Dose Estimates for Exposures Within the Plant
 - 12.4.2 Airborne Radioactivity Dose Estimates for Exposures Within the Plant
 - 12.4.3 Exposures at Locations Outside Plant Structures
 - 12.4.4 References
- 12.5 Health Physics Program
 - 12.5.1 Organization
 - 12.5.2 Facilities, Equipment, & Instrumentation
 - 12.5.3 Procedures

SUMMARY TABLE OF CONTENTS**Chapter 12 Tables**

12.2-1	Basic Reactor Data
12.2-2	Core Region Description Used in Calculations to Determine Radial Flux Distribution at Reactor Core Midplane
12.2-3	Material Composition to Determine Radial Flux Distributions at Reactor Core Midplane
12.2-4	Calculated Gamma Ray and Neutron Fluxes at Outside Surface of RPV
12.2-5	Calculated Gamma Ray and Neutron Fluxes at Outside Surface of Primary Shield
12.2-6	Reactor Water Cleanup System N-16 Shielding Source Terms
12.2-7	Reactor Water Cleanup Filter Demineralizer Shielding Source Terms
12.2-8	Reactor Water Cleanup Backwash Receiving Tank Shielding Source Terms
12.2-9A1	Activity (Curies) per Full Core of ATRIUM-11 Fuel
12.2-9A2	Activity (Curies) per Single Assembly of ATRIUM-11 Fuel
12.2-10	Residual Heat Removal System Shielding Source Terms
12.2-11	Steam N-16 Shielding Source Terms for Turbine and Reactor Building Equipment
12.2-12	Fuel Pool System Shielding Source Terms
12.2-13	Fuel Pool Filter Demineralizer Shielding Source Terms
12.2-14	Fuel Pool Water Cleanup Backwash Receiving Tank Shielding Source Terms
12.2-15	Condensate Shielding Source Terms
12.2-16	Condensate Demineralizer Shielding Source Terms
12.2-17	Off-gas Line from SJAE to Recombiner Shielding Source Terms
12.2-18	Off-gas Primary Recombiner Shielding Source Terms
12.2-19	Off-gas Line from Recombiner to Charcoal System Shielding Source Terms
12.2-21	Off-gas Ambient Charcoal Freon Chiller Shielding Source Terms
12.2-22	Off-gas Charcoal Guard Bed Shielding Source Terms
12.2-23	Off-gas Charcoal Beds Shielding Source Terms
12.2-24	Off-gas Post-HEPA Filter Shielding Source Terms
12.2-29	Condensate Storage Tank Source Terms
12.2-30	Estimated Airborne Radioactive Releases Prior to Treatment (Curies/Year)
12.2-31	Estimated Distribution of Airborne Radioactive Releases
12.2-32	Turbine Building Airborne Source Descriptions
12.2-33	Reactor Building Airborne Source Descriptions
12.2-34	Radwaste Building Airborne Source Descriptions
12.2-35	Estimated Airborne Concentrations in the Turbine Building and Fraction of DACs
12.2-36	Estimated Airborne Concentrations in the Reactor Building and Fraction of DACs
12.2-37	Estimated Airborne Concentrations in the Radwaste Building and Fraction of DACs
12.2-38	Turbine Building Shielding Design Radiation Source Description
12.2-39	Reactor Building Shielding Design Radiation Source Description
12.2-40	Radwaste Building Shielding Design Radiation Source Terms
12.2-41	Material Composition of the TIP System Components As Used in Activation Calculations
12.2-42	Traversing Incore Probe Detector Decay Gamma Activities in MEV/Sec of 0.001 g of U-235
12.2-43	Traversing Incore Probe Detector Decay Gamma Activities of Materials in the Detector (Excluding U-235) in Microcuries in the Irradiated Detector
12.2-44	Decay Gamma Activities of Materials in the Cable in Microcuries per Inch of Irradiated Cable.
12.2-46	Condensate Filter Vessel Shielding Source Terms

SUMMARY TABLE OF CONTENTS**Chapter 12 Tables**

12.2-47	Condensate Filter Vessel Backwash Shielding Source Terms
12.2-48	Condensate Filter Vessel Backwash Receiving Tank Shielding Source Terms
12.3-1	Plant Radiation Zone Description
12.3-2	List of Computer Codes Used in Shielding Design Calculations
12.3-7	Area Radiation Monitoring System
12.4-1	Summary of Historical Data Used in Compilation of Exposures Received at Operating Boiling Water Reactors
12.4-2	Occupational Exposures By Job Function for Operating Boiling Water Reactors
12.4-3	Exposure Estimates for the Turbine Building and Control Structure
12.4-4	Exposure Estimates for the Reactor Building
12.4-5	Exposure Estimates for the Radwaste Building
12.4-6	Estimated Exposure for Operators in Residence in Control Rooms
12.4-7	Summary of Routine Operations Exposure Estimate
12.4-8	Estimate of Expected Maintenance Man-hours for Various Types of Equipment
12.4-9	Summary of In-Plant Direct Radiation Exposure Estimates
12.4-10	Estimated Turbine Building Inhalation Exposures Due to Airborne Radioactivity
12.4-11	Estimated Reactor Building Inhalation Exposures Due to Airborne Radioactivity
12.4-12	Estimated Radwaste Building Inhalation Exposures Due to Airborne Radioactivity

SUMMARY TABLE OF CONTENTS**Chapter 12 Figures**

12.3-1	Typical Shielding Arrangement for Liquid Radwaste Filters and Valve Gallery
12.3-2	Typical Shielding Arrangement for Radwaste Demineralizer
12.3-3	Typical Shielding Arrangement for Charcoal and Particulate Filter
12.3-4	Typical Shielding Arrangement for Off-gas Recombiners
12.3-5	Typical Shielding Arrangement for Radwaste Tanks and Pumps
12.3-6	Typical Shielding Arrangement for Radwaste Evaporator
12.3-8	Figure replaced by Drawing A-511, Sh. 1
12.3-9	Figure replaced by Drawing A-512, Sh. 1
12.3-10	Figure replaced by Drawing A-513, Sh. 1
12.3-11	Figure replaced by Drawing A-514, Sh. 1
12.3-12	Figure replaced by Drawing A-515, Sh. 1
12.3-13	Figure replaced by Drawing A-516, Sh. 1
12.3-14	Figure replaced by Drawing A-517, Sh. 1
12.3-15	Figure replaced by Drawing A-518, Sh. 1
12.3-16	Figure replaced by Drawing A-519, Sh. 1
12.3-17	Figure replaced by Drawing A-520, Sh. 1
12.3-18	Figure replaced by Drawing A-521, Sh. 1
12.3-19	Figure replaced by Drawing A-522, Sh. 1
12.3-20	Figure replaced by Drawing A-523, Sh. 1
12.3-21	Figure replaced by Drawing A-524, Sh. 1
12.3-22	Figure replaced by Drawing A-525, Sh. 1
12.3-23	Figure replaced by Drawing A-526, Sh. 1
12.3-24	Figure replaced by Drawing A-527, Sh. 1
12.3-25	Figure replaced by Drawing A-528, Sh. 1
12.3-26	Figure replaced by Drawing A-529, Sh. 1
12.3-27	Figure replaced by Drawing A-530, Sh. 1
12.3-28	Figure replaced by Drawing BIN-100
12.3-29	Scaled Isometric of Control Building with Relationship to Containment
12.3-30-1	Figure replaced by Drawing M-137, Sh. 1
12.3-30-2	Figure replaced by Drawing M-137, Sh. 2
12.4-1	Estimated Turbine Shine Dose Rates
12.5-1	Health Physics Organization

