

## SECTION 2

### SITE CHARACTERISTICS

#### TABLE OF CONTENTS

| <u>Section</u> | <u>Title</u>   | <u>Page</u> |
|----------------|--|-------------|
| 2.1            | GEOGRAPHY AND DEMOGRAPHY                               | 2.1-1       |
| 2.1.1          | Site Location  | 2.1-1       |
| 2.1.2          | Site Description                                       | 2.1-2       |
| 2.1.2.1        | Exclusion Area Control                                 | 2.1-2       |
| 2.1.2.2        | Boundaries for Establishing<br>Effluent Release Limits | 2.1-3       |
| 2.1.3          | Population Distribution                                | 2.1-3       |
| 2.1.3.1        | Population Within 10 Miles                             | 2.1-4       |
| 2.1.3.1.1      | Population Projections for 0 to 10<br>Mile Area        | 2.1-5       |
| 2.1.3.1.2      | Population Update Within 10 Miles                      | 2.1-5       |
| 2.1.3.2        | Population Between 10 and 50 Miles                     | 2.1-10      |
| 2.1.3.2.1      | Population Projections for 10 to 50<br>Mile Area       | 2.1-10      |
| 2.1.3.2.2      | Population Update 10 to 50 Miles                       | 2.1-10      |
| 2.1.3.3        | Low Population Zone                                    | 2.1-14      |
| 2.1.3.4        | Transient Population                                   | 2.1-15      |
| 2.1.3.5        | Population Center                                      | 2.1-15      |
| 2.1.3.6        | Public Facilities and Institutions                     | 2.1-16      |
| 2.1.3.6.1      | Schools  | 2.1-16      |
| 2.1.3.6.2      | Hospitals and Nursing Homes                            | 2.1-17      |
| 2.1.3.6.3      | Correctional Institutions                              | 2.1-17      |
| 2.1.3.6.4      | Recreational Facilities                                | 2.1-18      |
| 2.1.3.7        | Population Projection Methodology                      | 2.1-18      |
| 2.1.4          | Use of Adjacent Land                                   | 2.1-22      |
| 2.1.4.1        | Recreational Land Use                                  | 2.1-25      |
| 2.1.5          | References for Section 2.1                             | 2.1-25      |

TABLE OF CONTENTS (Cont)

| <u>Section</u> | <u>Title</u>   | <u>Page</u> |
|----------------|--|-------------|
| 2.2            | NEARBY INDUSTRIAL, TRANSPORTATION AND<br>MILITARY FACILITIES   | 2.2-1       |
| 2.2.1          | Location and Routes  | 2.2-1       |
| 2.2.2          | Descriptions   | 2.2-1       |
| 2.2.2.1        | Missile Bases or Missile Sites                                 | 2.2-1       |
| 2.2.2.2        | Manufacturing Plants   | 2.2-2       |
| 2.2.2.3        | Chemical Plants and Storage Facilities                         | 2.2-2       |
| 2.2.2.4        | Oil and Gas Pipelines and Tank Farms                           | 2.2-2       |
| 2.2.2.5        | Transportation Complexes (Harbors,<br>Railway Yards, Airports) | 2.2-2       |
| 2.2.2.6        | Transportation Routes (Highways,<br>Railway, and Waterways)    | 2.2-3       |
| 2.2.2.7        | Petroleum Wells, Mines, or Quarries                            | 2.2-5       |
| 2.2.3          | Evaluations  | 2.2-5       |
| 2.2.3.1        | Barge Transportation   | 2.2-5       |
| 2.2.3.2        | Hazardous Chemicals - Onsite                                   | 2.2-9       |
| 2.2.3.3        | Hazardous Chemicals - Offsite                                  | 2.2-12      |
| 2.2.4          | References for Section 2.2                                     | 2.2-13      |
| 2.3            | METEOROLOGY  | 2.3-1       |
| 2.3.1          | Regional Climatology   | 2.3-1       |
| 2.3.1.1        | Data Sources   | 2.3-1       |
| 2.3.1.2        | General Climate  | 2.3-1       |
| 2.3.1.2.1      | Precipitation  | 2.3-1       |
| 2.3.1.2.2      | Humidity, Winds  | 2.3-2       |
| 2.3.1.3        | Severe Weather   | 2.3-2       |
| 2.3.2          | Local Meteorology  | 2.3-2       |
| 2.3.3          | Onsite Meteorological Measurements<br>Program                  | 2.3-3       |
| 2.3.3.1        | Preoperational Data Collection Program                         | 2.3-3       |
| 2.3.3.1.1      | Data Summaries and Turbulence<br>Classifications               | 2.3-4       |
| 2.3.3.2        | Operational Data Collection Program                            | 2.3-7       |

