Enclosure 1 to PLA- 7758

List of Changes Contained in Revision 62 to SSES Emergency Plan

Emergency Plan Changes Revision 61 to Revision 62

1. Revision 62 of the Emergency Plan takes credit for the 2018 annual review. (S2018-10-25-01)
2. Replaced "Manager-Emergency Preparedness" with "Manager-Security/Emergency Preparedness" throughout the document per recent organizational changes at SSES (S2018-03-28-01)
3. Updated Figures 4.1 and 4.2. (S2018-10-25-01)
4. Replaced "outlines" with "outlined" in second paragraph of section 5.1.4. (S2018-10-25-01)
5. Added "(Alert or higher emergency declaration)" after "classification" in Section 6.0, phase II section. (S2018-10-25-01)
6. Removed section 6.2.7e from the Security Coordinator responsibility to section 6.2.1.p. to align with current implementing procedures (S2018-10-25-01)
7. Combined sections 6.2.5.a with 6.2.5.i in current step 6.2.5.a and renumbered the remaining steps. (S2018-10-25-01)
8. Added responsibilities for Recovery Manager and Dose Assessment Supervisor in steps 6.3.1.1.m and 6.3.1.4.h to approve / advise, respectively, dose extensions for field monitoring teams personnel under EOF command and control (S2018-10-02-01, changes 1.a and 7.c and 7.e).
9. Corrected typo in section 6.3.1.5 (S2018-10-25-01)
10. Added EOF Technical Advisor position to Figure 6.4 (S2018-10-25-01)
11. Reordered bullets in bulleted list in section 7.1. (S2018-10-25-01)
12. Deleted reference to supplemental meteorological tower from section 7.1.1.1 (S2018-10-29-01/E2018-10-29-03)
13. Replaced "wind variability" with "wind direction variability" in the first paragraph of section 7.1.1.1. (S2018-10-25-01)
14. Replaced and with when in the seventh paragraph in Section 7.1.1.3. (S2018-10-25-01)
15. Deleted "To the extent reasonable, persons with high lifetime cumulative radiation exposure should not take part in these actions." from Table 7.2 to eliminate this criteria from dose extension decisions and thus increase ERO responsiveness. (S2018-10-24-01/E2018-10-24-01)
16. Replaced "—" with empty spaces in Health Effects Associated with Whole Body Absorbed Doses Received Within a Few Hours Table in Table 7.2. (S2018-10-25-01)
17. Replaced TSC with CR in the second paragraph of section 8.1.2. (S2018-10-25-01)
18. Updated name and address for PEMA Headquarters in section 8.3.2. (S2018-10-25-01)
19. Updated location of the redundant control ANS station in section 8.5.4. (E2018-04-26-01)
20. Refined description of the plant computer capabilities in the 5th bullet in Section 8.9.1. (S2018-10-25-01)
21. Removed the phrase "For Example: Offsite Emergency Calendars)" from section 9.4.4. (S2018-10-25-01)

22. Updated MOA for heavy equipment in Appendix A (E2018-10-29-01)
23. Updated Fire Department MOA in Appendix A. (E2018-10-29-02)
24. Deleted "EOF Information Coordinator" from Appendix C as this position was eliminated (S2017-10-25-01).
25. Deleted "OSC Clerk" from Appendix C as this position was eliminated (S2017-11-21-01)
26. Updated equipment in Appendix D Enclosures (E2018-04-13-01)
27. Updated Corporate Policy letter in Appendix E with current CNO signature. (S2018-10-25-01)

Enclosure 2 to PLA- 7758

List of Applicable 10 CFR 50.54(q) Screens and Evaluations

List of Applicable 10 CFR 50.54(q) Screens and Evaluations

1. E2018-04-13-01
2. E2018-04-26-01
3. E2018-10-24-01
4. E2018-10-29-01
5. E2018-10-29-02
6. E2018-10-29-03
7. S2017-10-25-01
8. S2017-11-21-01
9. S2018-03-28-01
10. S2018-10-02-01
11. S2018-10-24-01
12. S2018-10-25-01
13. S2018-10-29-01

Enclosure 3 to PLA- 7758

SSES Emergency Plan Revision 62

SUSQUEHANNA NUCLEAR, LLC

SUSQUEHANNA STEAM ELECTRIC STATION

EMERGENCY PLAN

REVISION 62
DATE: 11/28/2018

PORC MEETING: 18-11-13

SUSQUEHANNA NUCLEAR, LLC

SUSQUEHANNA STEAM ELECTRIC STATION

TEAM SUSQUEHANNA™
Generating Excellence

EMERGENCY PLAN

THIS DOCUMENT HAS BEEN UPDATED TO INCLUDE REVISIONS THROUGH 61

DATED: 11/28/2018

AFFECTED PAGES

NOTE:	PPL Susquehanna, LLC was reorganized to Susquehanna Nuclear, LLC. Susquehanna is now a part of parent company Talen instead of PPL. Agreements signed in the past as PPL Susquehanna, LLC will be honored and carried forward by Susquehanna Nuclear, LLC.

1. Revision 62 of the Emergency Plan takes credit for the 2018 annual review.
2. Replaced "Manager-Emergency Preparedness" with "Manager-Security/Emergency Preparedness" throughout the document per AR-2018-04646 (S2018-03-28-01)
3. Updated Figures 4.1 and 4.2 per AR-2018-13801. (S2018-10-25-01)
4. Replaced "outlines" with "outlined" in second paragraph of section 5.1.4. (S2018-10-25-01)
5. Added "(Alert or higher emergency declaration)" after "classification" in Section 6.0, phase II section. (S2018-10-25-01)
6. Removed section 6.2.7e from the Security Coordinator responsibility to section 6.2.1.p per AR-2017-09053 and AR-2017-20479. (S2018-10-25-01)
7. Combined sections 6.2.5.a with 6.2.5.i in current step 6.2.5.a and renumbered the remaining steps. (S2018-10-25-01)
8. Added steps 6.3.1.1.m and 6.3.1.4.h per AR-2018-13835 (S2018-10-02-01, changes 1.a and 7.c and 7.e).
9. Corrected typo in section 6.3.1.5 (S2018-10-25-01)
10. Added EOF Technical Advisor position to Figure 6.4 per AR-2018-13095. (S2018-10-25-01)
11. Reordered bullets in bulleted list in section 7.1. (S2018-10-25-01)
12. Deleted reference to supplemental meteorological tower from section 7.1.1.1 per AR-2017-17969 (S2018-10-29-01/E2018-10-29-03)
13. Replaced "wind variability" with "wind direction variability" in the first paragraph of section 7.1.1.1. (S2018-10-25-01)
14. Replaced and with when in the seventh paragraph in Section 7.1.1.3. (S2018-10-25-01)
15. Deleted "To the extent reasonable, persons with high lifetime cumulative radiation exposure should not take part in these actions." from Table 7.2 per AR-2018-13465. (S2018-10-24-01/E2018-10-24-01)
16. Replaced "—" with empty spaces in Health Effects Associated with Whole Body Absorbed Doses Received Within a Few Hours Table in Table 7.2. (S2018-10-25-01)
17. Replaced TSC with CR in the second paragraph of section 8.1.2. (S2018-10-25-01)
18. Updated name and address for PEMA Headquarters in section 8.3.2 per AR-2018-06092. (S2018-10-25-01)
19. Updated location of the redundant control ANS station in section 8.5.4 per AR-2018-06919. (E2018-04-26-01)
20. Refined description of the plant computer capabilities in the 5th bullet in Section 8.9.1. (S2018-10-25-01)
21. Removed the phrase "For Example: Offsite Emergency Calendars)" from section 9.4.4 per DPA-10-DI-2018-06672. (S2018-10-25-01)
22. Updated MOA for heavy equipment in Appendix A per ACT-02-CR-2018-03742 (E2018-10-29-01)
23. Updated Fire Department MOA in Appendix A per ACT-02-CR-2018-12173. (E2017-08-25-01)
24. Deleted "EOF Information Coordinator" from Appendix C per DPA-06-DI-2018-06672 (S2017-10-25-01).
25. Deleted "OSC Clerk" from Appendix C per AR-2017-20382 (S2017-11-21-01)
26. Changed Appendix D Enclosures per AR-2018-04987 (E2018-04-13-01)
27. Updated Corporate Policy letter in Appendix E with current CNO signature. (S2018-10-25-01)

TABLE OF CONTENTS

SECTION	TITLE	PAGE
1.0	**DEFINITIONS**	**7**
2.0	**ACRONYMS**	**18**
3.0	**REFERENCES**	**20**
4.0	**SCOPE AND CONTENTS**	**22**
5.0	**EMERGENCY CONDITIONS**	**26**
5.1	CLASSIFICATION SYSTEM	26
5.2	SPECTRUM OF POSTULATED ACCIDENTS	28
6.0	**ORGANIZATIONAL CONTROL OF EMERGENCIES**	**48**
6.1	NORMAL OPERATING ORGANIZATION	50
6.2	ON-SITE EMERGENCY ORGANIZATION - (PHASE II)	51
6.3	OFF-SITE RESOURCES AND ACTIVITIES - (PHASE III)	57
6.4	COORDINATION WITH PARTICIPATING GOVERNMENT AGENCIES	62
6.5	RESTORATION	65
7.0	**EMERGENCY MEASURES**	**76**
7.1	ASSESSMENT ACTIONS FOR ALL EMERGENCY CLASSIFICATIONS	76
7.2	CORRECTIVE ACTIONS	80
7.3	PROTECTIVE ACTIONS	80
7.4	AID TO AFFECTED PERSONNEL	84
8.0	**EMERGENCY FACILITIES AND EQUIPMENT**	**93**
8.1	ON-SITE EMERGENCY CENTERS	93
8.2	SUSQUEHANNA OFF-SITE EMERGENCY CENTERS	101
8.3	COUNTY AND STATE EMERGENCY CENTERS	104
8.4	ASSESSMENT CAPABILITIES	104
8.5	PROTECTIVE FACILITIES	105
8.6	ADDITIONAL COMMUNICATIONS SYSTEMS	106
8.7	ON-SITE FIRST AID AND MEDICAL FACILITIES	106
8.8	DAMAGE CONTROL EQUIPMENT	107
8.9	INFORMATION SYSTEMS	107
9.0	**MAINTAINING EMERGENCY PREPAREDNESS**	**114**
9.1	ORGANIZATIONAL PREPAREDNESS	114
9.2	REVIEW AND UPDATING	119
9.3	MAINTENANCE AND INVENTORY OF EMERGENCY EQUIPMENT/ SUPPLIES	120
9.4	PUBLIC EDUCATION AND INFORMATION	120
10.0	**APPENDICES**	
A	LETTERS OF AGREEMENT	124
B	WIND ROSES, DOSE/DISTANCE PLOTS AND JOINT FREQUENCY DISTRIBUTION	126
C	SSES EMERGENCY PLAN POSITION SPECIFIC PROCEDURES (TYPICAL)	143
D	EQUIPMENT INFORMATION LISTINGS	145
E	SUSQUEHANNA NUCLEAR, LLC POLICY STATEMENT	161
F	DEVIATIONS to NEI 99-01, Rev 6	163
G	SSES EVACUATION TIME ESTIMATES	165
H	DOWNSTREAM SUSQUEHANNA RIVER WATER USAGE	188
I	POPULATION UPDATE FOR SSES EMERGENCY PLANNING ZONE	191
J	NUREG-0654 PLANNING STANDARDS AND EVALUATION CRITERIA CROSS REFERENCE TO SSES EMERGENCY PLAN	193
K	ON-SHIFT STAFFING ANALYSIS	203