SUMMARY TABLE OF CONTENTS

Chapter 13

13.0 CONDUCT OF OPERATIONS

- 13.1 Organizational Structure
 - 13.1.1 Management and Technical Support Organization
 - 13.1.2 Operating Organization
 - 13.1.3 Qualification Requirements for Nuclear Plant (On-Site) Personnel
- 13.2 Training Program
 - 13.2.1 Plant Personnel Training Program
 - 13.2.2 Requalification and Replacement Training
- 13.3 Emergency Plan
- 13.4 Review and Audit
 - 13.4.1 Plant Operations Review Committee
 - 13.4.2 Nuclear Safety Review Board
 - 13.4.3 Audit Program
 - 13.4.4 Process Control Program (PCP)
 - 13.4.5 Technical Review and Control
- 13.5 Plant Procedures
 - 13.5.1 Administrative Procedures
 - 13.5.2 Operating and Maintenance Procedures
- 13.6 Industrial Security

SUMMARY TABLE OF CONTENTS

Chapter 13 Tables

13.1-1	Resumes of Key General Office Personnel
13.1-2	Resumes of Key Plant Personnel

SUMMARY TABLE OF CONTENTS

Chapter 13 Figures

13.1-1	Talen Energy Corporation Management Organization Applicable to Susquehanna SES
13.1-2	Susquehanna Nuclear, LLC, Off-Site Organization
13.1-3	Susquehanna Nuclear, LLC, On-Site Organization
13.5-2	Main Control Room

SUMMARY TABLE OF CONTENTS**Chapter 14****14.0 INITIAL TEST PROGRAM**

- 14.1 Specific Information to be Included in Preliminary Safety Analysis Reports
- 14.2 Specific Information to be Included in Final Safety Analysis Report
 - 14.2.1 Summary Of Test Program and Objectives
 - 14.2.2 Organization and Staffing
 - 14.2.3 Test Procedures
 - 14.2.4 Conduct of Test Program
 - 14.2.5 Review, Evaluation, and Approval of Test Results
 - 14.2.6 Test Records
 - 14.2.7 Conformance of Test Programs With Regulatory Guides
 - 14.2.8 Utilization of Reactor Operating and Testing Experience In the Development of The Test Program
 - 14.2.9 Trial Use of Plant Operating and Emergency Procedures
 - 14.2.10 Initial Fuel Loading and Initial Criticality
 - 14.2.11 Test Program Schedule
 - 14.2.12 Individual Test Descriptions
- 14.3 Power Uprate Test Program
 - 14.3.1 Summary of Power Uprate Test Program and Objectives
 - 14.3.2 Organization and Staffing
 - 14.3.3 Test Procedures

SUMMARY TABLE OF CONTENTS

Chapter 14 Tables

14.2-1	Preoperational Test Procedures
14.2-2	Acceptance Test Procedures
14.2-3	Startup Test Procedures
14.2-4	Major Test Phase and Test Plateau Schedule - Test Condition Sequence
14.2-5	Control Rod Drive System Startup Tests
14.2-6	Unit 2 Preoperational Test Procedures
14.2-7	Unit 2 Acceptance Test
14.3-1	Power Uprate Test Procedures
14.3-2	Test Plateau and Test Condition Definition

SUMMARY TABLE OF CONTENTS**Chapter 14 Figures**

14.2-1	Integrated Startup Group Organization
14.2-2A	Preoperational Test Procedure Standard Format
14.2-2B	Startup Test Procedure Standard Format - Unit 1
14.2-2C	Startup Test Procedure Standard Format - Unit 2
14.2-3	Initial Test Program Schedule
14.2-4a	Unit 1 Preoperational Test Sequence
14.2-4b	Unit 2 Preoperational Test Sequence
14.2-5-1	Individual Startup Test Sequence - Unit 1
14.2-5-2	Individual Startup Test Sequence - Unit 1
14.2-5-3	Individual Startup Test Sequence - Unit 2
14.2-5-4	Individual Startup Test Sequence - Unit 2
14.2-6-1	Power Flow Map and Startup Test Conditions
14.2-6-2	Power Flow Map and Power Test Conditions
14.2-7	RCIC Acceptance Criteria Curves For Capacity and Actuation Time

SUMMARY TABLE OF CONTENTS**Chapter 15****15.0 ACCIDENT ANALYSIS**

- 15.0.1 Analytical Objective
- 15.0.2 Analytical Categories
- 15.0.3 Event Evaluation
- 15.0.4 Nuclear Safety Operational Analysis (NSQA) Relationship
- 15.0.5 References

- 15.1 Decrease in Reactor Coolant Temperature
 - 15.1.1 Loss of Feedwater Heating
 - 15.1.2 Feedwater Controller Failure-Maximum Demand
 - 15.1.3 Pressure Regulator Failure - Open
 - 15.1.4 Inadvertent Safety/Relief Valve Opening
 - 15.1.5 Spectrum of Steam System Piping Failures Inside and Outside of Containment In A PWR
 - 15.1.6 Inadvertent RHR Shutdown Cooling Operation
 - 15.1.7 References

- 15.2 Increase in Reactor Pressure
 - 15.2.1 Pressure Regulator Failure - Closed
 - 15.2.2 Generator Load Rejection
 - 15.2.3 Turbine Trip
 - 15.2.4 MSIV Closures
 - 15.2.5 Loss of Condenser Vacuum
 - 15.2.6 Loss of AC Power
 - 15.2.7 Loss of Feedwater Flow
 - 15.2.8 Feedwater Line Break
 - 15.2.9 Failure of RHR Shutdown Cooling
 - 15.2.10 References

- 15.3 Decrease in Reactor Coolant System Flow Rate
 - 15.3.1 Recirculation Pump Trip
 - 15.3.2 Recirculation Flow Control Failure - Decreasing Flow
 - 15.3.3 Recirculation Pump Seizure
 - 15.3.4 Recirculation Pump Shaft Break
 - 15.3.5 References

- 15.4 Reactivity and Power Distribution Anomalies
 - 15.4.1 Rod Withdrawal Error - Low Power
 - 15.4.2 Rod Withdrawal Error-at Power
 - 15.4.3 Control Rod Maloperation (System Malfunction or Operator Error)
 - 15.4.4 Abnormal Startup of Idle Recirculation Pump
 - 15.4.5 Recirculation Flow Control Failure with Increasing Flow
 - 15.4.6 Chemical and Volume Control System Malfunctions
 - 15.4.7 Misplaced Bundle Accident
 - 15.4.8 Spectrum of Rod Ejection Assemblies