TABLE OF CONTENTS (Cont)

| <u>Section</u> | <u>Title</u>  | <u>Page</u> |
|----------------|---|-------------|
| 2.3.4          | Short-Term Diffusion Estimate   | 2.3-11      |
| 2.3.4.1        | Objective   | 2.3-11      |
| 2.3.4.2        | Accident Assessment   | 2.3-12      |
| 2.3.4.2.1      | Methodology   | 2.3-12      |
| 2.3.4.2.2      | Meteorological Data   | 2.3-13      |
| 2.3.4.2.2.1    | Representativeness  | 2.3-13      |
| 2.3.4.2.2.2    | Joint Frequency Distributions   | 2.3-13      |
| 2.3.4.3        | Atmospheric Diffusion Model   | 2.3-14      |
| 2.3.4.4        | Diffusion Estimates   | 2.3-14a     |
| 2.3.4.4.1      | Exclusion Area Boundary   | 2.3-14a     |
| 2.3.4.4.2      | Low Population Zone   | 2.3-14a     |
| 2.3.5          | Long-Term Diffusion Estimate  | 2.3-14b     |
| 2.3.5.1        | Objective   | 2.3-14b     |
| 2.3.5.2        | Calculations  | 2.3-14b     |
| 2.3.6          | References for Section 2.3  | 2.3-15      |
| Appendix 2.3A  | Joint Frequency Distributions of Wind Speed and Direction by Lapse Rate Delta Temperature Stability Classes: June 1969 to November 1971 | 2.3A-1      |
| 2.4            | HYDROLOGIC ENGINEERING  | 2.4-1       |
| 2.4.1          | Hydrologic Description  | 2.4-1       |
| 2.4.1.1        | Site and Facilities   | 2.4-1       |
| 2.4.1.2        | Hydrosphere   | 2.4-4       |
| 2.4.2          | Floods  | 2.4-5       |
| 2.4.3          | Probable Maximum Flood  | 2.4-6       |
| 2.4.3.1        | Probable Maximum Precipitation  | 2.4-6       |
| 2.4.4          | Potential Dam Failures  | 2.4-7       |
| 2.4.5          | Probable Maximum Surge and Seiche Flooding  | 2.4-7       |
| 2.4.5.1        | Probable Maximum Winds and Associated Meteorological Parameters   | 2.4-7       |
| 2.4.5.2        | Surge and Seiche History  | 2.4-12      |
| 2.4.5.3        | Surge and Seiche Sources  | 2.4-12      |
| 2.4.5.4        | Wave Action   | 2.4-12      |
| 2.4.5.5        | Resonance   | 2.4-13      |
| 2.4.5.6        | Runup   | 2.4-13      |
| 2.4.5.7        | Protective Structures   | 2.4-14      |
| 2.4.6          | Probable Maximum Tsunami Flooding   | 2.4-14      |

TABLE OF CONTENTS (Cont)