LISTING OF TABLES

TABLE	TITLE	PAGE
Section 5-Table R	ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT	35
Section 5-Table F	FISSION PRODUCT BARRIER DEGRADATION	36
Section 5-Table S	SYSTEM MALFUNCTIONS	37
Section 5-Table H	HAZARDS	38
Section 5-Table E	ISFSI	39
Section 5-Table C	COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTIONS	40
5.1	TABLE DELETED	N/A
5.2	EMERGENCY ACTIONS BASED ON CLASSIFICATION	41
6.1	STATION EMERGENCY PLAN MINIMUM STAFFING REQUIREMENTS	67
6.2	ADDITIONAL ASSISTANCE FROM OUTSIDE SUSQUEHANNA NUCLEAR, LLC	70
7.1	SUMMARY OF IMMEDIATE NOTIFICATION AND RESPONSE FOR ALL CLASSIFICATIONS	85
7.2	EMERGENCY EXPOSURE CRITERIA	87
7.3	PROTECTIVE ACTION RECOMMENDATIONS	90
8.1	RELATIONSHIP OF THE PRIMARY PARAMETER, SECONDARY DISPLAY, AND ALGORITHMS ON SPDS	109
9.1	TRAINING OF SUSQUEHANNA SES EMERGENCY RESPONSE PERSONNEL	121

LISTING OF FIGURES

FIGURE	TITLE	PAGE
4.1	MAP OF SSES VICINITY	24
4.2	MAP OF SSES 50 MILE INGESTION EXPOSURE ZONE	25
6.1	DELETED (NUCLEAR DEPARTMENT ORGANIZATION - FSAR) FIGURE 13.1-3	N/A
6.2	TSC ORGANIZATION	71
6.3	OSC ORGANIZATION	72
6.4	EOF ORGANIZATION	73
6.6	LONG TERM RESTORATION ORGANIZATION	74
6.7	COMMUNICATION INTERFACES WITH OFFSITE AGENCIES	75
8.1	MAP OF THE SUSQUEHANNA SES EMERGENCY FACILITIES	110
8.2	TECHNICAL SUPPORT CENTER FLOOR PLAN	111
8.3	EMERGENCY OPERATIONS FACILITY/JOINT INFORMATION CENTER FLOOR PLAN	112
8.4	SIREN LOCATION	113

1.0 DEFINITIONS

1. ACCIDENT - an unforeseen and unintentional event which may result in an emergency.

2. ACTIVATE – an emergency response facility has sufficient staffing to perform required functions and the facility has taken over command and control of the emergency. The positions required to activate the TSC, OSC and EOF are specified with an * in Figures 6.2, 6.3 and 6.4. The terms "activated", "activation" "activation time" and "take over management of the emergency" have the same definition.

3. AFFECTING SAFE SHUTDOWN - Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

   Example 1: Event causes damage that result in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event **is not** "AFFECTING SAFE SHUTDOWN."

   Example 2: Event causes damage that result in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event **is** "AFFECTING SAFE SHUTDOWN."

4. ALERT – Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

5. ANNUAL – occurring within calendar year starting January 1 and ending December 31.

6. ALERT NOTIFICATION SYSTEM – sirens with ratings of 121 dB at 100' within the ten-mile EPZ around the Susquehanna Steam Electric Station. Siren location was determined by a detailed study including field surveys, actual determination of average background noise level, and consideration of population distribution within the 10-mile EPZ.

7. ASSESSMENT ACTIONS - those actions taken during or after an incident to obtain and process information that is necessary to make decisions to implement specific emergency measures.

8. BIENNIAL EXERCISE – NRC/DHS-FEMA exercise performed on alternate years, to be completed within the calendar year scheduled.

9. BIWEEKLY – occurring on alternate weeks, within the 7-day week.

10. BOMB - refers to an explosive device suspected of having sufficient force to damage plant systems or structures.

11. CAN/CANNOT BE MAINTAINED ABOVE/BELOW - The value of an identified parameter is/is not able to be held within the specified limit. The determination requires an evaluation of system performance and availability in relation to parameter values and trends. An instruction prescribing action when a parameter cannot be maintained above or below a specified limit neither requires nor prohibits anticipatory action-depending upon plant conditions, the action may be taken as soon as it is determined that the limit will ultimately be exceeded, or delayed until the limit is actually reached. Once the parameter does exceed the limit, however, the action must be performed; it may not be delayed while attempts are made to restore the parameter to within the desired control band.

12. CAN/CANNOT BE RESTORED ABOVE/BELOW - The value of an identified parameter is/is not able to be brought within the specified limit. The determination requires an evaluation of system performance and availability in relation to parameter values and trends. An instruction prescribing action when a value CANNOT BE RESTORED AND MAINTAINED above or below a specified limit does not require immediate action simply because the current values is outside the range, but does not permit extended operation beyond the limit; the action must be taken as soon as it is apparent that the specified range cannot be attained.

13. CDE - the Committed Dose Equivalent; dose to an organ due to an intake of radioactive material during the 50 year period following the intake.

14. COLUMBIA COUNTY EMERGENCY MANAGEMENT AGENCY (CCEMA) - emergency response coordinating agency for Columbia County, responsible for implementing off-site action upon direct notification from Susquehanna SES or PEMA.

15. CONFINEMENT BOUNDARY - the barrier(s) between spent fuel and the environment once the spent fuel is processed for dry storage. As related to the Susquehanna ISFSI, Confinement Boundary is defined as the Dry Shielded Canister (DSC).

16. CONTAINMENT CLOSURE - the procedurally defined conditions or actions taken to secure Primary or Secondary Containment and its associated structures, systems, and components as a functional barrier to fission product release under shutdown conditions.

17. CONTROL ROOM - the location of the Control Panels from which the reactor and its auxiliary systems are controlled.

18. CORPORATE LEADERSHIP COUNCIL (CLC) - the Talen Management group which determines major policy commitments for the company. The CLC membership includes the President of the company and other senior executives.

19. CORRECTIVE ACTIONS - those emergency measures taken to ameliorate or terminate an emergency situation.

20. DEPARTMENT OF ENVIRONMENTAL PROTECTION/BUREAU OF RADIATION PROTECTION (DEP/BRP) - the State agency responsible to provide guidance and recommendations for specific off-site protective measures.

21. DEPARTMENT OF HOMELAND SECURITY – Federal Emergency Management Agency (DHS-FEMA) - within the context of this plan, serves as the primary contact for requests for Federal assistance; lead coordinator all non-technical federal response.

22. DOSE PROJECTION - a calculated estimate of the potential radiation dose to individuals at a given location, normally off-site, (determined from the quantity of radioactive material released and the appropriate meteorological transport and dispersion parameters).

23. DOSE RATE - the amount of radiation an individual can potentially receive per unit of time.

24. EFFECTIVE DOSE EQUIVALENT (EDE) - the sum of the products of the dose equivalent to the organ or tissue and the weighting factors applicable to each of the body organs or tissues that are irradiated.

25. EMERGENCY ACTION LEVELS (EAL) - A predetermined, site-specific, observable threshold for an Initiating Condition that, when met or exceeded, places the plant in a given emergency classification level.

26. EMERGENCY ACTIONS - those steps taken, as a result of exceeding an Emergency Action Level in the Emergency Plan, to ensure that the situation is assessed and that the proper corrective and/or protective actions are taken.

27. EMERGENCY ALERT SYSTEM (EAS) – radio and television broadcast system used by public emergency management officials to notify the public concerning protective actions to be taken in the event of natural disasters, radiological protective actions, and other information of immediate impact to the public. Formerly referred to as the Civil Defense Emergency Broadcast System.

28. EMERGENCY CLASSIFICATION LEVEL (ECL) - One of a set of names or titles established by the US Nuclear Regulatory Commission (NRC) for grouping off-normal events or conditions according to (1) potential or actual effects or consequences, and (2) resulting onsite and offsite response actions. The emergency classification levels, in ascending order of severity, are:

    - Notification of Unusual Event (NOUE) - synonymous with Unusual Event (UE)
    - Alert
    - Site Area Emergency (SAE)
    - General Emergency (GE)

29. EMERGENCY CONDITION - the characterization of several classes of emergency situations consisting of exclusive groupings including the entire spectrum of possible radiological emergency situations. The four classes of emergencies, listed in increasing severity, which Susquehanna has incorporated into this Emergency Plan, are outlined in Section 5.0 of this plan.

30. EMERGENCY COORDINATORS - designated Susquehanna SES staff members responsible for coordinating specific emergency organization functions.

31. EMERGENCY DIRECTOR (ED) - the Susquehanna individual responsible for direction of on-site activities during an emergency at the Susquehanna SES.

32. EMERGENCY OPERATIONS CENTERS - designated state and county emergency management agency headquarters facilities designed and equipped for the purpose of exercising effective coordination and control over disaster operations carried out within their jurisdiction.

33. EMERGENCY OPERATIONS FACILITY - Emergency Response Facility co-located with the Joint Information Center in Plains Township, Pennsylvania, to provide continuous coordination and evaluation of Susquehanna activities during an emergency having or potentially having environmental consequences (Reference REFERENCES, Section 3.19).

34. EMERGENCY PLAN BOUNDARY - same as the EXCLUSION AREA, i.e., that area around Susquehanna SES within a radius of 1800 feet determined in accordance with 10 CFR 100.11. The dose criterion of 10 CFR 50.67 applies at the EXCLUSION AREA boundary.

35. EMERGENCY PLAN IMPLEMENTING PROCEDURES - specific procedures defining in detail the action to be taken in the event of an emergency condition. The Emergency Plan Implementing Procedures will be separate from, but may incorporate and refer to, normal plant operating procedures and instructions, Emergency Plan Position Specific Procedures and Emergency Plan Technical Procedures.

36. EMERGENCY PLAN TECHNICAL PROCEDURES – procedures describing how to perform processes associated with the Emergency Plan. These procedures may include processes such as Emergency Classification or Protective Action. Used together with Emergency Plan Position Specific Procedures, these procedures are designed to implement the Emergency Plan during a declared emergency.

37. EMERGENCY PLANNING ZONE - there are two Emergency Planning Zones. The first is an area, approximately 10 miles in radius around the Susquehanna SES, for which emergency planning consideration of the plume exposure pathway has been given in order to ensure that prompt and effective actions can be taken to protect the public in the event of an accident. The second is an area approximately 50 miles in radius around the Susquehanna SES, for which emergency planning consideration of the ingestion exposure pathway has been given.

38. EMERGENCY PLAN POSITION SPECIFIC PROCEDURES - procedures describing how to perform tasks assigned to emergency positions. Each procedure includes an overview of the position's tasks, detailed instructions, and relevant material. Used together, these procedures are designed to implement the Emergency Plan during a declared emergency.

39. EMERGENCY PROTECTION AGENCY PROTECTIVE ACTION GUIDELINES - Environmental Protection Agency Protective Action Guidelines. The EPA PAGs are expressed in terms of dose commitment: 1 Rem TEDE or 5 Rem CDE Thyroid. Actual or projected offsite exposures in excess of the EPA PAGs require Susquehanna to recommend protective actions for the general public to offsite planning agencies.

40. EMERGENCY RESPONSE ORGANIZATION (ERO) – The SSES organization that is activated when an emergency classification has been declared that meets one of the four emergency classifications.

41. EXCLUSION AREA – is a circle of radius 1800 feet with the center at the common release point on the Unit 1 and Unit 2 Reactor Buildings as determined in accordance with 10 CFR100.11. The dose criterion of 10 CFR 50.67 applies at the EXCLUSION AREA boundary.

42. EXPLOSION - A rapid, violent and catastrophic failure of a piece of equipment due to combustion, chemical reaction or overpressurization. A release of steam (from high energy lines or components) or an electrical component failure (caused by short circuits, grounding, arcing, etc.) should not automatically be considered an explosion. Such events require a post-event inspection to determine if the attributes of an explosion are present.

43. FIRE - is combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute FIRES. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

44. FISSION PRODUCT BARRIER THRESHOLD - A pre-determined, site-specific, observable threshold indicating the loss or potential loss of a fission product barrier.

45. FLOODING - A condition where water is entering a room or area faster than installed equipment is capable of removal, resulting in a rise of water level within the room or area.

46. FULLY FUNCTIONAL- all minimum required staff as defined in Table 6.1 and the positions designated by dashed lines in Figures 6.2, 6.3 and 6.4 are present.

47. GENERAL EMERGENCY - Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

48. HOSTAGE - is a person(s) held as leverage against the station to ensure that demands will be met by the station.

49. HOSTILE FORCE - one or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

50. HOSTILE ACTION- An act toward Susquehanna or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Susquehanna. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the OWNER CONTROLLED AREA).