SUMMARY TABLE OF CONTENTS**Chapter 15**

15.4.9	Control Rod Drop Accident (CRDA)
15.4.10	References
15.5	Increase in Reactor Coolant Inventory
15.5.1	Inadvertent HPCI Startup
15.5.2	Chemical Volume Control System Malfunction (or Operator Error)
15.5.3	BWR Transients Which Increase Reactor Coolant Inventory
15.5.4	References
15.6	Decrease in Reactor Coolant Inventory
15.6.1	Inadvertent Safety Relief Valve Opening
15.6.2	Instrument Line Break
15.6.3	Steam Generator Tube Failure
15.6.4	Steam System Piping Break Outside Containment
15.6.5	Loss-Of-Coolant Accidents (Resulting From Spectrum of Postulated Piping Breaks Within The Reactor Coolant Pressure Boundary) - Inside Containment
15.6.6	Feedwater Line Break-Outside Containment
15.6.7	References
15.7	Radioactive Release from Subsystems and Components
15.7.1	Gaseous Radwaste System Leak or Failure
15.7.2	Liquid Radwaste System Failure
15.7.3	Postulated Radioactive Releases Due To Liquid Radwaste Tank Failure
15.7.4	Fuel and Equipment Handling Accidents
15.7.5	Spent Fuel Cask Drop Accident
15.7.6	References
15.8	Anticipated Transients Without Scram (ATWS)
15.8.1	Causes, Frequency Classification, Initiating Events, Acceptance Criteria, Mathematical Models, Input Parameters, and Initial Conditions
15.8.2	Inadvertent Control Rod Withdrawal
15.8.3	Loss of Feedwater (LOFW)
15.8.4	Loss of Offsite Power (LOOP)
15.8.5	Loss of Electrical Load
15.8.6	Loss of Condenser Vacuum
15.8.7	Turbine Trip
15.8.8	Closure of Main Steam Line Isolation Valves
15.8.9	Pressure Regulator Failure–Open
15.8.10	Feedwater Controller Failure–Open (FWCFO)
15.8.11	Inadvertent Opening of a S/R Valve
15.8.12	References
15.9	Station Blackout (SBO)
15.9.0	Coping Assessment for the Susquehanna Steam Electric Station During a Station Blackout
15.9.1	References

SUMMARY TABLE OF CONTENTS**Chapter 15**

15A	Nuclear Safety Operational Analysis (NOSA) (A System Level/Qualitative Type Plant FMEA)
15A.1	OBJECTIVES
15A.1.1	General Objectives
15A.1.2	Specific Objectives
15A.2	APPROACH TO OPERATIONAL NUCLEAR SAFETY
15A.2.1	General Philosophy
15A.2.2	Specific Philosophy
15A.2.3	Comprehensiveness of the Analysis
15A.2.4	Systematic Approach of the Analysis
15A.2.5	Relationship of Nuclear Safety Operational Analysis to Safety Analyses of Chapter 15
15A.2.6	Relationship Between NSOA and Operational Requirements, Technical Specifications, Design Basis, and SACF Aspects
15A.2.7	Unacceptable Results Criteria
15A.2.8	General Nuclear Safety Operational Criteria
15A.3	METHOD OF ANALYSIS
15A.3.1	General Approach
15A.3.2	BWR Operating States
15A.3.3	Selection of Events for Analysis
15A.3.4	Applicability of Events to Operating States
15A.3.5	Rules for Event Analysis
15A.3.6	Steps in an Operational Analysis
15A.4	DISPLAY OF OPERATIONAL ANALYSIS RESULTS
15A.4.1	General
15A.4.2	Protection Sequence and Safety System Auxiliary Diagrams
15A.5	BASES FOR SELECTING SURVEILLANCE TEST FREQUENCIES
15A.5.1	Normal Surveillance Test Frequencies
15A.5.2	Allowable Repair Times
15A.5.3	Repair Time Rule
15A.6	OPERATIONAL ANALYSES
15A.6.1	Safety System Auxiliaries
15A.6.2	Planned (Normal) Operations
15A.6.3	Anticipated (Expected) Operational Transients
15A.6.4	Abnormal (Unexpected) Operational Transients
15A.6.5	Design Basis (Postulated) Accidents
15A.6.6	Special (Plant Capability) Events
15A.7	REMAINDER OF NSQA
15A.8	CONCLUSIONS
15A.9	LIST OF REFERENCES
15B	Accident Dose Model Descriptions
15B.1	OFFSITE DOSE MODEL
15B.1.1	Total Body Gamma Dose
15B.1.2	Thyroid Inhalation Dose
15B.1.3	Beta Skin Dose

SUMMARY TABLE OF CONTENTS

Chapter 15

15B.2	CONTROL ROOM DOSE MODEL
15B.3	REFERENCES
15C	Susquehanna Steam Electric Station Unit 1 Final Safety Analysis Report- Cycle Specific Data
15C.1	Appendix C Contents
15C.1.1	Content Discussion
15C.1.2	References
15D	Susquehanna Steam Electric Station Unit 2 Final Safety Analysis Report- Cycle Specific Data
15D.1	Appendix D Contents
15D.1.1	Content Discussion
15D.1.2	References
15E	Susquehanna Steam Electric Station Units 1 and 2 Non-Limiting Events

SUMMARY TABLE OF CONTENTS**Chapter 15 Tables**

15.1-1	Sequence of Events for Inadvertent Safety Relief Valve Opening
15.1-2	Safety Relief Valve Opening Event Activity Above Suppression Pool (Curies)
15.1-3	Safety Relief Valve Opening Event Activity Release to Environs (Curies)
15.1-4	Safety Relief Valve Opening Event Radiological Doses (REM-TEDE)
15.1-5	Inadvertent Safety/Relief Valve Openings
15.4-2	Control Rod Drop Accident – Design Basis Analysis–Airborne Activity in Condense (2000 Failed Rods)
15.4-3	Control Rod Drop Accident – Design Basis Analysis-Airborne Activity in Condenser (35 Failed Rods)
15.4-4	Control Rod Drop Accident – Design Basis Analysis- Activity Released to Environs (2000 Failed Rods)
15.4-5	Control Rod Drop Accident – Design Basis Analysis- Activity Released to Environs (35 Failed Rods)
15.4-6	Control Rod Drop Accident – Activity Airborne in Condenser (Realistic Analysis) (2000 Rods)
15.4-7	Control Rod Drop Accident – Activity Airborne in Condenser (Realistic Analysis) (35 Rods)
15.4-8	Control Rod Drop Accident – Activity Released to Environs (Realistic Analysis) (2000 Rods)
15.4-9	Control Rod Drop Accident – Activity Released to Environs (Realistic Analysis) (35 Rods)
15.4-10	Control Rod Accident Radiological Effects Design Basis Case and Realistic Case
15.4-11	Control Rod Drop Accident – Parameters to be Tabulated for Postulated Accident Analysis
15.6-1	Sequence of Events for Instrument Line Break
15.6-2	Mass Releases-Instrument Line Break
15.6-3	Instrument Line Break Activity Released to the Environment (Curies)
15.6-4	Instrument Line Break Inside Secondary Containment Radiological Consequences
15.6-5	Instrument Line Break Accident - Parameters for Postulated Accident Analysis
15.6-6	Sequence of Events for Steam Line Break Outside Containment
15.6-7	Steam Line Break Accident Activity Released to the Environment (Curies) (Design Basis Analysis)
15.6-8	Steam Line Break Accident Activity Released to the Environment (Curies) (Realistic Analysis)
15.6-9	Steam Line Break Outside Containment Radiological Doses (rem)
15.6-10	Steam Line Break Accident - Parameters to be Tabulated for Postulated Accident Analyses
15.6-11	Loss of Coolant Accident - Activity Airborne in Primary Containment (Curies) (Design Basis Analysis)
15.6-13	Loss of Coolant Accident - Activity Airborne in Reactor Building (Curies) (Design Basis Analysis)
15.6-14	Loss of Coolant Accident - Activity Released to Environment (Curies) (Design Basis Analysis)