| <u>Section</u> | <u>Title</u>   | <u>Page</u> |
|----------------|--|-------------|
| 2.4.7          | Ice Flooding   | 2.4-15      |
| 2.4.8          | Cooling Water Canals and Reservoirs                              | 2.4-16      |
| 2.4.9          | Channel Diversions   | 2.4-16      |
| 2.4.10         | Flood Protection Requirements                                    | 2.4-16      |
| 2.4.11         | Low Water Considerations   | 2.4-16      |
| 2.4.11.1       | Low Flow in Rivers and Streams                                   | 2.4-16      |
| 2.4.11.2       | Low Water Resulting from Surges,<br>Seiches, and Tsunamis        | 2.4-16      |
| 2.4.11.3       | Historical Low Water   | 2.4-19      |
| 2.4.11.4       | Future Control   | 2.4-19      |
| 2.4.11.5       | Plant Requirements   | 2.4-19      |
| 2.4.11.6       | Heat Sink Dependability Requirements                             | 2.4-19      |
| 2.4.12         | Environmental Acceptance of Effluents                            | 2.4-19      |
| 2.4.13         | Groundwater  | 2.4-21      |
| 2.4.13.1       | Description and Onsite Use                                       | 2.4-21      |
| 2.4.13.2       | Sources  | 2.4-22      |
| 2.4.13.3       | Accident Effects   | 2.4-26      |
| 2.4.13.4       | Monitoring or Safeguard Requirements                             | 2.4-27      |
| 2.4.13.5       | Technical Specifications and Emergency<br>Operation Requirements | 2.4-27      |
| 2.4.14         | References for Section 2.4                                       | 2.4-27      |
| 2.4.15         | Bibliography for Section 2.4                                     | 2.4-28      |
| 2.5            | GEOLOGY AND SEISMOLOGY   | 2.5-1       |
| 2.5.1          | Basic Geologic and Seismic Information                           | 2.5-1       |
| 2.5.1.1        | Regional Geology   | 2.5-2       |
| 2.5.1.1.1      | Physiography   | 2.5-2       |
| 2.5.1.1.2      | History and Tectonics  | 2.5-3       |
| 2.5.1.1.3      | Stratigraphy   | 2.5-5       |
| 2.5.1.1.4      | Structure  | 2.5-6       |
| 2.5.1.1.5      | Groundwater  | 2.5-8       |
| 2.5.1.2        | Site Geology   | 2.5-9       |

TABLE OF CONTENTS (Cont)

| <u>Section</u> | <u>Title</u>  | <u>Page</u> |
|----------------|---|-------------|
| 2.5.2          | Vibratory Ground Motion                               | 2.5-11      |
| 2.5.2.1        | Geologic Conditions at Site                           | 2.5-11      |
| 2.5.2.2        | Tectonic Conditions                                   | 2.5-11      |
| 2.5.2.3        | Behavior During Prior Earthquakes                     | 2.5-12      |
| 2.5.2.4        | Geotechnical Properties                               | 2.5-13      |
| 2.5.2.5        | Seismicity  | 2.5-13      |
| 2.5.2.6        | Correlation of Epicenters with<br>Geologic Structures | 2.5-16      |
| 2.5.2.7        | Identification of Active Faults                       | 2.5-17      |
| 2.5.2.8        | Description of Active Faults                          | 2.5-17      |
| 2.5.2.9        | Maximum Earthquake                                    | 2.5-17      |
| 2.5.2.10       | Safe Shutdown Earthquake                              | 2.5-18      |
| 2.5.2.11       | Operating Basis Earthquake                            | 2.5-19      |
| 2.5.2.12       | Response Spectra                                      | 2.5-19      |
| 2.5.3          | Surface Faulting                                      | 2.5-20      |
| 2.5.4          | Stability of Subsurface Materials                     | 2.5-20      |
| 2.5.5          | Slope Stability                                       | 2.5-20      |
| 2.5.6          | References for Section 2.5                            | 2.5-20      |
| 2.5.7          | Bibliography for Section 2.5                          | 2.5-21      |

## LIST OF TABLES

| <u>Table</u> | <u>Title</u>  |
|--------------|---|
| 2.1-1        | New Jersey Population Projections to 2020                                       |
| 2.1-2        | Population Projections Available for MCD's of Counties Within 50 Miles of Salem |
| 2.1-3        | Persons per Household Factors   |
| 2.1-4        | Population Estimates of Cities and Towns Within 10 Miles of the Site            |
| 2.1-5        | Resident Population Distribution by Zone and Sector, 0 to 10 Miles from SGS     |
| 2.1-6        | Resident Population Distribution by Zone and Sector 10 to 50 Miles from SGS     |
| 2.1-7        | Land Use in Five Surrounding Counties   |
| 2.1-8        | Agricultural Statistics   |
| 2.1-9        | Schools Located in EPZ by Emergency Planning Area                               |
| 2.1-10       | Recreational Facilities in SNGS Local Area                                      |
| 2.1-11       | Health Care Facilities  |
| 2.1-12       | Correctional Facilities/Jails   |
| 2.2-1        | Industries within Ten Miles of the Site   |
| 2.2-2        | Hazardous Chemicals Stored Onsite   |