51. IMMINENT - The trajectory of events or conditions is such that an EAL will be met within a relatively short period of time regardless of mitigation or corrective actions.

52. IMPEDE(D) - Personnel access to a room or area is hindered to an extent that extraordinary measures are necessary to facilitate entry of personnel into the affected room/area (e.g., requiring use of protective measures such as temporary shielding, SCBAs or dose extensions beyond Emergency Plan RWP that are not routinely employed to access the room/area).

53. INITIATING CONDITION (IC) - An event or condition that aligns with the definition of one of the four emergency classification levels by virtue of the potential or actual effects or consequences.

54. ISFSI - Independent Spent Fuel Storage Facility – A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

55. JOINT INFORMATION CENTER - the designated location from which news releases, press conferences and other media interfacing can be provided.

56. LDE - Lens Dose Equivalent; the external exposure to the lens of the eye.

57. LOWER FLAMMABILITY LIMIT (LFL) – The minimum concentration of a combustible substance that is capable of propagating a flame through a homogenous mixture of the combustible and a gaseous oxidizer.

58. LUZERNE COUNTY EMERGENCY MANAGEMENT AGENCY (LCEMA) - the host county emergency response coordinating agency, responsible for implementing off-site action upon either direct notification from the Susquehanna SES or from PEMA.

59. MAINTAIN - Take appropriate action to hold the value of an identified parameter within specified limits.

60. MONTHLY – occurring within the calendar month.

61. NORMAL LEVELS - As applied to radiological IC/EALs, the highest reading in the past twenty-four hours excluding the current peak value.

62. NORMAL PLANT OPERATIONS - activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

63. NOTIFICATION OF UNUSUAL EVENT – Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

64. NUCLEAR REGULATORY COMMISSION (NRC) - within the context of this plan, the Federal agency responsible for verifying that appropriate emergency plans have been implemented and for conducting investigative activities associated with a radiological emergency.

65. OPERATING BASIS EARTHQUAKE (OBE) - An earthquake which, considering the regional and local geology, and seismology and specific characteristics of local subsurface material, could reasonably be expected to affect the plant site during the operating life of the plant. It is that earthquake which produces the vibratory ground motion for which these features of the nuclear power plant necessary for continued operation without undue risk to the health and safety of the public are designed to remain functional.

66. OFF-SITE - any area outside the Emergency Plan Boundary surrounding the Susquehanna SES.

67. OFF-SITE RADIOLOGICAL INCIDENT - any radiation incident affecting areas beyond the Emergency Plan boundary and posing a significant threat to public health and safety.

68. ON-SITE – the area within the PROTECTED AREA.

69. OPERATIONAL SUPPORT CENTER (OSC) - the primary on-site assembly area for operations support team personnel during the initial phase of an emergency. The primary OSC is not in the control structure but is located in an administrative building. In the event of a large radioactive release, the OSC may be relocated to the back-up OSC that is located in the control structure.

70. OWNER CONTROLLED AREA - includes the area within the expanded security perimeter, i.e. the areas that are bordered by the Vehicle Barrier System. The OWNER CONTROLLED AREA encompasses the Monitored OWNER CONTROLLED AREA (MOCA) as defined in Security Procedures.

71. PENNSYLVANIA EMERGENCY MANAGEMENT AGENCY (PEMA) - within the context of this plan, the lead state-agency for radiological emergency planning, response and recovery and for providing guidance to local government for development of radiological emergency plans and programs.

72. PLANT PROCEDURES - those procedures utilized by the plant operations staff to control and manipulate the plant under both normal and abnormal circumstances.

73. PROTECTED AREA - An area encompassed by Physical Barriers and to which access is controlled.

74. PROJECTILE – A means of a fired, self-propelled object directed toward a Nuclear Power Plant that could cause concern for its continued operability, reliability, or personnel safety.

75. PROTECTIVE ACTION GUIDES (PAG) - the projected dose to reference personnel, or other defined individual, from an unplanned release of radioactive material at which a specific protective action to reduce or avoid that dose is recommended.

76. PROTECTIVE ACTIONS - those emergency measures taken for the purpose of preventing or minimizing radiological exposures.

77. QUARTERLY – occurring during the calendar quarter.

78. RADIATION DOSE - the quantity of radiation absorbed by the body or any portion of the body.

79. RADIATION MONITORING SYSTEM – an in-plant system consisting of ARMs, CAMs, and process monitors that contributes to personal protection, equipment monitoring, and accident assessment by measuring and recording radiation levels and concentrations at selected locations throughout the station. Reference Appendix D.

80. RADIOACTIVE MATERIAL - any solid, liquid, or gas which emits radiation spontaneously.

81. RADIOLOGICAL EMERGENCY RESPONSE TEAM - the response team from the Department of Environmental Protection/Bureau of Radiation Protection, Department of Health, Pennsylvania Emergency Management Agency, and other State agencies, which will be dispatched to the scene of radiological emergencies. The team provides technical guidance and other services to local governments or an affected nuclear facility.

82. RADIOLOGICALLY CONTROLLED AREA (RCA) - any temporary or permanent area established by Radiation Protection, which is controlled for purposes of protection from exposure to radiation or radioactive materials. Typically, the Radiologically Controlled Area is defined by the outer perimeters of the Turbine, Reactor, and Radwaste Buildings, portions of the Control Structure, and portions of LLRWHF.

83. RCS INTACT – The RCS should be considered intact when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals).

84. RADIOLOGICALLY CONTROLLED AREA EVACUATION – evacuation of nonessential individuals from some or all of the Radiologically Controlled Area.

85. RECOVERY ACTIONS – those actions taken after the emergency to restore the plant as nearly as possible to its pre-emergency condition.

86. RECOVERY MANAGER – the individual responsible for the management of emergency response activities in the EOF during an emergency at the Susquehanna Steam Electric Station.

87. REFUELING PATHWAY – The reactor refueling cavity, spent fuel pool and fuel transfer canal comprise the refueling pathway.

88. REM (Acronym for roentgen equivalent man) – a unit of measure of radiation dose in biological tissue.

89. REMOTE ASSEMBLY AREA – a designated area, outside the exclusion area, for the assembly of evacuated plant personnel, if necessary, during a Site Evacuation. The Primary Remote Assembly Area is the Susquehanna Energy Information Center. The alternate assembly area is the West Building.

90. RESTORE – Take the appropriate action required to return the value of an identified parameter to the applicable limits.

91. ROUTE ALERTING TEAMS – a back-up to the siren system that is implemented, as necessary, in the event of siren failure or to alert persons or areas that may not be within the sound of the sirens. Route alerting is a municipal responsibility and is accomplished by municipal route alert teams traveling in vehicles along preplanned routes delivering the following message: "There is an emergency at the Susquehanna Steam Electric Station; please tune to your Emergency Alert Station."

92. SDE – Shallow Dose Equivalent; external exposure of the skin or extremity which is measured at 0.007 cm in tissue.

93. SABOTAGE – is deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may NOT meet the definition of SABOTAGE until this determination is made by security supervision.

94. SAFE SHUTDOWN EARTHQUAKE (SSE) – An earthquake which is based upon an evaluation of the maximum earthquake potential considering the regional and local geology, and seismology and specific characteristics of local subsurface material. It is that earthquake which produces the maximum vibratory ground motion for which Seismic Category I systems and components are designed to remain functional.

95. SAFETY SYSTEM – A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related (as defined in 10CFR50.2):

Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

(1) The integrity of the reactor coolant pressure boundary;

(2) The capability to shut down the reactor and maintain it in a safe shutdown condition;

(3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

96. SAFE SHUTDOWN SYSTEMS/EQUIPMENT – consists of the following: Diesel Generators, HPCI, Core Spray, Standby Gas Treatment System, RCIC, 4kV Safeguard Buses, ESW, ADS, RHR, RHRSW, Remote Shutdown Panels and DC Vital Buses.

97. SECURITY CONDITION – Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

98. SHIFT MANAGER – the individual who acts in the capacity of Susquehanna Steam Electric Station emergency manager immediately upon concurrence of an emergency as described in the SSES Emergency Plan. The designation Shift Manager is synonymous with the designation Shift Supervisor and may be used interchangeably in the emergency plan. Both terms designate the same individual.

99. SIGNIFICANT TRANSIENT – is an UNPLANNED event involving one or more of the following: (1) Reactor Re-circulation System runback involving a power reduction of over 25% thermal reactor power, (2) Reactor Recirc Pump Trip while >25% Reactor Power, (3) Reactor Scram, (4) ECCS Injection, or (5) thermal power oscillations >10%.

100. SITE AREA EMERGENCY – Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels that exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY.

101. SITE BOUNDARY – that line, beyond which the land is not owned, leased or otherwise controlled by the licensee. (Susquehanna drawing C243786, Sh 1, "Site Facilities and Boundary Map.")

102. SITE EVACUATION – evacuation of all non-essential personnel from the Exclusion Area.

103. STATE – the Commonwealth of Pennsylvania.

104. STATION ACCOUNTABILITY AREAS – areas designated for the gathering of individuals for the purpose of personnel accountability. Typically these are large areas with installed card readers to facilitate electronic accounting for personnel. Specific locations are defined in station procedures.

105. SUSQUEHANNA NUCLEAR, LLC – subsidiary company of Talen Energy Corporation that owns and operates Susquehanna Steam Electric Station. The Emergency Plan will refer to this company as Susquehanna.

106. TECHNICAL SUPPORT CENTER – a designated on-site location where the conditions during and after an accident can be analyzed to provide technical and radiological assessments of the accident to the Emergency Director. In the event of certain hazards preventing site access or certain security related events, personnel who normally report to the Technical Support Center may report to the Emergency Operations Facility where arrangements will be made to accommodate TSC-specific functions not assumed by the EOF. The alternate TSC will be activated as soon as possible to support the site; however, it is recognized that the activation time for the alternate TSC may exceed 60 minutes.*

107. TEDE – Total Effective Dose Equivalent; integrated doses consisting of the sum of external doses from plume shine, 50 year committed effective dose equivalent from inhalation (CEDE), and 4 day ground shine doses.

108. THYROID DOSE – radiation exposure to the thyroid resulting from an intake of radioactive materials.

109. TRANSMISSION POWER DISPATCHER – individual manning the transmission and distribution system for PPL Corporation.

110. UNISOLABLE – An open or breached system line that cannot be isolated, remotely or locally.

- The term UNISOLABLE also includes any decision by plant staff or procedure direction to not isolate a primary system.
- Normal leakage past a closed isolation valve is not considered UNISOLABLE leakage

111. UNPLANNED – A parameter change or an event that is not: 1) the result of an intended evolution, or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

* Letter dated February 25, 2002 from Samuel J. Collins, Director, Office of Nuclear Reactor Regulations, to Robert G. Byram, Senior Vice President and Chief Nuclear Officer. Subject: Issuance of Order for Interim Safeguards and Security Compensatory Measures for – Susquehanna Steam Electric Station, Units 1 & 2.

112. VALID – an indication, report, or condition is considered to be VALID when it is verified by (1) an instrument channel check, or (2) indications on related redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

113. VISIBLE DAMAGE – Damage to a component or structure that is readily observable without measurements, testing, or analysis. The visual impact of the damage is sufficient to cause concern regarding the operability or reliability of the affected component or structure.

114. VITAL AREAS – is any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation. Plant VITAL AREAS include the following: SCC, Control Structure, Diesel Generator Buildings, ESSW Pump House, Spray Pond and Reactor Buildings.