SUMMARY TABLE OF CONTENTS**Chapter 15 Tables**

15.6-15	Loss of Coolant Accident - Activity Airborne in Primary Containment (Curies) (Realistic Analysis)
15.6-16	Loss of Coolant Accident - Activity Airborne in Reactor Building (Curies) (Realistic Analysis)
15.6-17	Loss of Coolant Accident - Activity Released to Environment (Curies) (Realistic Analysis)
15.6-18	Loss-of-Coolant Accident - Summary of Offsite Doses
15.6-21	Loss-of-Coolant Accident - Summary of Control Room Operator Doses (Design Basis Analysis)
15.6-22	Loss-of-Coolant Accident - Parameters for Postulated Accident Analysis
15.6-23	Sequence of Events for Feedwater Line Break Outside Containment
15.6-24	Feedwater Line Break Accident - Parameters for Postulated Accident Analyses
15.6-25	Feedwater Line Break Activity Released to Environment (Curies)
15.6-26	Feedwater Line Break Outside Containment Radiological Doses (rem)
15.7-1	Sequence of Events for Main Condenser Offgas Treatment System Failure
15.7-2	Activity Inventory Stored in Offgas Treatment System Activity Released to the Environs (curies) (Design Basis Analysis)
15.7-3	Activity Inventory Stored in Offgas Treatment System Activity Released to the Environs (curies) (Realistic Analysis)
15.7-4	Main Condenser Offgas Treatment System Failure Radiological Effects
15.7-5	Offgas Treatment System Failure Parameters for Postulated Accident Analysis
15.7-6	Failure of Air Ejector Lines Activity Released to the Environment (curies/sec)
15.7-7	Failure of Steam Jet Air Ejector Lines Radiological Consequences
15.7-8	Failure of Air Ejector Lines Parameters for Postulated Accident Analysis
15.7-9	RWCU Phase Separator Tank Failure – Initial Activity
15.7-9A	RWCU Phase Separator Tank Failure Activity Release to Environment
15.7-10	RWCU Phase Separator Tank Failure Radiological Effects
15.7-11	RWCU Phase Separator Tank Failure
15.7-12	Refueling Accidents Activity Airborne in Reactor Building (Curies) (Design Basis Analysis)
15.7-13	Refueling Accidents Activity Released to Environment (Curies) (Design Basis Analysis)
15.7-14	Refueling Accidents - Activity Airborne in Reactor Building (Realistic Analysis)
15.7-15	Refueling Accidents - Activity Released to Environs (Realistic Analysis)
15.7-16	Refueling Accidents - Radiological Effects
15.7-17	Refueling Accidents - Parameters to be Tabulated for Postulated Accident Analyses
15.7-18	Sequence of Events for SJAE Failure
15.8-1	Input Parameters for ATWS Analysis
15.8-3	Input Operating Conditions for ATWS Analysis
15.8-5	Sequence of Events for MSIV Closure ATWS
15.8-7	Results for MSIV Closure ATWS Event
15.8-9	Sequence of Events for Prego ATWS
15.8-11	Results for Prego ATWS Event

SUMMARY TABLE OF CONTENTS**Chapter 15 Tables**

15.9-1	Unit 1 Station Blackout Instrumentation List
15.9-2	Unit 2 Station Blackout Instrumentation List
15A.2-1	Planned (Normal) Operation Cross-Correlation References
15A.2-2	Anticipated (Expected) Operational Transients Cross-Correlation References
15A.2-3	Abnormal (Unexpected) Operational Transients Cross-Correlation References
15A.2-4	Design Basis (Postulated) Accidents Cross-Correlation References
15A.2-5	Special (Plant Capability) Events Cross-Correlation References
15A.2-6	Plant Event Category: Planned (Normal) Operation Unacceptable Results Criteria
15A.2-7	Plant Event Category: Anticipated (Expected) Operational Transients Unacceptable Results Criteria
15A.2-8	Plant Event Category: Abnormal (Unexpected) Operational Transients Unacceptable Results Criteria
15A.2-9	Plant Event Category: Design Basis (Postulated) Accidents Unacceptable Result Criteria
15A.2-10	Plant Event Category: Special (Plant Capability) Events Unacceptable Results Considerations
15A.3-1	BWR Operating States
15A.6-1	Plant Events Applicable in Each BWR Operating State Planned (Normal) Operation
15A.6-2	Plant Events Applicable in Each BWR Operating State Anticipated (Expected) Operational Transients
15A.6-3	Plant Events Applicable in Each BWR Operating State Abnormal (Unexpected) Operational Transients
15A.6-4	Plant Events Applicable in Each BWR Operating State Design Basis (Postulated) Accidents
15A.6-5	Plant Events Applicable in Each BWR Operating State Special (Plant Capability) Events
15.B-1	Control Room Atmospheric Dispersion Factors For Design Basis Accidents - X/Q
15B-2	Physical Data for Isotopes
15B-3	Breathing Rates
15C.0-1	Results Summary of Transient Events Unit 1 (Typical)
15C.0-2	Input Parameters and Initial Conditions for Transients Unit 1
15C.0-3	MCPR Fuel Cladding Integrity Safety Limit (All Fuel) Unit 1
15C.0-4	Unit 1 Minimum MCPR Requirement For Single Loop Operation & 2 Loop Operation
15C.0-5	Average Scram Insertion Times Unit 1
15C.1.1-1	Sequence of Events for Loss of Feedwater Heating Unit 1
15C.1.2-1	Sequence of Events for Feedwater Controller Failure, Maximum Demand Unit 1 (Typical)
15C.1.3-1	Sequence of Events for Pressure Regulator Failure – Open Unit 1
15C.2.2-1	Sequence of Events for Generator Load Rejection Without Bypass and Turbine Trip Without Bypass Unit 1 (Typical)
15C.3.3-1	Pump Seizure Accident from Two Loop Operation Sequence of Events Unit 1