LIST OF TABLES (Cont)

| <u>Table</u> | <u>Title</u>  |
|--------------|---|
| 2.2-3        | DELETED   |
| 2.2-4        | Estimates of Hazardous Chemical Traffic   |
| 2.3-1        | Percentage of Days with Various Hydrometers - Dover Delaware Air Force Base (1942-1965) |
| 2.3-2        | Snowfall - Philadelphia International Airport   |
| 2.3-3        | Snowfall - Trenton Airport  |
| 2.3-4        | Distribution of Peak Winds - Philadelphia International Airport                         |
| 2.3-5        | Distribution of Hourly Temperatures - Temperature Classes                               |
| 2.3-6        | Precipitation   |
| 2.3-7        | Percentage of Hours with Fog  |
| 2.3-8        | Percentage Frequency of Turbulence Classes  |
| 2.3-9        | Percentage Frequency of Lapse Rates   |
| 2.3-10       | Relation Between Lapse Rates and Turbulence Classes                                     |
| 2.3-11       | Average Horizontal Range  |
| 2.3-12       | Average Horizontal Range for Wind Directions Between 130 and 160 Degrees                |
| 2.3-13       | Percentage Frequency of Wind Speed Classes  |

LIST OF TABLES (Cont)

| <u>Table</u> | <u>Title</u>   |
|--------------|--|
| 2.3-14       | Mean Annual Wind Speeds at Various Levels  |
| 2.3-15       | Wind Data Recovery (June 1969 - May 1970)  |
| 2.3-16       | Meteorological Instrumentation   |
| 2.3-16A      | Data Acquisition System Hardware   |
| 2.3-17       | Vent Release - Exit Velocity of 7.2 M/Seconds -<br>Undepleted X/Q at Ground Level Applicable to Long<br>Term (Routine) Gaseous Releases - Sector Annual<br>X/Q at Ground Level |
| 2.3-18       | Vent Release - Exit Velocity of 7.2 M/Seconds -<br>Undepleted X/Q at Ground Level Applicable to Long<br>Term (Routine) Gaseous Releases - Sector Annual<br>X/Q at Ground Level |
| 2.3-19       | Vent Release - Exit Velocity of 7.2 M/Seconds -<br>Undepleted X/Q at Ground Level Applicable to Long<br>Term (Routine) Gaseous Releases - Sector Annual<br>X/Q at Ground Level |
| 2.3-20       | Vent Release - Exit Velocity of 7.2 M/Seconds -<br>Undepleted X/Q at Ground Level Applicable to Long<br>Term (Routine) Gaseous Releases - Sector Annual<br>X/Q at Ground Level |
| 2.3-21       | Accident X/Q Estimates   |
| 2.3-22       | Accident X/Q Values at LPZ by Sector   |
| 2.4-1        | Summary of Maximum Stillwater Elevation<br>Determinations  |
| 2.4-2        | Agencies and Individuals Contacted   |



LIST OF TABLES (Cont)

| <u>Table</u> | <u>Title</u>   |
|--------------|--|
| 2.4-3        | Hydrologic Characteristics of Geologic Formations                |
| 2.4-4        | Public Water Supplies  |
| 2.4-5        | Private Water Wells in Vicinity of the Site                      |
| 2.5-1        | List of References - Agencies and Individuals<br>Interviewed     |
| 2.5-2        | Modified Mercalli Intensity (Damage) Scale of 1931               |
| 2.5-3        | Significant Earthquakes within 100 Miles of Salem,<br>New Jersey |