115. WHOLE BODY EXPOSURE – direct radiation exposure to the body from external sources.

2.0 ACRONYMS

2.1	ANS -	Alert Notification System
2.2	ARI -	Alternate Rod Insertion
2.3	ARM -	Area Radiation Monitors
2.4	CAM -	Continuous Air Monitors
2.5	CAS -	Central Alarm Station
2.6	CCEMA -	Columbia County Emergency Management Agency
2.7	CEDE -	Committed Effective Dose Equivalent
2.8	CR -	Control Room
2.9	CREOASS -	Control Room Emergency Outside Air Supply System
2.10	CSAR	Certified Safety Analysis Report
2.11	CTN -	Centrex Telephone Network
2.12	DAC -	Derived Air Concentration
2.13	DCS -	Document Control Services
2.14	DEP/BRP -	Department of Environmental Protection/Bureau of Radiological Protection
2.15	DHS – FEMA	Department of Homeland Security – Federal Emergency Management Agency
2.16	DOE -	U.S. Department of Energy
2.17	EAL -	Emergency Action Levels
2.18	EAS -	Emergency Alert System
2.19	ECCS -	Emergency Core Cooling Systems
2.20	ED -	Emergency Director at Susquehanna SES
2.21	EDE -	Effective Dose Equivalent
2.22	EMA -	Emergency Management Agency
2.23	EMC -	Emergency Management Coordinator (Municipality)
2.24	EOC -	Emergency Operations Center
2.25	EOF -	Emergency Operations Facility
2.26	EP -	Emergency Preparedness
2.27	EPA -	Environmental Protection Agency
2.28	EP-PS -	Emergency Plan Position Specific Procedures
2.29	EPZ -	Emergency Planning Zone
2.30	ERDS -	Emergency Response Data System
2.31	ERF -	Emergency Response Facility
2.32	ERO	Emergency Response Organization for SSES
2.33	ETN -	Electronic Tandem Network
2.34	FPC -	Fuel Pool Cooling
2.35	FRC -	Federal Response Coordinator
2.36	FRERP -	Federal Radiological Emergency Response Plan
2.37	FRMAC -	Federal Radiological Monitoring and Assessment Center
2.38	FSAR -	Susquehanna SES Final Safety Analysis Report, Units 1 and 2
2.39	FTS -	Federal Telecommunications System
2.40	HHS -	Health and Human Services
2.41	HPCI -	High Pressure Coolant Injection System
2.42	JIC -	Joint Information Center
2.43	LCEMA -	Luzerne County Emergency Management Agency
2.44	LCO -	Limiting Condition for Operation
2.45	LER -	License Event Report

2.46	LLRWHF -	Low Level Radwaste Holding Facility
2.47	LOCA -	Loss of Coolant Accident
2.48	MOCA -	Monitored Owner Controlled Area
2.49	MIDAS -	Meteorological Information and Dose Assessment System
2.50	MSIV -	Main Steam Isolation Valve
2.51	MSL -	Main Steam Line
2.52	NEP -	Nuclear Emergency Planning
2.53	NRC -	Nuclear Regulatory Commission
2.54	NRP -	National Response Plan
2.55	NSRB	Nuclear Safety Review Board
2.56	NSSS -	Nuclear Steam Supply System
2.57	ODCM -	Offsite Dose Calculation Manual
2.58	ORO	Offsite Response Organization
2.59	OSC -	Operations Support Center
2.60	PAGS -	Protective Action Guides from EPA
2.61	PASS -	Post Accident Sampling System
2.62	PEMA -	Pennsylvania Emergency Management Agency
2.63	PICSY -	Plant Integrated Computer System, synonymous with Plant Process Computer (PPC) or R*TIME
2.64	PORC -	Plant Operations Review Committee
2.65	PPL -	PPL Corporation
2.66	PSP -	Pennsylvania State Police
2.67	RCA -	Radiologically Controlled Area
2.68	RCIC -	Reactor Core Isolation Cooling
2.69	RDAS -	Remote Data Analysis System
2.70	RHR -	Residual Heat Removal
2.71	RPS -	Reactor Protection System
2.72	RX -	Reactor
2.73	SAS -	Secondary Alarm Station
2.74	SDE -	Shallow Dose Equivalent
2.75	SDS -	Satellite Display System
2.76	SEIC -	Susquehanna Energy Information Center
2.77	SGTS -	Standby Gas Treatment System
2.78	SLC -	Standby Liquid Control
2.79	SOCA -	Security Owner Controlled Area
2.80	SPDS -	Safety Parameter Display System
2.81	SSE -	Safe Shutdown Earthquake
2.82	SSES	Susquehanna Steam Electric Station
2.83	Susquehanna	Susquehanna Nuclear, LLC (subsidiary company of Talen Energy Corporation)
2.84	TEDE -	Total Effective Dose Equivalent
2.85	TR -	Temperature Recorder
2.86	TSC -	Technical Support Center
2.87	UMC -	Unit Monitoring Console (PCS)
2.88	UPS -	Uninterruptible Power Supply
2.89	USDA -	United States Department of Agriculture
2.90	VERMS	Vent Effluent Radiation Monitoring System

3.0 REFERENCES

3.1 Columbia County Radiological Emergency Response Plan to Nuclear Power Plant Incidents.

3.2 DEP/BRP Emergency Plan - Bureau of Radiation Protection "Plan for Nuclear Power Generating Station Incidents".

3.3 NRC Generic Letter 91-14, "Emergency Telecommunications".

3.4 Luzerne County Radiological Emergency Response Plan to Nuclear Power Plant Incidents.

3.5 NUREG 0654/FEMA-REP-1 - Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness In Support of Nuclear Power Plants.

3.6 NUREG 0696 - Final Report - Functional Criteria for Emergency Response Facilities.

3.7 NUREG 0737 - Clarification of TMI Action Plan Requirements.

3.8 NUREG 1392 - Emergency Response Data System Implementation.

3.9 PEMA Emergency Plan - Annex E to Commonwealth of Pennsylvania "Disaster Operations Plan", Nuclear Incidents (Fixed Facility).

3.10 Susquehanna SES Emergency Plan Position Specific Procedures.

3.11 Susquehanna SES Letters of Agreement with off-site emergency organizations (Appendix A).

3.12 Susquehanna Nuclear, LLC Security Plan.

3.13 Susquehanna SES Plant Procedures.

3.14 10CFR Part 50 - Domestic Licensing of Production and Utilization Facilities.

3.15 Design of the Siren Alerting System for the Susquehanna Steam Electric Station: Final Report.

3.16 SSES Preparedness, Prevention and Contingency Plan.

3.17 EPA 400-R-91-001 - Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.

3.18 NEI 99-01 Revision 6, “Development of Emergency Action Levels for Non-Passive Reactors”.

3.19 NRC Letter dated April 17, 1996, MOVING THE EOF TO THE NORTHEAST DIVISION HEADQUARTERS (TAC NOS. M91377 AND M91378), Docket Nos. 50-387/50-412.

3.20 Letter dated February 25, 2002 from Samuel J. Collins, Director, Office of Nuclear Reactor Regulations, to Robert G. Byram, Senior Vice President and Chief Nuclear Officer. Subject: Issuance of Order for Interim Safeguards and Security Compensatory Measures for – Susquehanna Steam Electric Station, Units 1 & 2.

3.21 Susquehanna Nuclear, LLC Training and Qualification Plan.

3.22 Regulatory Guide 1.101 Emergency Planning and Preparedness for Nuclear Power Reactors (Revision 3, August 1992).

3.23 NRC Bulletin 2005-02 Emergency Preparedness and Response Actions for Security Based Events July 18, 2005.

3.24 Regulatory Issue Summary 2004-15, Supplement 1, Emergency Preparedness Issues: Post-9/11.

3.25 EC 690275/AR 850156, Extended Power Uprate (EPU) Impact Evaluation.

3.26 NEI 03-12, Template for Security Plan and Training and Qualification Plan, June 2004.

4.0 SCOPE AND CONTENTS

SSES includes two boiling water reactor electrical generating units. The station is located in Salem Township, Luzerne County, in east central Pennsylvania; about five miles northeast of Berwick, Pennsylvania (see Figure 4.1). This Emergency Plan applies to the operation of Unit 1 and Unit 2.

4.1 SCOPE

This Plan provides guidance for both on-site and off-site emergency situations. It ranges in scope from relatively minor events and occurrences involving small releases of radioactive material, up to and including a major nuclear emergency having significant off-site radiological consequences. This Plan, together with the state, county, and municipal radiological emergency response plans, provides detailed guidance and direction for taking emergency measures by the ERO to ensure the health and safety of the public living within the 10-mile EPZ of SSES. Additional guidance is provided in state and county plans for ingestion pathway preventive measures out to 50 miles (see Figure 4.2).

Additional guidance on specific emergency actions for non-radiological releases of hazardous materials can be found in the SSES Preparedness, Prevention, and Contingency Plan.

4.2 CONTENTS

4.2.1 Classification

This Plan provides for a graded response for distinct classifications of emergency conditions, action within those classifications, and criteria for escalation to another classification. This classification system is also used by PEMA, DEP/BRP, LCEMA, and CCEMA. This system is covered in Section 5.0.

4.2.2 Organization Control

The Susquehanna organization for control of emergencies begins with the on-shift station personnel and contains provisions for augmentation and extension to include other station personnel, Talen corporate personnel, and outside emergency response organizations.

The total emergency program includes the support of state, federal and local emergency organizations. Detailed provisions are made for implementing protective measures against direct radiation exposure for the public within a radius of at least ten miles from the SSES. Additional preventive measures may be taken beyond that distance to preclude ingestion pathway exposures.

Specific agreements are also made with local off-site support organizations to provide firefighting, medical, law enforcement, and traffic control services.

State, County, and Federal agencies have lead responsibilities specifically related to this Plan.

Organizational control is covered in Section 6.0.

4.2.3 Emergency Measures

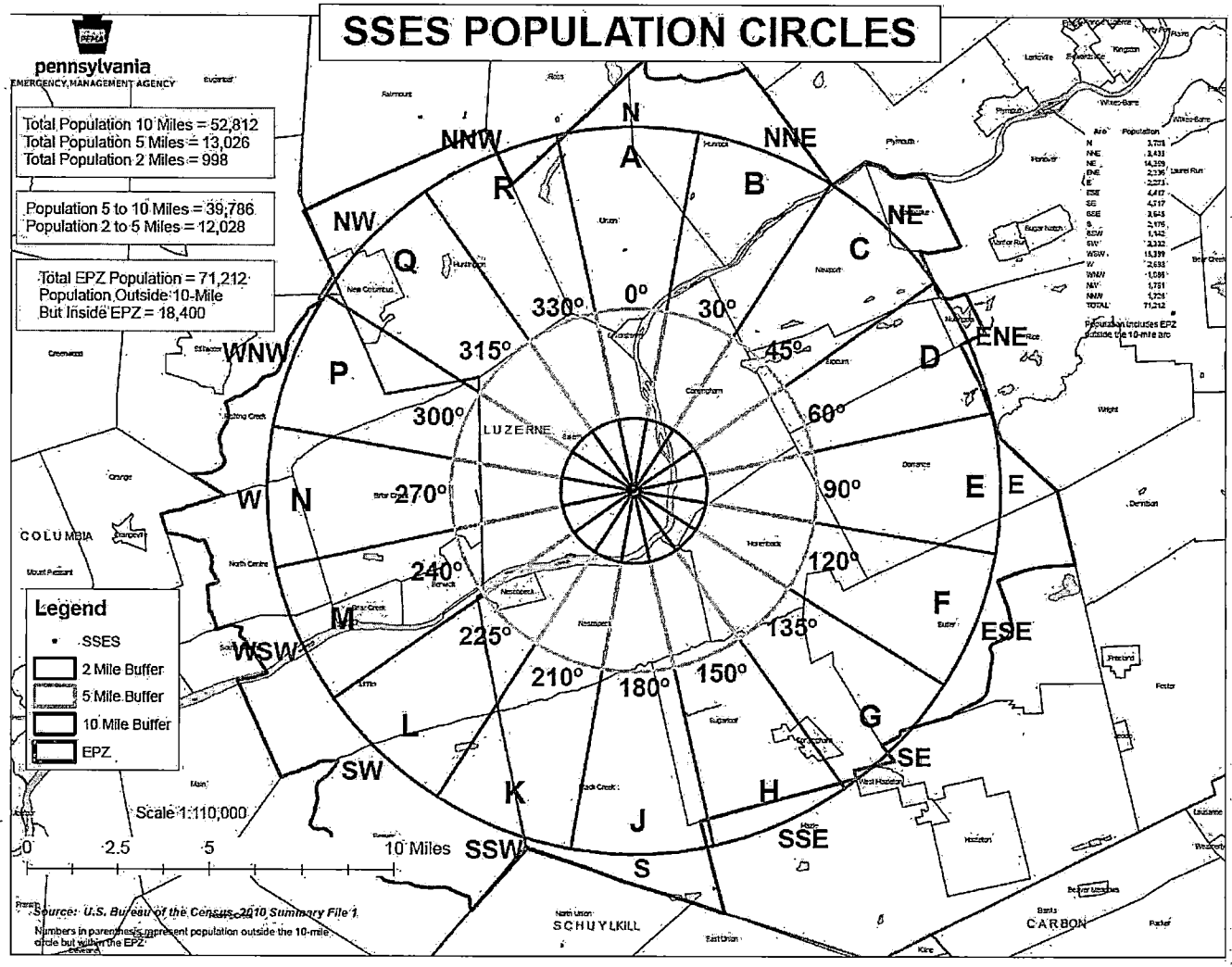
The mechanisms through which this Plan provides for the proper response to emergency conditions at SSES include identification of the event, initial and ongoing assessment, and initial and ongoing emergency actions. Emergency actions include classification of event, completion of notifications, activation of onsite and offsite ERO, requests for offsite assistance, implementing onsite protective actions, recommending offsite protective actions, and activation of the restoration organization. These mechanisms are discussed in Section 7.0.