SUMMARY TABLE OF CONTENTS**Chapter 15 Tables**

15C.3.3-2	Pump Seizure Accident from Single Loop Operation Sequence of Events Unit 1
15C.4.2-1	Sequence of Events – RWE Drift in Power Range Unit 1
15C.4.5-1	Sequence of Events for Recirculation Flow Controller Failure Unit 1
15C.4.7-1	Unit 1 Sequence of Events for Misloaded Bundle Accident
15C.4.9-1	Sequence of Events for Control Rod Drop Accident Unit 1
15C.4.9-2	Control Rod Drop Accident Unit 1 (Typical)
15D.0-1	Results Summary of Transient Events Unit 2 (Typical)
15D.0-2	Input Parameters and Initial Conditions for Transients Unit 2
15D.0-3	MCPR Fuel Cladding Integrity Safety Limit (All Fuel) Unit 2
15D.0-4	Unit 2 Minimum MCPR Requirement for Single Loop Operation & Minimum MCPR Requirement for 2 Loop Operation
15D.0-5	Average Scram Insertion Times Unit 2
15D.1.1-1	Sequence of Events for Loss of Feedwater Heating Unit 2
15D.1.2-1	Sequence of Events for Feedwater Controller Failure, Maximum Demand Unit 2 (Typical)
15D.1.3-1	Sequence of Events for Pressure Regulator Failure – Open Unit 2
15D.2.2-1	Sequence of Events for Generator Load Rejection Without Bypass and Turbine Trip Without Bypass Unit 2 (Typical)
15D.3.3-1	Pump Seizure Accident from Two Loop Operation Sequence of Events Unit 2
15D.3.3-2	Pump Seizure Accident from Single Loop Operation Sequence of Events Unit 2
15D.4.2-1	Sequence of Events – RWE Drift in Power Range Unit 2
15D.4.5-1	Sequence of Events for Recirculation Flow Controller Failure Unit 2
15D.4.7-1	Sequence of Events for Misloaded Bundle Accident Unit 2
15D.4.9-1	Sequence of Events for Control Rod Drop Accident Unit 2
15D.4.9-2	Control Rod Drop Accident Unit 2 (Typical)
15E.0-1	Results Summary of Transient Events Units 1 and 2 Non-Limiting Events (Values are for the Initial Cores Only)
15E.0-2	Input Parameters and Initial Conditions for Transients Units 1 and 2 Initial Cycles
15E.1.1-1	Operator Actions When Reactor Scram is Incurred
15E.1.4-1	Sequence of Events for Inadvertent Safety Relief Valve Opening
15E.1.4-2	Safety Relief Valve Opening Event Activity Above Suppression Pool (curies)
15E.1.4-3	Safety Relief Valve Opening Event Activity Released to the Environs (curies)
15E.1.4-4	Safety Relief Valve Opening Event Offsite Radiological Doses (rems)
15E.1.6-1	Sequence of Events for Inadvertent RHR Shutdown Cooling Operation
15E.2.2-1	Sequence of Events for Figure 15E2.2-1 Generator Load Rejection, Bypass On
15E.2.3-1	Sequence of Events for Turbine Trip With Bypass Operable Figure 15E.2.3-1
15E.2.4-1	Sequence of Events for MSIV Closure, Figure 15E.2.4-1
15E.2.5-1	Typical Rates of Decay for Condenser Vacuum
15E.2.5-2	Loss of Condenser Vacuum Sequence of Events for Figure 15E.2.5-1
15E.2.5-3	Trips Signals Associated With Loss of Condenser Vacuum
15E.2.6-1	Loss of Auxiliary Power Sequence of Events for Figure 15E.2.6-1
15E.2.6-2	Loss of All Grid Connections Sequence of Events for Figure 15E.2.6-2
15E.2.7-1	Loss of Feedwater Flow Sequence of Events for Figure 15E.2.7-1
15E.2.9-1	Sequence of Events for Failure of RHR Shutdown Cooling
15E.2.9-2	Input Parameters for Evaluation of Failure of RHR Shutdown Cooling

SUMMARY TABLE OF CONTENTS

Chapter 15 Tables

15E.3.1-1	Sequence of Events for Trip of One Recirculation Pump
15E.3.1-2	Sequence of Events for Trip of Two Recirculation Pumps
15E.4.4-1	Sequence of Events Abnormal Startup of Idle Recirculation Pump for Figure 15E.4.4-1
15E.5.1-1	Sequence of Events for Inadvertent Startup of HPCI

SUMMARY TABLE OF CONTENTS**Chapter 15 Figures**

15.4-1	Leakage Path for Control Rod Drop Accident
15.6-1	Leakage Path for Instrument Line Break
15.6-2	Steam Flow Schematic for Steam Break Outside Containment
15.6-3	Leakage Flow for LOCA
15.6-4	Leakage Path for Feedwater Line Break Outside Containment
15.7-1	Leakage Path for Refueling Accidents
15A.2-1	Possible Inconsistencies in the Selection of Nuclear Safety Operational Requirements
15A.2-2	Methods Used to Derive NSO Requirements System and Sub-System Level Qualitative FMEA and Design Basis Confirmation Audits and Tech. Specs.
15A.4-1	Format for Protection Sequence Diagrams
15A.4-2	Format for Safety System Auxiliary Diagrams
15A.4-3	Format for Commonality of Auxiliary Diagrams
15A.6-1	Safety System Auxiliaries
15A.6-2	Safety System Auxiliaries
15A.6-3	Safety Action Sequences for Planned Operations in State A
15A.6-4	Safety Action Sequences for Planned Operations in State B
15A.6-5	Safety Action Sequences for Planned Operations in State C
15A.6-6	Safety Action Sequences for Planned Operations in State D
15A.6-7	Protection Sequence for Manual or Inadvertent Scram
15A.6-8	Protection Sequence for Loss of Plant Instrument Air System
15A.6-9	Protection Sequence for Inadvertent Start-Up of HPCI's Pump
15A.6-10	Protection Sequences for Inadvertent Start-Up of Idle Recirculation Loop Pump
15A.6-11	Protection Sequence for Recirculation Loop Flow Control Failure - Maximum Demand
15A.6-12	Protection Sequence for Recirculation Loop Flow Control Failure – Decreasing
15A.6-13	Recirculation Loop Pump Trip - One or Both
15A.6-14a	Protection Sequences for Isolation of All Main Steamlines
15A.6-14b	Protection Sequences for Isolation of the One Main Steamline
15A.6-15	Protection Sequences for Inadvertent Opening of a Safety/Relief Valve
15A.6-16	Protection Sequence for Control Rod Withdrawal Error - Startup and Refueling Operation
15A.6-17	Protection Sequence for Control Rod Withdrawal Error - Power Operation
15A.6-18	Protection Sequences for RHR'S - Loss of Shutdown Cooling Failure
15A.6-19	RHR'S - Shutdown Cooling Failure - Increased Cooling
15A.6-20	Protection Sequences for Loss of Feedwater Flow
15A.6-21	Protection Sequence for Loss of a Feedwater Heater
15A.6-22	Protection Sequences for Feedwater Controller Failure - Maximum Demand
15A.6-23	Protection Sequences for Pressure Regulator Failure - Open
15A.6-24	Protection Sequence for Pressure Regulator Failure - Closed
15A.6-25	Protection Sequences for Main Turbine Trip with Bypass
15A.6-26	Protection Sequences for Loss of Main Condenser Vacuum
15A.6-27	Protection Sequences for Main Generator Trip with Bypass
15A.6-28	Protection Sequence for Loss of Normal AC Power - Aux Transformer Failure