## LIST OF FIGURES

| <u>Figure</u> | <u>Title</u>  |
|---------------|---|
| 2.1-1         | General Site Location   |
| 2.1-2         | General Site Location 0 to 60 Miles   |
| 2.1-3         | Site Environs Detail  |
| 2.1-4         | Aerial Photograph of Site   |
| 2.1-5         | Area Plot Plan of Site  |
| 2.1-6         | Resident Population Distribution (0 to 10 Miles) -<br>1970 and 1980         |
| 2.1-7         | Resident Population Distribution (0 to 10 Miles) -<br>1970 and 1990         |
| 2.1-8         | Resident Population Distribution (0 to 10 Miles) -<br>1970 and 2000         |
| 2.1-9         | Resident Population Distribution (0 to 10 Miles) -<br>1970 and 2010         |
| 2.1-10        | Resident Population Distribution (0 to 10 Miles) -<br>1970 and 2020         |
| 2.1-11        | Regional Resident Population Distribution (10 to 50<br>Miles) 1970 and 1980 |
| 2.1-12        | Regional Resident Population Distribution (10 to 50<br>Miles) 1970 and 1990 |

LIST OF FIGURES (Cont)

| <u>Figure</u> | <u>Title</u>   |
|---------------|--|
| 2.1-13        | Regional Resident Population Distribution (10 to 50 Miles) 1970 and 2000 |
| 2.1-14        | Regional Resident Population Distribution (10 to 50 Miles) 1970 and 2010 |
| 2.1-15        | Regional Resident Population Distribution (10 to 50 Miles) 1970 and 2020 |
| 2.1-16        | 10 Mile EPZ Boundary   |
| 2.1-17        | Evacuation Time Estimates  |
| 2.1-18        | Evacuation Time Estimates  |
| 2.2-1         | Site Vicinity Map Showing Major Facilities                               |
| 2.3-1         | Sources of Meteorological Records  |
| 2.3-2         | Two Year Wind Rose - All Hours   |
| 2.3-3         | Two Year Wind Rose - Only Hours with a Stable Stability                  |
| 2.3-4         | Definition of Turbulence Classes   |
| 2.3-5         | Diurnal Variation of Lapse Rate - June 1970                              |
| 2.3-6         | Diurnal Variation of Lapse Rate - December 1970                          |
| 2.3-7         | SNGS Meteorological Tower Schematic                                      |

LIST OF FIGURES (Cont)

| <u>Figure</u> | <u>Title</u>   |
|---------------|--|
| 2.3-8         | Meteorological Data Acquisition Display System   |
| 2.4-1         | Map of Area  |
| 2.4-2         | Deleted: Refer to Plant Drawing 232091   |
| 2.4-3         | Deleted: Refer to Plant Drawing 211612   |
| 2.4-4         | Site Location in Relation to the Surrounding Area  |
| 2.4-5         | Typical Rainfall Intensity-Duration-Frequency<br>Curves for New Jersey Area                      |
| 2.4-6         | Map of Delaware Bay Showing Storm Track and Point<br>of Calculations for Maximum Hurricane Surge |
| 2.4-7         | Deleted  |
| 2.4-8         | Map of Delaware Bay Showing Location of PMH for<br>Maximum Low Water Conditions                  |
| 2.4-9         | Yard-Fresh Water Well Locations  |
| 2.4-10        | Public Water Supplies in Vicinity of Site  |
| 2.4-11        | Map of Area-Known Water Wells in New Jersey in<br>Vicinity of Site                               |
| 2.5-1         | Regional Physiographic Map   |
| 2.5-2         | Geological Section - Coastal Plain   |
| 2.5-3         | Regional Geologic Map  |

LIST OF FIGURES (Cont)

| <u>Figure</u> | <u>Title</u>   |
|---------------|--|
| 2.5-4         | Regional Tectonic Map  |
| 2.5-5         | Geologic Columnar Section - Site Area  |
| 2.5-6         | Plot Plan  |
| 2.5-7         | Plot Plan - Detail A   |
| 2.5-8         | Sub-Surface Sections   |
| 2.5-9         | Columnar Section Showing Geophysical Data  |
| 2.5-10        | Soil Profile and Material Properties at Salem<br>Nuclear Generating Station Site |
| 2.5-11        | Epicentral Location Map  |
| 2.5-12        | Ground Response Spectra - Safe Shutdown<br>Earthquake                            |
| 2.5-13        | Ground Response Spectra - Operating Basis<br>Earthquake                          |