4.2.4 Emergency Facilities

Emergency facilities and equipment are provided to ensure the capabilities for prompt, efficient assessment and control of situations over the entire spectrum of probable and postulated emergency conditions. The facilities and associated equipment and their emergency functions are described in Section 8.0.

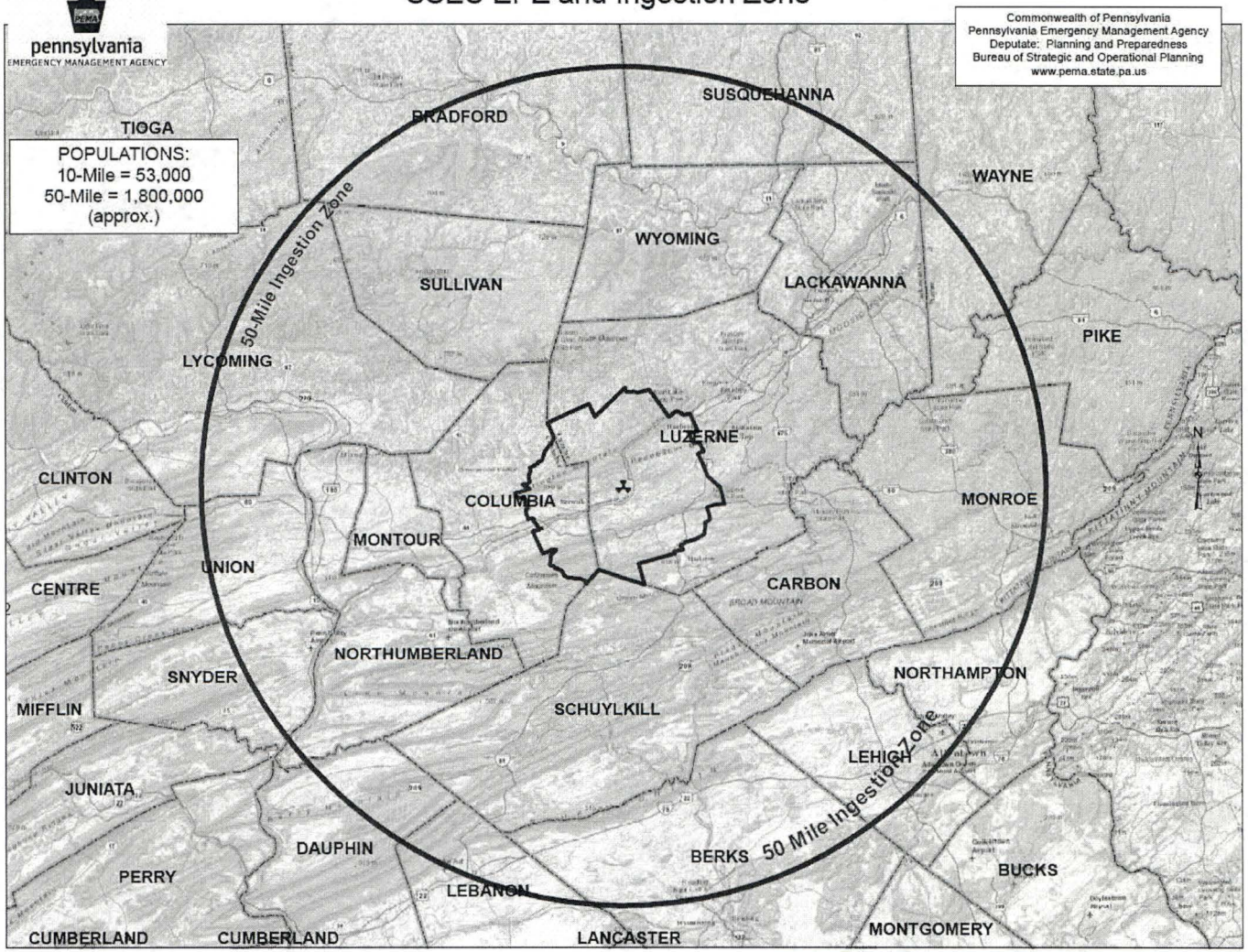
4.2.5 Emergency Training

A concept of in-depth preparedness is employed regarding the SSES emergency preparedness program. This concept is emphasized in the training program and in preparedness drills and exercises. Personnel are trained to provide an in-depth response capability for required actions in an emergency situation. Section 9.0 includes the means to achieve and maintain preparedness and to ensure maintenance of an effective emergency program.



SUSQUEHANNA STEAM ELECTRIC STATION
Units 1 and 2
EMERGENCY PLAN
MAP OF SSES VICINITY
Figure 4.1

SSES EPZ and Ingestion Zone



SUSQUEHANNA STEAM ELECTRIC STATION
Units 1 and 2
EMERGENCY PLAN
MAP OF SSES 50 MILE INGESTION
EXPOSURE ZONE
Figure 4.2

5.0 EMERGENCY CONDITIONS

5.1 CLASSIFICATION SYSTEM

Emergency conditions are grouped into four classifications that cover the entire spectrum of probable and postulated accidents. These classifications are Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency. Action level criteria are specified for determining and declaring each emergency classification. Planning is coordinated with State and county agencies to ensure that this classification system is compatible with the system used by those agencies. The system provides for notification of appropriate emergency response organizations and for implementation of actions immediately applicable to a specific condition. Provisions are included for upgrading the classification level and the corresponding response in the event of a change in the emergency condition.

Recognition and action level criteria are based on readily available information such as Control Room instrumentation. Immediate actions for response to conditions involving plant operating parameters, such as Technical Specification Limiting Conditions for Operation (LCOs), are detailed in the Plant Procedures.

The emergency classification system, initiating conditions, and EAL thresholds for each initiating condition are defined in Tables R, F, S, H, E and C. These tables demonstrates how an initiating condition leads directly to the appropriate emergency classification based on the magnitude of the event. In many cases, the proper classification is immediately apparent from in-plant instrumentation. In other cases, more extensive assessment is necessary to determine the applicable emergency classification. Continuing reassessment is required to ensure that the classification is consistent with the conditions. The emergency actions that will be taken for each of the four emergency classifications are shown in Table 5.2.

5.1.1 Notification of Unusual Event

Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Conditions that constitute a Notification of Unusual Event classification are outlined in Tables R, F, S, H, E and C.

The ED declares a Notification of Unusual Event within 15 minutes of having information necessary to make a declaration.

The emergency actions that will be taken by Susquehanna and offsite agencies for an unusual event are listed in Table 5.2. In general the table states that the plant emergency management personnel and offsite agencies will be notified by plant staff if a Notification of Unusual Event is declared. Plant staff will request assistance as necessary to disseminate information, make critical decisions and resolve the unusual event.

5.1.2 Alert

Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Conditions that constitute an Alert classification are outlined in Tables R, F, S, H and C.

The ED or Recovery Manager declares an Alert within 15 minutes of having information necessary to make a declaration.

The emergency actions that will be taken by Susquehanna and offsite agencies for an Alert are listed in Table 5.2. In general the actions will be similar to a Notification of Unusual Event but will also include the dispatch of monitoring teams if a radioactive release is involved.

5.1.3 Site Area Emergency

Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels that exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY.

Conditions that constitute a Site Area Emergency are outlined in Tables R, F, S, H and C.

The ED or Recovery Manager declares a Site Area Emergency within 15 minutes of having information necessary to make a declaration.

The emergency actions taken by Susquehanna and offsite agencies for a Site Area Emergency are listed in Table 5.2. In general, the actions will be similar to the actions taken for an Alert with increased emphasis on information dissemination, more senior technical and management staff in the emergency response facilities, and additional field radiological monitoring.

5.1.4 General Emergency

Events are in process or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Total activation of the onsite and offsite emergency organizations is required for such events. Actions involving offsite populations are probable. Conditions that constitute a General Emergency are outlined in Tables R, F, S, H and C.

The ED or Recovery Manager declares a General Emergency within 15 minutes of having information necessary to make a declaration.

The emergency actions taken by Susquehanna and offsite agencies for a General Emergency are listed in Table 5.2. In general the actions will be similar to the actions taken for a Site Area Emergency with additional resources dedicated to the health and safety of the general public. Additional actions include the initiation of predetermined protective actions for the public.

5.2 SPECTRUM OF POSTULATED ACCIDENTS

The classification and corresponding protective actions relative to significant emergency conditions are based primarily on the resultant or potential radiation doses. Methods are described in this Plan and in EP Procedures for measuring, projecting and evaluating those doses.

The discrete accidents addressed in this section are those which are defined in the SSES FSAR as "design basis accidents" resulting in off-site dose consequences and accidents involving the spent fuel storage facility (ISFSI). The following discussion of these postulated accidents and Tables R, F, S, H, E and C identify the instrumentation and other mechanisms for prompt detection and continued assessment, and demonstrates how each accident is encompassed within the emergency classification system of this Plan. When an event also involves elevated off-site radiological consequences or other specific conditions, the event classification will be adjusted to reflect actual conditions.

5.2.1 Control Rod Drop Accident

This accident is described in FSAR Section 15.4.9 and is postulated to occur with the reactor in hot startup condition, and very conservative calculations indicate failure of fuel rods. The main steam line radiation monitors detect the significant increase in activity and initiate an alarm to alert operations personnel. Operations personnel would then validate the alarm condition, manually SCRAM the reactor and initiate closure of the main steam isolation valves (MSIV) and isolation of the main condenser. During the MSIV closing time period, noble gases and radioiodines are transported with the steam to the condenser. Release of radioactivity to the environment is by way of leakage from the turbine building.

Initial assessment of this accident, performed by the Control Room Personnel under the direction of the ED includes evaluation of radiation levels. Data are direct radiation levels at the locations of various turbine building ARMs, and an indication of the airborne radioactivity concentration from the turbine building vent exhaust monitor. EP Procedures provide guidance for dose projections based on radiation readings. Data from the Turbine Building vent exhaust monitors is supplemented by information obtained by the radiological monitoring team.

The emergency actions include:

a) Evaluate Emergency Action Levels per Tables R, F, S, H and C

b) Declare the appropriate classification as warranted

c) Implement Radiologically Controlled Area Evacuation

5.2.2 Fuel Handling

This accident is described in FSAR Section 15.7.4 and is postulated to occur with the reactor in shutdown condition with the vessel head removed and results in fuel failure. The reactor building ventilation exhaust duct radiation monitoring system alarms, isolates the ventilation system, and starts operation of the Standby Gas Treatment System (SGTS). Noble gases and radioiodines are released to the fuel pool, migrate to the secondary containment, and are released to the environment after filtration through the SGTS.