SUMMARY TABLE OF CONTENTS**Chapter 15 Figures**

15A.6-29	Protection Sequences for Loss of Normal AC Power - Grid Connection Loss
15A.6-30	Protection Sequences Main Generator Trip - Without Bypass
15A.6-31	Protection Sequences Main Turbine Trip – With Bypass Failure
15A.6-32	Protection Sequence for Inadvertent Loading and Operations of Fuel Assembly in Improper Position
15A.6-38	Protection Sequences for Recirculation Loop Pump Seizure
15A.6-39	Protection Sequence for Recirculation Loop Pump Shaft Break
15A.6-40	Protection Sequences for Control Rod Drop Accident
15A.6-41	Protection Sequences for Fuel Handling Accident
15A.6-42	Protection Sequences for Loss-of-Coolant Piping Breaks in RCPB - Inside Containment
15A.6-43	Protection Sequences for Liquid, Steam, Large, Small Piping Breaks Outside Containment
15A.6-46	Protection Sequences for Gaseous Radwaste System Leak or Failure
15A.6-47	Protection Sequence for Off-Gas Treatment System Failure
15A.6-48	Protection Sequence for Liquid Radwaste System Leak or Failure
15A.6-49	Protection Sequence for Liquid Radwaste System Storage Tank Failure
15A.6-50	Protection Sequence for Spent Fuel Cask Drop
15A.6-51	Protection Sequence for Reactor Shutdown - From Anticipated Transient Without Scram
15A.6-52	Protection Sequences for Reactor Shutdown - From Outside Main Control Room
15A.6-53	Protection Sequence for Reactor Shutdown - Without Control Rods
15A.6-54-1	Commonality of Auxiliary Systems - DC Power Systems (125/250 Volts)
15A.6-54-2	Event Identification For Figure 15A.6-54, Page 1 of 2
15A.6-54-3	Event Identification For Figure 15A.6-54, Page 2 of 2
15A.6-55-1	Commonality of Auxiliary Systems – AC Power Systems (120/480/4160 Volts)
15A.6-55-2	Event Identification For Figure 15A.6-55, Page 1 of 2
15A.6-55-3	Event Identification For Figure 15A.6-55, Page 2 of 2
15A.6-56-1	Commonality of Auxiliary Systems - Equipment Area Coding System
15A.6-56-2	Event Identification For Figure 15A.6-56
15A.6-57-1	Commonality of Auxiliary Systems - Plant Service Water System
15A.6-57-2	Event Identification For Figure 15A.6-57
15A.6-58	Commonality of Auxiliary Systems - RHR Service Water System
15A.6-59-1	Commonality of Auxiliary Systems - Suppression Pool Storage
15A.6-59-2	Event Identification For Figure 15A.6-59
15C.1.2-1-1	Susquehanna Feedwater Controller Failure, Maximum Demand, with High Water Level Trip Unit 1 (Typical)
15C.1.2-1-2	Susquehanna Feedwater Controller Failure, Maximum Demand, with High Water Level Trip Unit 1 (Typical)
15C.1.2-1-3	Susquehanna Feedwater Controller Failure, Maximum Demand, with High Water Level Trip Unit 1 (Typical)
15C.1.2-1-4	Susquehanna Feedwater Controller Failure, Maximum Demand, with High Water Level Trip Unit 1 (Typical)
15C.1.2-1-5	Susquehanna Feedwater Controller Failure, Maximum Demand, with High Water Level Trip Unit 1 (Typical)

SUMMARY TABLE OF CONTENTS**Chapter 15 Figures**

15C.1.3-1-1	Pressure Regulator Failure – Steam Flow at 130% of Steam Flow at 3441 MWt
15C.1.3-1-2	Pressure Regulator Failure – Steam Flow 130% of Rated
15C.1.3-1-3	Pressure Regulator Failure – Steam Flow 130% of Rated
15C.1.3-1-4	Pressure Regulator Failure – Steam Flow 130% of Rated
15C.1.3-1-5	Pressure Regulator Failure – Steam Flow 130% of Rated
15C.2.2-1-1	Susquehanna Generator Load Reject Without Bypass and Turbine Trip Without Bypass Unit 1 (Typical)
15C.2.2-1-2	Susquehanna Generator Load Reject Without Bypass and Turbine Trip Without Bypass Unit 1 (Typical)
15C.2.2-1-3	Susquehanna Generator Load Reject Without Bypass and Turbine Trip Without Bypass Unit 1 (Typical)
15C.2.2-1-4	Susquehanna Generator Load Reject Without Bypass and Turbine Trip Without Bypass Unit 1 (Typical)
15C.2.2-1-5	Susquehanna Generator Load Reject Without Bypass and Turbine Trip Without Bypass Unit 1 (Typical)
15C.3.3-1	Pump Seizure Accident Two Loop Operation 4031 MWth/108Mlbm/HR Core Response
15C.3.3-2	Pump Seizure Accident Two Loop Operation 4031 MWth/108Mlbm/HR Typical CPR Response
15C.3.3-3	Pump Seizure Accident Single Loop Operation 2652 MWth/52Mlbm/HR Core Response
15C.3.3-4	Pump Seizure Accident Single Loop Operation 2652 MWth/52Mlbm/HR Typical CPR Response
15D.1.2-1-1	Susquehanna Feedwater Controller Failure, Maximum Demand, With High Water Level Trip Unit 2 (Typical)
15D.1.2-1-2	Susquehanna Feedwater Controller Failure, Maximum Demand, With High Water Level Trip Unit 2 (Typical)
15D.1.2-1-4	Susquehanna Feedwater Controller Failure, Maximum Demand, With High Water Level Trip Unit 2 (Typical)
15D.1.2-1-5	Susquehanna Feedwater Controller Failure, Maximum Demand, With High Water Level Trip Unit 2 (Typical)
15D.1.3-1	Pressure Regulator Failed Open – Typical of Unit 2
15D.2.2-1-1	Susquehanna Generator Load Reject Without Bypass and Turbine Trip Without Bypass Unit 2 (Typical)
15D.2.2-1-2	Susquehanna Generator Load Reject Without Bypass and Turbine Trip Without Bypass Unit 2 (Typical)
15D.2.2-1-4	Susquehanna Generator Load Reject Without Bypass and Turbine Trip Without Bypass Unit 2 (Typical)
15D.2.2-1-5	Susquehanna Generator Load Reject Without Bypass and Turbine Trip Without Bypass Unit 2 (Typical)
15D.3.3-5	Pump Seizure Accident Two Loop Operation Typical of Unit 2
15D.3.3-6	Pump Seizure Accident Single Loop Operation Typical of Unit 2
15E.0-1	Typical Power/Flow Map
15E.0-2	Scram Position and Reactivity Characteristics
15E.2.2-1	Susquehanna Generator Load Rejection, With Bypass On

SUMMARY TABLE OF CONTENTS**Chapter 15 Figures**

15E.2.3-1	Turbine Trip, Trip Scram, Bypass and RPT On
15E.2.4-1	Three-Second Closure of All MSIV's With Position Switch Scram Trip
15E.2.5-1	Loss of Condenser Vacuum at 2 Inches Per Second
15E.2.6-1	Loss of Auxiliary Power Transformer
15E.2.6-2	Loss of All Grid Connections
15E.2.7-1	Loss of All Feedwater Flow
15E.2.7-2	Loss of Feedwater Core Power, Heat Flux and Core Flow
15E.2.7-3	Loss of Feedwater, Feedwater Flow Steam Flow and RCIC Flow
15E.2.9-1-1	ADS/RHR Cooling Loops
15E.2.9-1-2	Notes for Figure 15E.2.9-1-1
15E.2.9-1-3	Notes for Figure 15E.2.9-1-1
15E.2.9-2	Summary of Paths Available to Achieve Cold Shutdown
15E.2.9-3	Vessel Temperature and Pressure Versus Time (Activity C1 or C2)
15E.2.9-4	Suppression Pool Temperature Versus Time (90° Service Water Temperature) Capacity C1 or C2
15E.2.9-5	Activity C1 Alternate Shutdown Cooling Path Utilizing RHR Loop B
15E.2.9-6	Activity C2 Alternate Shutdown Cooling Path Utilizing RHR Loop A
15E.3.1-1	Trip of One Recirculation Pump Motor
15E.3.1-2	Trip of Both Recirculation Pump Motors
15E.4.4-1	Startup of Idle Recirculation Loop Pump
15E.5.1-1	Inadvertent Startup of HPCI

SUMMARY TABLE OF CONTENTS

Chapter 16

16.0 TECHNICAL SPECIFICATIONS

- 16.1 Preliminary Technical Specifications
- 16.2 Proposed Final Technical Specifications
- 16.3 Technical Requirements Manuals

SUMMARY TABLE OF CONTENTS**Chapter 17****17.0 QUALITY ASSURANCE**

- 17.1 Quality Assurance During Design and Construction
- 17.2 Quality Assurance During the Operations Phase
 - 17.2.0 Introduction
 - 17.2.1 Organization
 - 17.2.2 Quality Assurance Program
 - 17.2.3 Design Control
 - 17.2.4 Procurement Document Control
 - 17.2.5 Instructions, Procedures, and Drawings
 - 17.2.6 Document Control
 - 17.2.7 Control of Purchased Material, Equipment, and Services
 - 17.2.8 Identification and Control of Materials, Parts, and Components
 - 17.2.9 Control of Special Processes
 - 17.2.10 Inspection
 - 17.2.11 Test Control
 - 17.2.12 Control of Measuring and Test Equipment
 - 17.2.13 Handling, Storage, and Shipping
 - 17.2.14 Inspection, Test, and Operating Status
 - 17.2.15 Nonconforming Materials, Parts, or Components
 - 17.2.16 Corrective Action
 - 17.2.17 Quality Assurance Records
 - 17.2-18 Audits

SUMMARY TABLE OF CONTENTS

Chapter 17 Tables

17.2-1	Quality Assurance Program Description Compliance Matrix
17.2-2	Operational Policy Statement Cross Reference Matrix with 10CFR50 Appendix B Criteria

SUMMARY TABLE OF CONTENTS

Chapter 17 Figures

17.2-1	Hierarchy of Operational Quality Assurance Documents
17.2-2	Talen Energy Corporation Management Organization Applicable to Susquehanna SES
17.2-3	Susquehanna Nuclear, LLC Management Organization
17.2-4	Nuclear Oversight Organization

SUMMARY TABLE OF CONTENTS**Chapter 18****18.0 RESPONSES TO TMI RELATED REQUIREMENTS**

- 18.0 Organization
- 18.1 Response to Requirements in NUREG 0737
 - 18.1.1 Shift Technical Advisor (I.A.1.1)
 - 18.1.2 Shift Supervisor Responsibilities (I.A.1.2)
 - 18.1.3 Shift Manning (I.A.1.3)
 - 18.1.4 Immediate Upgrading Of Reactor Operator and Senior Reactor Operator Training and Qualifications (I.A.2.1)
 - 18.1.5 Administration of Training Programs (I.A.2.3)
 - 18.1.6 Revise Scope And Criteria for Licensing Examinations (I.A.3.1)
 - 18.1.7 Evaluation Of Organization and Management (I.B.1.2)
 - 18.1.8 Short-Term Accident and Procedure Review (I.C.1)
 - 18.1.9 Shift Relief and Turnover Procedures (I.C.2)
 - 18.1.10 Shift Supervisor Responsibility (I.C.3)
 - 18.1.11 Control Room Access (I.C.4)
 - 18.1.12 Feedback Of Operating Experience (I.C.5)
 - 18.1.13 Verify Correct Performance of Operating Activities (I.C.6)
 - 18.1.14 NSSS Vendor Review of Procedures (I.C.7)
 - 18.1.15 Pilot Monitoring of Selected Emergency Procedures for Near Term Operating Licenses (I.C.8)
 - 18.1.16 Control Room Design Review (I.D.1)
 - 18.1.17 Plant Safety Parameter Display System (I.D.2)
 - 18.1.18 Training During Low-Power Testing (I.G.1)
 - 18.1.19 Reactor Coolant System Vents (II.B.1)
 - 18.1.20 Plant Shielding (II.B.2)
 - 18.1.21 Post-Accident Sampling (II.B.3)
 - 18.1.22 Training For Mitigating Core Damage (II.B.4)
 - 18.1.23 Relief and Safety Valve Test Requirements (II.D.1)
 - 18.1.24 Safety/Relief Valve Position Indication (II.D.3)
 - 18.1.25 Auxiliary Feedwater System Evaluation (II.E.1.1)
 - 18.1.26 Auxiliary Feedwater System Initiation And Flow (II.E.1.2)
 - 18.1.27 Emergency Power for Pressurizer Heaters (II.E.3.1)
 - 18.1.28 Dedicated Hydrogen Penetrations (II.E.4.1)
 - 18.1.29 Containment Isolation Dependability (II.E.4.2)
 - 18.1.30 Accident-Monitoring Instrumentation (II.F.1)
 - 18.1.31 Instrument for Detection of Inadequate Core Cooling (II.F.2)
 - 18.1.32 Emergency Power for Pressurizer Equipment (II.G.1)
 - 18.1.33 Review ESF Valves (II.K.1.5)
 - 18.1.34 Operability Status (II.K.1.10)
 - 18.1.35 Trip Pressurizer Low-Level Coincident Signal Bistables (II.K.1.17)
 - 18.1.36 Operator Training for Prompt Manual Reactor Trip (II.K.1.20)
 - 18.1.37 Automatic Safety Grade Anticipatory Reactor Trip (II.K.1.21)
 - 18.1.38 Auxiliary Heat Removal System Procedures (II.K.1.22)
 - 18.1.39 Reactor Vessel Level Procedures (II.K.1.23)
 - 18.1.40 Commission Orders On Babcock and Wilcox Plants (II.K.2)

SUMMARY TABLE OF CONTENTS**Chapter 18**

18.1.41	Automatic Power-Operated Relief Valve Isolation System (II.K.3.1)
18.1.42	Report On Power-Operated Relief Valve Failures (II.K.3.2)
18.1.43	Reporting Safety/Relief Valve Failures and Challenges (II.K.3.3)
18.1.44	Automatic Trip of Reactor Coolant Pumps During A LOCA (II.K.3.5)
18.1.45	Evaluation of Power-Operated Relief Valve Opening Probability (II.K.3.7)
18.1.46	Proportional Integral Derivative Controller Modification (II.K.3.9)
18.1.47	Proposed Anticipatory Trip Modification (II.K.3.10)
18.1.48	Power-Operated Relief Valve Failure Rate (II.K.3.11)
18.1.49	Anticipatory Reactor Trip on Turbine Trip (II.K.3.12)
18.1.50	Separation Of High Pressure Coolant Injection and Reactor Core Isolation Cooling System Initiation Levels (II.K.3.13)
18.1.51	Modify Break-Detection Logic to Prevent Spurious Isolation of High Pressure Coolant Injection and Reactor Core Isolation Cooling (II.K.3.15)
18.1.52	Reduction of Challenges and Failures of Relief Valves (II.K.3.16)
18.1.53	Report On Outages Of Emergency Core Cooling Systems (II.K.3.17)
18.1.54	Modification of Automatic Depressurization System Logic (II.K.3.18)
18.1.55	Restart of Core Spray And Low Pressure Coolant Injection Systems (II.K.3.21)
18.1.56	Automatic Switchover of Reactor Core Isolation Cooling System Suction (II.K.3.22)
18.1.57	Confirm Adequacy of Space Cooling For High Pressure Coolant Injection and Reactor Core Isolation Cooling Systems (II.K.3.24)
18.1.58	Effect of Loss of Alternating-Current Power on Recirculation Pump Seals (II.K.3.25)
18.1.59	Provide A Common Reference Level for Vessel Level Instrumentation (II.K.3.27)
18.1.60	Verify Qualification of Accumulators on Automatic Depressurization System Valves (II.K.3.28)
18.1.61	Revised Small-Break Loss of Coolant Accident Methods (II.K.3.30)
18.1.62	Plant-Specific Calculations To Show Compliance with 10CFR Part 50.46 (II.K.3.31)
18.1.63	Evaluation of Anticipated Transients with Single Failure To Verify No Fuel Cladding Failure (II.K.3.44)
18.1.64	Evaluation of Depressurization With Other Than The Automatic Depressurization System (II.K.3.45)
18.1.65	Michelsen Concerns (II.K.3.46)
18.1.66	Emergency Preparedness - Short Term (III.A.1.1)
18.1.67	Upgrade Emergency Support Facilities (III.A.1.2)
18.1.68	Emergency Preparedness - Long Term (III.A.2)
18.1.69	Integrity Of Systems Outside Containment Likely To Contain Radioactive Material (III.D.1.1)
18.1.70	Inplant Iodine Radiation Monitoring (III.D.3.3)
18.1.71	Control Room Habitability Requirements (III.D.3.4)
18.1.72	References
18.2	Response to Requirements in NUREG 0694
18.2.1	Shift Technical Advisor (I.A.1.1)