Initial assessment of this accident includes the performance of dose projections in accordance with EP-PSs. Dose projections utilize data from the reactor building vent monitor, standby gas treatment vent monitor, and meteorological instrumentation.

The emergency actions include:

a) Evaluate Emergency Action Levels per Tables R, F, S, H and C

b) Declare the appropriate classification as warranted

c) Implement Radiologically Controlled Area Evacuation

5.2.3 Main Steam Line Break

This accident is described in FSAR Section 15.6.4 and is postulated to occur with the reactor in operating status. The steam line break occurs outside the containment and releases steam until complete closure of the MSIVs. Noble gases and radioiodines in the coolant are assumed to be released directly to the environment.

The initial assessment of this event includes the performance of dose projections. An estimate of the resultant doses can be made and compared to those shown in Table 15.6-9 of the FSAR for worst case conditions. Actual doses are proportional to the fission product activity in the steam, as monitored by the off-gas release rate, prior to the accident. The doses in Table 15.6-9 of the FSAR are based on the assumption that the off-gas release rate is at the upper limiting condition for operation. Actual dose estimates, and corresponding emergency actions, may be taken, based on the off-gas release rate prior to the accident. Consideration may also be given to the relative benefit from taking or not taking specific protective action, based on the short-term duration of exposure associated with this accident.

The emergency actions include:

a) Evaluate Emergency Action Levels per Tables R, F, S, H and C

b) Declare the appropriate classification as warranted

c) Implement Radiologically Controlled Area Evacuation

5.2.4 Instrument Line Break

This accident is described in the FSAR section 15.6.2 and is a circumferential rupture of an instrument line connected to the primary coolant system postulated to occur outside the primary containment but inside the secondary containment. This failure results in the release of primary system coolant to the secondary containment, until the reactor is depressurized. Operator recognition of the accident is by a combination of alarms or abnormal readings or by comparison of radiation, temperature, humidity, fluid and noise readings with several instruments monitoring the same process variable such as reactor level, jet pump flow, steam flow, and steam pressure.

Design Basis analysis shows that the event analyzed in Subsection 15.6.5 is bounding. The following describes a realistic analysis of the event. The iodine concentration prior to the break is assumed to be 0.2 micro-curies/gram dose equivalent I-131, which is the maximum equilibrium concentration for continued full-power operation permitted by the Technical Specifications. All of the iodine activity in the steam from the flashed liquid and steam from the steam dome and 10 percent from the remaining liquid released from the break are assumed to become airborne. A plateout factor of 2 is assumed for airborne iodine inside secondary containment. Although there will be some activation and corrosion products released the isotopes of primary importance are the iodine isotopes.

The emergency actions include:

a) Evaluate Emergency Action Levels per Tables R, F, S, H and C

b) Declare the appropriate classification as warranted

c) Implement Radiologically Controlled Area Evacuation

5.2.5 Loss of Coolant Accident (LOCA)

This accident is described in FSAR Section 15.6.5 and is postulated to involve a complete circumferential break of a recirculating loop pipe inside the primary containment, with the reactor operating at full power. The accident results in release of a significant quantity of fission products into the primary containment, leakage into the secondary containment, and release to the environment through the SGTS. Containment failure, although not likely, must be considered possible.

The occurrence of a design basis LOCA is uniquely identified by low-low reactor water level and high drywell pressure signals from the reactor protection system sensors and high radiation signal from the containment accident radiation monitor(s). A reactor scram and MSIV closure occur. Operation of the emergency core cooling system is initiated.

The radiological exposures resulting from the activity released to the environment as a consequence of the LOCA have been determined for the realistic and design basis cases. The design basis and realistic LOCA doses are presented in FSAR Table 15.6-18. The radiological exposure of the Control Room personnel for the design basis case is given in Table 15.6-21.

The emergency actions include:

a) Evaluate Emergency Action Levels per Tables R, F, S, H and C

b) Declare the appropriate classification as warranted

c) Implement Radiologically Controlled Area Evacuation

5.2.6 Off-Gas Treatment System Failure

This accident is described in FSAR Section 15.7.1.1 and is postulated to be initiated by an occurrence such as earthquake (greater than design basis), explosion, or fire. The accident results in release of the stored inventory of radionuclides in the system including that contained in the charcoal adsorption beds. In addition to recognition of the initiating event, the operator is provided with recognition and assessment information from alarmed instrumentation such as ARMs and vent radiation monitors.

The emergency actions include:

a) Evaluate Emergency Action Levels per Tables R, F, S, H and C

b) Declare the appropriate classification as warranted

c) Implement Radiologically Controlled Area Evacuation

5.2.7 Air Ejector Line Failure

This accident is described in FSAR Section 15.7.1.3 and is postulated to result from a seismic event more serious than the system is designed to withstand. The noble gas and radioiodine activity from the air ejector, which is normally processed by the off-gas treatment system, is discharged to the environment via the turbine building ventilation system. The accident is recognized by the off-gas system loss of flow indication and ARMs. Assessment of the severity includes evaluation of the off-gas activity release rate prior to the accident and results of on-site monitoring.

The emergency actions include:

a) Evaluate Emergency Action Levels per Tables R, F, S, H and C

b) Declare the appropriate classification as warranted

c) Implement Radiologically Controlled Area Evacuation

5.2.8 Liquid Radwaste Failure

This accident is described in FSAR Section 15.7.3 and is postulated to be a rupture of the RWCU phase separator in the Radwaste enclosure. Airborne radioactivity released during the accident passes directly to the environment via the turbine building vent. A high water level alarm on the Radwaste building sump alarms and activates the sump pumps. Radwaste building ARMs and on-site monitoring provides data for assessing the magnitude of the radiological consequences.

The emergency actions include:

a) Evaluate Emergency Action Levels per Tables R, F, S, H and C

b) Declare the appropriate classification as warranted

c) Implement Radiologically Controlled Area Evacuation

5.2.9 Recirculation Pump Seizure

This accident is described in FSAR Section 15.3.3 and is postulated to result in the nearly instantaneous stoppage of the pump motor shaft of one of the recirculation pumps to occur with the reactor in operating status. As a result of the very rapid decrease in core flow in response to the large hydraulic resistance produced by the stopped pump impeller, a resulting level swell in the reactor may initiate a trip of the main and feedwater turbines, a scram due to stop valve closure, and a trip of the recirculation pumps.

Fuel damage is not expected for the pump seizure accident for either two loop or single loop operation. Any rods that experience boiling transition may be conservatively postulated to fail and potentially causing an Emergency Plan entry per the fuel cladding degradation Emergency Action Level. The radioactivity released from the fuel is transported into the steam line and is released to the environment via leakage from the condenser.

The occurrence of recirculation pump seizure is identified by the indication of recirculation flow loss and pump differential pressure in the control room.

The emergency actions include:

a) Evaluate Emergency Action Levels per Tables R, F, S, H and C

b) Declare the appropriate classification as warranted

5.2.10 Feedwater Line Break – Outside Containment

This accident is described in FSAR Section 15.6.6 and is postulated to be an instantaneous, circumferential break of the largest feedwater line outside of containment. The break releases coolant to the turbine building until the feedwater line check valves isolate the reactor from the feedwater system. The reactor will scram on low water level. At low-low water level, RCIC and HPCI initiate and maintain reactor water level above the low-low-low level trip point and eventually restore the reactor water level to its normal elevation.

There is no fuel damage as a result of this accident scenario. Radioactivity will be released from the feedwater piping prior to isolation of the break location. Activity concentrations are the same as those found in the main condenser hotwell. Activity release will occur through flashing and partitioning into the turbine building atmosphere, and then to the environment through the turbine building ventilation system.

The estimated activity released to the environment for the worst case condition is shown in FSAR Table 15.6-25. Actual doses are proportional to the fission product activity in the coolant. Fission product activity can be determined from coolant grab samples or off-gas grab samples. Area Radiation Monitors, Main Steam Line Radiation Monitors, or Off-Gas radiation monitors may also indicate fission product activity.

The emergency actions include:

a) Evaluate Emergency Action Levels per Tables R, F, S, H and C

b) Declare the appropriate classification as warranted

c) Implement Radiologically Controlled Area Evacuation.

5.2.11 Accidents Affecting Independent Spent Fuel Storage Installation as described in the CSAR

The design basis accidents postulated to affect the Dry Fuel Storage System include:

- Reduced Horizontal Storage Module air inlet and outlet shielding
- Natural phenomena events as defined in the CSAR
- Accidental transfer cask drop with loss of neutron shield
- Lightning effects
- Debris blockage of Horizontal Storage Module air inlet and outlet opening
- Postulated Dry Cask Storage leakage
- Pressurization due to fuel cladding failure within the Dry Cask Storage

The consequences of the postulated accidents are as specified in the CSAR. Impact of the postulated accidents would be detected by radiological monitoring during transport and storage of spent fuel.

a) Evaluate Emergency Action Levels per Tables E, R and H.

b) Declaration of a Notification of Unusual Event as warranted.

c) Implement recovery actions.

NOTE:	The following Emergency Action Level (EAL) Tables are excerpts from the EAL Basis Controlling Procedure and contain page number references after each EAL threshold for its corresponding basis section. Those page number references are not applicable within the Emergency Plan.