SUMMARY TABLE OF CONTENTS**Chapter 18**

18.2.2	Shift Supervisor Administrative Duties (I.A.1.2)
18.2.3	Shift Manning (I.A.1.3)
18.2.4	Immediate Upgrading Of Operator And Senior Operator Training And Qualification (I.A.2.1)
18.2.5	Revise Scope And Criteria For Licensing Examinations (I.A.3.1)
18.2.6	Evaluation Of Organization And Management Improvements Of Near-Term Operating License Applicants (I.B.1.2)
18.2.7	Short-Term Accident Analysis And Procedure Revision (I.C.1)
18.2.8	Shift Relief And Turnover Procedures (I.C.2)
18.2.9	Shift Supervisor Responsibilities (I.C.3)
18.2.10	Control Room Access (I.C.4)
18.2.11	Procedures For Feedback Of Operating Experience To Plant Staff (I.C.5)
18.2.12	NSSS Vendor Review Of Procedures (I.C.7)
18.2.13	Pilot Monitoring Of Selected Emergency Procedures Near-Term Operating License Applicants (I.C.8)
18.2.14	Control Room Design (I.D.1)
18.2.15	Training During Low Power Testing (I.G.1)
18.2.16	Reactor Coolant System Vents (II.B.1)
18.2.17	Plant Shielding (II.B.2)
18.2.18	Post-Accident Sampling (II.B.3)
18.2.19	Training For Mitigating Core Damage (II.B.4)
18.2.20	Relief And Safety Valve Test Requirements (II.D.1)
18.2.21	Relief And Safety Valve Position Indication (II.D.3)
18.2.22	Containment Isolation Dependability (II.E.4.2)
18.2.23	Additional Accident Monitoring Instrumentation (II.F.1)
18.2.24	Inadequate Core Cooling Instruments (II.F.2)
18.2.25	Assurance Of Proper ESF Functioning (II.K.1.5)
18.2.26	Safety Related System Operability Status (II.K.1.10)
18.2.27	Trip Pressurizer Low-Level Coincident Signal Bistables (II.K.1.17)
18.2.28	Operator Training For Prompt Manual Reactor Trip (II.K.1.20)
18.2.29	Automatic Safety Grade Anticipatory Trip (II.K.1.21)
18.2.30	Auxiliary Heat Removal Systems Operating Procedures (II.K.1.22)
18.2.31	Reactor Level Instrumentation (II.K.1.23)
18.2.32	Commission Orders On Babcock And Wilcox Plants (II.K.2)
18.2.33	Reporting Requirements For Safety/Relief Valve Failures Or Challenges (II.K.3.3)
18.2.34	Proportional Integral Derivative Controller (II.K.3.9)
18.2.35	Anticipatory Reactor Trip Modification (II.K.3.10)
18.2.36	Power Operated Relief Valve Failure Rate (II.K.3.11)
18.2.37	Anticipatory Reactor Trip on Turbine Trip (II.K.3.12)
18.2.38	Emergency Preparedness-Short Term (II.A.1.1)
18.2.39	Upgrade Emergency Support Facilities (III.A.1.2)
18.2.40	Primary Coolant Sources Outside Containment (III.D.1.1)
18.2.41	Inplant Radiation Monitoring (III.D.3.3)
18.2.42	Control Room Habitability (III.D.3.4)

SUMMARY TABLE OF CONTENTS**Chapter 18 Tables**

18.1-1	Interim Required Shift Staffing
18.1-2	Initial Core Isotopic Inventory
18.1-3	Post Accident Radiation Zone Classification
18.1-4	Vital Areas
18.1-5	Principal Dose Rate Contributors in Plant Area
18.1-8	Training Criteria for Mitigating Core Damage
18.1-9	Mitigating Core Damage Course Outline
18.1-10	Containment Isolation Actuation Provision
18.1-11	Essential/Non-Essential Penetration Classification Basis
18.1-12	Actuation/Isolation Signal Codes and Corresponding Actuating Switches
18.1-13	Meteorological Information
18.1-17	Information Required for Control Room Habitability Evaluation
18.1-18	Possible ICC Detection Devices
18.2-1	Testing Program Outline

SUMMARY TABLE OF CONTENTS**Chapter 18 Figures**

18.1-1	Radiation Levels for the Site Plan
18.1-2	Radiation Levels for the Site Plan Elevations 646'-0," 645'0," and 656'-0"
18.1-3	Radiation Levels for Elevations 670'-0" and 676'-0"
18.1-4	Radiation Levels for Elevations 683'-0," 699'-0," 714'-0," and 716'-3"
18.1-5	Radiation Levels for Elevations 719'-1," 729'-0," and 741'-1"
18.1-6	Radiation Levels for Elevations 749'-1," 754'-0," 762'-0," 771'-0," and 783'-0"
18.1-7	Radiation Levels for Elevations 779'-1," 799'-1," and 806'-0"
18.1-8	Radiation Levels for Elevations 818'-1" and 872'-4 1/2"
18.1-12	Typical HPCI RCIC Steamline Break Detection Logic
18.1-13	Typical Reactor Water Level Display
18.1-14	Downcomer Water Level History
18.1-15	Water Level as an Indicator of Core Overheating
18.1-16	Cladding Temperature Sensitivity to Core Recovery Time

SUMMARY TABLE OF CONTENTS**Chapter – Responses to NRC Questions**

NOTE 1: 040, 281, and 441 questions concerning fire protection may be found in the FPRR

NOTE 2: Any 040 questions which contain "X10" in the question numbers were initiated by the Oak Ridge National Laboratories

<u>Branch No.</u>	<u>Branch Title</u>
005	Auxiliary System
010	Auxiliary Systems
021	Containment Systems
032	Instrumentation and Control Systems
040	Power Systems
110	Mechanical Engineering
112	Mechanical Engineering
121	Materials Engineering Branch-Materials Integrity Section
123	Structural and Geosciences Branch
130	Structural Engineering
211	Reactor Systems
221	Analysis Branch-Reactor Analysis Section
222	Analysis Branch-System Analysis Section
230	Core Performance Branch
231	Core Performance Branch-Reactor Fuels Section
232	Core Performance Branch-Reactor Physics Section
260	Quality Assurance Branch
281	Chemical Engineering Branch
312	Accident Analysis
313	Accident Analysis Branch-Emergency Planning
321	Effluent Treatment Systems
331	Radiological Assessment
361	Geosciences Branch-Seismology Geology Section
362	Geosciences Branch-Foundation Engineering Section
371	Hydrology-Meteorology Branch-Hydrology Section
372	Hydrology-Meteorology Branch-Meteorology Section
400	Project Management
410	Licensee Qualification Branch
421	Quality Assurance-Operations
422	Licensee Qualification Branch
423	Quality Assurance Branch-Initial Test Program
440	Operator Licensing
441	Operator Licensing Branch-Training
442	Operator Licensing Branch-Procedures
500	Security