TABLE R – ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

R Abnormal Rad Levels / Rad Effluent	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
1 Rad Effluent	IC: Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mrem TEDE or 5,000 mrem child thyroid CDE **RG1.1** 1 2 3 4 5 D (pg. 32) Gaseous effluent > Table R-1 column "GE" for ≥ 15 min. (Notes 1, 2, 3, 4) **RG1.2** 1 2 3 4 5 D (pg. 35) Dose assessment using actual meteorology indicates doses > 1,000 mrem TEDE or 5000 mrem child thyroid CDE at or beyond the EMERGENCY PLAN BOUNDARY (Note 4) **RG1.3** 1 2 3 4 5 D (pg. 37) Field survey results indicate **EITHER** of the following at or beyond the EMERGENCY PLAN BOUNDARY: • Closed window dose rates > 1,000 mR/hr expected to continue for ≥ 60 min. • Analyses of field survey samples indicate child thyroid CDE > 5,000 mrem for 60 min. of inhalation. (Notes 1, 2)	IC: Release of gaseous radioactivity resulting in offsite dose greater than 100 mrem TEDE or 500 mrem child thyroid CDE **RS1.1** 1 2 3 4 5 D (pg. 39) Gaseous effluent > Table R-1 column "SAE" for ≥ 15 min. (Notes 1, 2, 3, 4) **RS1.2** 1 2 3 4 5 D (pg. 42) Dose assessment using actual meteorology indicates doses > 100 mrem TEDE or 500 mrem child thyroid CDE at or beyond the EMERGENCY PLAN BOUNDARY (Note 4) **RS1.3** 1 2 3 4 5 D (pg. 44) Field survey results indicate **EITHER** of the following at or beyond the EMERGENCY PLAN BOUNDARY: • Closed window dose rates > 100 mR/hr expected to continue for ≥ 60 min. • Analyses of field survey samples indicate child thyroid CDE > 500 mrem for 60 min. of inhalation. (Notes 1, 2)	IC: Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem child thyroid CDE **RA1.1** 1 2 3 4 5 D (pg. 46) Gaseous effluent > Table R-1 column "ALERT" for ≥ 15 min. (Notes 1, 2, 3, 4) **RA1.2** 1 2 3 4 5 D (pg. 49) Dose assessment using actual meteorology indicates doses > 10 mrem TEDE or 50 mrem child thyroid CDE at or beyond the EMERGENCY PLAN BOUNDARY (Note 4) **RA1.3** 1 2 3 4 5 D (pg. 52) Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses > 10 mrem TEDE or 50 mrem child thyroid CDE at or beyond the EMERGENCY PLAN BOUNDARY for 60 min. of exposure (Notes 1, 2) **RA1.4** 1 2 3 4 5 D (pg. 54) Field survey results indicate **EITHER** of the following at or beyond the EMERGENCY PLAN BOUNDARY: • Closed window dose rates > 10 mR/hr expected to continue for ≥ 60 min. • Analyses of field survey samples indicate child thyroid CDE > 50 mrem for 60 min. of inhalation. (Notes 1, 2)	IC: Release of gaseous or liquid radioactivity greater than 2 times the TRM limits for 60 minutes or longer **RU1.1** 1 2 3 4 5 D (pg. 56) Gaseous or liquid effluent > Table R-1 column "UE" for ≥ 60 min. (Notes 1, 2, 3) **RU1.2** 1 2 3 4 5 D (pg. 60) Sample analyses for a gaseous or liquid release indicates a concentration or release rate > 2 x TRM limits for ≥ 60 min. (Notes 1, 2) POSSIBLE CONCURRENT EAL Table S – EAL SU4.1
2 Irradiated Fuel Event	IC: Spent fuel pool level cannot be restored to at least the top of the fuel racks for 60 minutes or longer **RG2.1** 1 2 3 4 5 D (pg. 62) Spent fuel pool level **CANNOT** BE RESTORED to at least 0.5ft. above the top of the spent fuel racks for ≥ 60 min. (Note 1)	IC: Spent fuel pool level at the top of the fuel racks **RS2.1** 1 2 3 4 5 D (pg. 64) Lowering of spent fuel pool level to ≤ 0.5 ft. above the top of the spent fuel racks	IC: Significant lowering of water level above or damage to irradiated fuel **RA2.1** 1 2 3 4 5 D (pg. 66) Uncovery of irradiated fuel in the REFUELING PATHWAY **RA2.2** 1 2 3 4 5 D (pg. 68) Damage to irradiated fuel resulting in a release of radioactivity **AND** Any of the following radiation monitor indications: • Refuel Floor High Exhaust (> 18 mR/hr) • Refuel Floor Wall Exhaust (> 21 mR/hr) • Channel 14 Spent Fuel Pool Area Criticality Monitor (> 100 mR/hr) • Channel 15 Refueling Floor Area (> 80 mR/hr) • Channel 42 Refueling Floor Area (> 80 mR/hr) • Channel 47 Unit 1/ 44 (Unit 2) Spent Fuel Pool Area Criticality Monitor (> 100 mR/hr) • Channel 49 Refueling Floor High Range Monitor (on scale) **RA2.3** 1 2 3 4 5 D (pg. 70) Lowering of spent fuel pool level to ≤ 10 ft. above the top of the spent fuel racks	IC: Unplanned loss of water level above irradiated fuel **RU2.1** 1 2 3 4 5 D (pg. 72) UNPLANNED water level drop in the REFUELING PATHWAY as indicated by **ANY** of the following on **EITHER** unit: • Fuel Pool Water Low Level alarm • Skimmer Surge Tank Low Level alarm • Visual observation of a water level drop below a fuel pool skimmer surge tank inlet • Observation of water draining down the outside wall of primary containment **AND** UNPLANNED rise in area radiation levels as indicated by **ANY** of the following radiation monitors: • Channel 14 Spent Fuel Pool Area Criticality Monitor • Channel 15 Refueling Floor Area • Channel 42 Refueling Floor Area
3 Area Radiation Levels	None	None	IC: Radiation levels that IMPEDE access to equipment necessary for normal plant operations, cooldown, or shutdown **RA3.1** 1 2 3 4 5 D (pg. 74) Dose rate > 15 mR/hr in **ANY** of the following areas: • Main Control Room • Radwaste Control Room • Both the Central Alarm Station (CAS) and Secondary Alarm Station (SAS) **RA3.2** 3 4 5 (pg. 75) An UNPLANNED event results in radiation levels that prohibit or IMPEDE access to **ANY** Table R-2 rooms or areas (Note 5, Note 6)	None

Notes

Note 1: The EDRM should declare the event promptly upon determining that time limit has been exceeded, or **will likely** be exceeded

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is **NO** longer VALID for classification purposes

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available

Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then no emergency classification is warranted

Note 6: This EAL is applicable even if the initiating event, which is causing elevated radiation levels, occurred in Modes 1 or 2.

Table R-1 Effluent Monitor Classification Thresholds (Note 4)

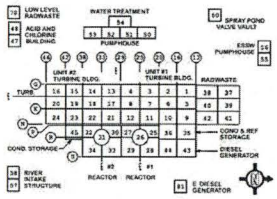
	Release Point	Monitor	GE	SAE	Alert	UE
Gaseous	Plant Vent (noble gas)	0C658	1.3E+09 µCi/min (site total)	1.3E+08 µCi/min (site total)	1.3E+07 µCi/min (site total)	4.3E+06 µCi/min (site total)
Liquid	LRW	RR-06433	--	--	--	2 x hi alarm
	1(2) RHRSW A/B	RR-D12-1(2)R606	--	--	--	2 x hi alarm
	1(2)SW	RR-D12-1(2)R604	--	--	--	2 x hi alarm

Table R-2 Safe Operation & Shutdown Areas (pg. 277)

Elevation	Unit 1 Area(s) **	Unit 2 Area(s) **	Mode(s)
670'	RB 27	RB 32	3, 4, 5
683'	RB 27, 28, 29	RB 32, 33, 34	3, 4, 5
703'	RB 28 29	RB 33, 34	3, 4, 5
719'	RB 25, 29	RB 30, 34	3, 4, 5
749'	RB 25, 29	RB 32, 33	3, 4, 5

** See Chart 1 for location of Plant Areas

Chart 1 – Plant Area Key Plan



Modes: 1 Power Operations | 2 Startup | 3 Hot Shutdown | 4 Cold Shutdown | 5 Refueling | D Defueled

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Form EP-RM-004-R
Rev. 3, Page 1 of 1

ALL CONDITIONS

TABLE F – FISSION PRODUCT BARRIER DEGRADATION

F Fission Product Barrier Degradation	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
	IC: Loss of **ANY** two barriers **AND** loss or potential loss of the third barrier. FG1.1 1 2 3 (pg.212) Loss of **ANY** two barriers **AND** Loss or potential loss of the third barrier (Table F-1)	IC: Loss or potential loss of **ANY** two barriers FS1.1 1 2 3 (pg.213) Loss or potential loss of **ANY** two barriers (Table F-1)	IC: **ANY** loss or **ANY** potential loss either fuel clad or RCS FA1.1 1 2 3 (pg.214) **ANY** loss or **ANY** potential loss of **EITHER** Fuel Clad or RCS barrier (Table F-1)	POSSIBLE UNUSUAL EVENT Table S – EAL SU4.2 POSSIBLE UNUSUAL EVENT Table S – EAL SU5.1

Table F-1 Fission Product Barrier Threshold Matrix

	FC - Fuel Clad Barrier		RCS - Reactor Coolant System Barrier		PC - Primary Containment Barrier	
	Loss	Potential Loss	Loss	Potential Loss	Loss	Potential Loss
A RPV Level	1. SAG entry required (pg. 219)	1. RPV level **CANNOT** BE RESTORED AND MAINTAINED > -161 in. (TAF) or **CANNOT** be determined. (pg. 220)	1. RPV level **CANNOT** BE RESTORED AND MAINTAINED > -161 in. (TAF) or **CANNOT** be determined. (pg. 254)	None	None	1. SAG entry required (pg. 254)
B RCS Leak Rate	None	None	1. UNISOLABLE break in **ANY** of the following: • Main Steam Line • HPCI Steam Line • RCIC Steam Line • RWCU • Feedwater (pg. 237) OR 2. Emergency RPV Depressurization is required (pg. 238)	1. UNISOLABLE primary system leakage that results in exceeding **EITHER**: One or more Max Normal Reactor Building Radiation Limits (EO-000-104 Table 9) that can be read in the Control Room (Table F-3) OR One or more Max Normal Reactor Building area temperature Limits (EO-000-104 Table 6) that can be read in the Control Room (Table F-4) (pg. 240)	1. UNISOLABLE primary system leakage that results in exceeding **EITHER**: One or more Max Safe Reactor Building Radiation Limits (EO-000-104 Table 9) that can be read in the Control Room (Table F-5) OR One or more Max Safe Reactor Building area temperature Limits (EO-000-104 Table 8) that can be read in the Control Room (Table F-6) (pg. 256)	None
C PC Conditions	None	None	1. Primary Containment pressure > 1.73 psig due to RCS leakage (pg. 244)	None	1. UNPLANNED rapid drop in Primary Containment pressure following Primary Containment pressure rise (pg. 261) OR 2. Primary Containment pressure response **NOT** consistent with LOCA conditions (pg. 262)	1. Primary Containment Pressure > 53 psig (pg. 264) OR 2. Deflagration concentrations exist inside PC (H2 ≥ 6% **AND** O2 ≥ 5%) (pg. 265) OR 3. Heat Capacity Temperature Limit (Figure – HCTL) exceeded (pg. 266)
D PC Radiation / RCS Activity	1. CHRRM radiation > 3.0E+3 R/hr (pg. 226) OR 2. Primary coolant activity > 300 µCi/gm I-131 dose equivalent (pg. 228)	None	1. CHRRM radiation > 7.0E+3 R/hr with indication of a RCS leak inside the drywell (pg. 246)	None	None	1. CHRRM radiation > 4.0E+4 R/hr (pg. 269)
E PC Integrity or Bypass	None	None	None	None	1. UNISOLABLE direct downstream pathway to the environment exists after Primary Containment isolation signal (pg. 271) OR 2. Intentional Primary Containment venting per EP-DS Procedures OR EO Procedures (pg. 273)	None
F ED/RM Judgment	1. **ANY** condition in the opinion of the Emergency Director/Recovery Manager that indicates loss of the fuel clad barrier (pg. 232)	1. **ANY** condition in the opinion of the Emergency Director/Recovery Manager that indicates potential loss of the Fuel Clad barrier (pg. 233)	1. **ANY** condition in the opinion of the Emergency Director/Recovery Manager that indicates loss of the RCS barrier (pg. 251)	1. **ANY** condition in the opinion of the Emergency Director/Recovery Manager that indicates potential loss of the RCS barrier (pg. 252)	1. **ANY** condition in the opinion of the Emergency Director/Recovery Manager that indicates loss of the Primary Containment barrier (pg. 275)	1. **ANY** condition in the opinion of the Emergency Director/Recovery Manager that indicates potential loss of the Primary Containment barrier (pg. 276)

Table F-2 Fission Product Barrier Status Table

Circle the X's in the table for all applicable situations. Declare the EAL based upon all circled X's in any column.	GENERAL EMERGENCY				SITE AREA EMERGENCY												ALERT			
	FG1.1 Loss of **ANY** two barriers **AND** loss or potential loss of third barrier				FS1.1 Loss or potential loss of **ANY** two barriers												FA1.1 **ANY** loss **OR ANY** potential loss of either Fuel Clad **OR** RCS Barrier			
Fuel Clad - Loss	X	X		X	X		X		X	X							X			
Fuel Clad – Potential Loss			X			X		X			X	X						X		
RCS – Loss	X	X	X		X			X					X	X					X	
RCS – Potential Loss				X		X	X								X	X				X
Primary Containment - Loss	X		X	X					X		X		X		X					
Primary Containment – Potential Loss		X								X		X		X		X				

FIGURE – HCTL
Heat Capacity Temperature Limit

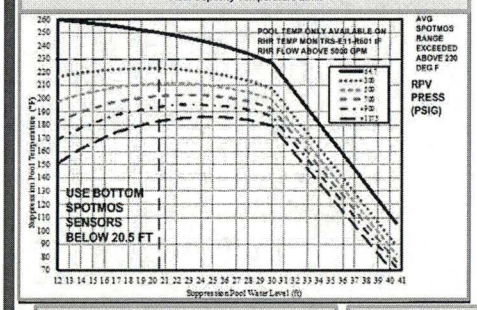


Table F-3
Max Normal Reactor Building Radiation Limits

RB AREA Elevation (ft.)	ARM Number	ARM Channel Description	Max Norm Rad Limit
818	35 14 15 42 47 (44 U2)	Cask Stor Area Spent Fuel Crit Mon Refuel Floor North (South U2) Refuel Floor West Spent Fuel Crit Mon	Hi Alarm
749	8 10 11	RWCU Recirc PP Access Fuel Pool PP Area Rx Bldg Sample St	Hi Alarm
719	5 6	CRD North CRD South	Hi Alarm
670	16	Remote Shutdown Room	Hi Alarm
645	3 2 25 1 4	HPCI PP & Turbine Room RCIC PP & Turbine Room RHR A C PP Room RHR B D PP Room RB/RW Sump Area	Hi Alarm

Table F-4
Max Normal Reactor Building Temperature Limits

RB AREA Elevation (ft.)	Area Temperature	Max Norm Temp (°F)
749	RWCU – Pump Room RWCU – Heat Exch Room RWCU – Penetration Room	120 120 120
719	Main Steam Line Tunnel	157
683	HPCI Pipe Routing Area RCIC Pipe Routing Area	120 120
645	HPCI – Equip Area HPCI – Emerg Area Cooler	120 120
645	RCIC – Emerg Area Cooler RCIC – Equip Area	120 120
645	RHR Equip Area 1	110
645	RHR Equip Area 2	110

Table F-5
Max Safe Reactor Building Radiation Limits

RB AREA Elevation (ft.)	ARM Number	ARM Channel Description	Max Safe Rad Limit (R/HR)
818	49	Refuel Floor	10
749	52 54	RWCU Recirc PP Access Fuel Pool PP Area	10
719	50 51	CRD North CRD South	10
670	53	Remote Shutdown Room	10
645	48 57 55 56	HPCI PP & Turbine Room RCIC PP & Turbine Room RHR A C PP Room RHR B D PP Room	10

Table F-6
Max Safe Reactor Building Temperature Limits

RB Area Elevation (ft.)	Area Temperature	Max Safe Temp (°F)
749	RWCU – Pump Room RWCU – Heat Exch Room RWCU – Penetration Room	147 147 131
719	Main Steam Line Tunnel	177
683	HPCI Pipe Routing Area RCIC Pipe Routing Area	167 167
645	HPCI – Equip Area HPCI – Emerg Area Cooler	167 167
645	RCIC – Emerg Area Cooler RCIC – Equip Area	167 167
645	RHR Equip Area 1	142
645	RHR Equip Area 2	142

Modes: 1 Power Operations | 2 Startup | 3 Hot Shutdown | 4 Cold Shutdown | 5 Refueling | D Defueled

Susquehanna Nuclear, LLC

Form EP-RM-004-F
Rev. 5, Page 1 of 1

HOT CONDITIONS

TABLE S – SYSTEM MALFUNCTIONS

S – System Malfunct.

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
1 Loss of Essential AC Power	IC: Prolonged loss of **ALL** offsite and **ALL** onsite AC power to essential buses **SG1.1** 1 2 3 **(pg. 164)** Loss of **ALL** offsite and **ALL** onsite AC power capability to **ALL** 4.16 kV ESS buses on **EITHER** unit **AND** **EITHER:** Restoration of at least one 4.16 kV ESS bus in < 4 hours is **NOT** likely (Note 1) **OR** RPV water level **CANNOT** BE RESTORED AND MAINTAINED > -179 in. IC: Loss of **ALL** essential AC and vital DC power sources for 15 minutes or longer **SG1.2** 1 2 3 **(pg. 166)** Loss of **ALL** offsite and **ALL** onsite AC power capability to **ALL** 4.16 kV ESS buses on **EITHER** unit for ≥ 15 min. **AND** Indicated voltage is < 105 VDC on **ALL** of the following vital 125 VDC main distribution buses on the affected unit for ≥ 15 min. (Note 1): • 1D612 (2D612) • 1D622 (2D622) • 1D632 (2D632) • 1D642 (2D642)	IC: Loss of **ALL** offsite and **ALL** onsite AC power to essential buses for 15 minutes or longer **SS1.1** 1 2 3 **(pg. 168)** Loss of **ALL** offsite and **ALL** onsite AC power capability to **ALL** 4.16 kV ESS buses on **EITHER** unit for ≥ 15 min. (Note 1)	IC: Loss of **ALL BUT ONE** AC power source to essential buses for 15 minutes or longer **SA1.1** 1 2 3 **(pg. 171)** AC power capability to **ALL** 4.16 kV ESS buses on **EITHER** unit (Table S-5) reduced to a single power source for ≥ 15 min. (Note 1) **AND** **ANY** additional single power source failure will result in loss of **ALL** AC power to SAFETY SYSTEMS	IC: Loss of **ALL** offsite AC power capability to essential buses for 15 minutes or longer **SU1.1** 1 2 3 **(pg. 175)** Loss of **ALL** offsite AC power capability to **ALL** 4.16 kV ESS buses on **EITHER** unit (Table S-5) for ≥ 15 min. (Note 1)
2 Loss of Vital DC Power		IC: Loss of **ALL** vital DC power for 15 minutes or longer **SS2.1** 1 2 3 **(pg. 178)** Indicated voltage is < 105 VDC on **ALL** of the following vital 125 VDC main distribution buses on the affected unit for ≥ 15 min. (Note 1): • 1D612 (2D612) • 1D622 (2D622) • 1D632 (2D632) • 1D642 (2D642)	None	None
3 Loss of Control Room Indications	None	None	IC: UNPLANNED loss of Control Room indications for 15 minutes or longer with a significant transient in progress **SA3.1** 1 2 3 **(pg. 180)** An UNPLANNED event results in the inability to monitor one or more Table S-1 parameters from within the Control Room for ≥ 15 min. (Note 1) **AND** **ANY** significant transient is in progress, Table S-2	IC: UNPLANNED loss of Control Room indications for 15 minutes or longer **SU3.1** 1 2 3 **(pg. 183)** An UNPLANNED event results in the inability to monitor one or more Table S-1 parameters from within the Control Room for ≥ 15 min. (Note 1)
4 RCS Activity	None	None	**POSSIBLE ALERT** Table F – Fuel Clad Barrier Loss or Potential Loss	IC: Reactor coolant activity greater than Technical Specification allowable limits **SU4.1** 1 2 3 **(pg. 185)** Offgas pretreatment monitor high high radiation alarm **SU4.2** 1 2 3 **(pg. 186)** Coolant activity > 0.2 µCi/gm dose equivalent I-131 for > 48 hours **OR** Coolant activity > 4.0 µCi/gm dose equivalent I-131 at **any** time
5 RCS Leakage	None	None	**POSSIBLE ALERT** Table F – RCS Barrier Loss or Potential Loss	IC: RCS leakage for 15 minutes or longer **SU5.1** 1 2 3 **(pg. 187)** RCS unidentified or pressure boundary leakage > 10 gpm for ≥ 15 min. **OR** RCS identified leakage > 25 gpm for ≥ 15 min. **OR** Leakage from the RCS to a location outside Primary Containment > 25 gpm for ≥ 15 min (Note 1)
6 RPS Failure	None	IC: Inability to shut down the reactor causing a challenge to RPV water level or RCS heat removal **SS6.1** 1 2 **(pg. 190)** An automatic or manual scram fails to shut down the reactor **AND** **ALL** actions to shut down the reactor are **NOT** successful as indicated by reactor power ≥ 5% **AND** **EITHER:** RPV level **CANNOT** BE RESTORED AND MAINTAINED > -179 in. or **CANNOT** be determined **OR** Suppression pool water temperature AND RPV pressure **CANNOT** BE MAINTAINED below the Heat Capacity Temperature Limit (Figure – HCTL)	IC: Automatic or manual scram fails to shut down the reactor, and subsequent manual actions taken at the reactor control consoles are **NOT** successful in shutting down the reactor **SA6.1** 1 2 **(pg. 193)** An automatic or manual scram fails to shut down the reactor **AND** Manual scram actions taken at the reactor control console (Manual PBs, Mode Switch, ARI) are **NOT** successful in shutting down the reactor as indicated by reactor power ≥ 5% (Note 8)	IC: Automatic or manual scram fails to shut down the reactor **SU6.1** 1 2 **(pg. 195)** An automatic scram did **NOT** shut down the reactor after **ANY** RPS setpoint is exceeded **AND** A subsequent automatic scram or manual scram action taken at the reactor control console (Manual PBs, Mode Switch, ARI) is successful in shutting down the reactor as indicated by reactor power < 5% (APRM downscale) (Note 8) **SU6.2** 1 2 **(pg. 198)** A manual scram did **NOT** shut down the reactor after **ANY** manual scram action was initiated **AND** A subsequent automatic scram or manual scram action taken at the reactor control console (Manual PBs, Mode Switch, ARI) is successful in shutting down the reactor as indicated by reactor power < 5% (APRM downscale) (Note 8)
7 Loss of Comm.	None	None	None	IC: Loss of **ALL** onsite or offsite communications capabilities **SU7.1** 1 2 3 **(pg. 201)** Loss of **ALL** Table S-3 onsite communication methods **OR** Loss of **ALL** Table S-3 ORO communication methods **OR** Loss of **ALL** Table S-3 NRC communication methods
8 Hazardous Event Affecting Safety Systems	None	None	IC: Hazardous event affecting a SAFETY SYSTEM needed for the current operating mode **SA8.1** 1 2 3 **(pg. 204)** The occurrence of **ANY** Table S-4 hazardous event **AND** **EITHER:** Event damage has caused indications of degraded performance in at least one train of a SAFETY SYSTEM needed for the current operating mode **OR** The event has caused VISIBLE DAMAGE to a SAFETY SYSTEM component or structure needed for the current operating mode	**POSSIBLE UNUSUAL EVENT** Table H – EALs HU2.x, HU3.x and HU4.x

Notes

Note 1: The ED/RM should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded

Note 8: A manual scram action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does **NOT** include manually driving in control rods or implementation of boron injection strategies

Table S-1 Safety System Parameters

- Reactor power
- RPV water level
- RPV pressure
- Primary Containment pressure
- Suppression Pool water level
- Suppression Pool temperature

Table S-2 Significant Transients

- Reactor scram
- Runback > 25% reactor power
- Reactor Recirc pump trip while > 25% reactor power
- ECCS injection
- Thermal power oscillations > 10%

Table S-5 AC 4.16 kV ESS buses

Unit 1:
- 1A201
- 1A202
- 1A203
- 1A204

Unit 2:
- 2A201
- 2A202
- 2A203
- 2A204

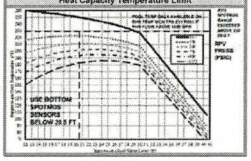
Table S-3 Communication Methods

System	Onsite	ORO	NRC
• UHF Radio	X		
• Plant PA System	X		
• Dedicated Conference Lines		X	
• Commercial Telephone Systems	X	X	X
• Cellular Telephone		X	X
• FTS-2001 (ENS)		X	X

Table S-4 Hazardous Events

- Seismic event (earthquake)
- Internal or external FLOODING event
- High winds or tornado strike
- FIRE
- EXPLOSION
- Other events with similar hazard characteristics as determined by the Shift Manager

FIGURE – HCTL Heat Capacity Temperature Limit



Modes: 1 Power Operations | 2 Startup | 3 Hot Shutdown | 4 Cold Shutdown | 5 Refueling | D Defueled

Susquehanna Nuclear, LLC

Form EP-RM-004-S
Rev. 1, Page 1 of 1

HOT CONDITIONS

TABLE H – HAZARDS

H Hazards	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
1 Security	**IC:** HOSTILE ACTION resulting in loss of physical control of the facility HG1.1 1 2 3 4 5 D (pg. 126) A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervision **AND** **EITHER** of the following has occurred: **ANY** of the following safety functions **CANNOT** be controlled or maintained • Reactivity • RPV water level • RCS heat removal **OR** Damage to spent fuel has occurred or is IMMINENT	**IC:** HOSTILE ACTION within the PROTECTED AREA HS1.1 1 2 3 4 5 D (pg. 128) A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervision	**IC:** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes HA1.1 1 2 3 4 5 D (pg. 130) A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervision **OR** A validated notification from NRC of an aircraft attack threat within 30 min. of the site	**IC:** Confirmed SECURITY CONDITION or threat HU1.1 1 2 3 4 5 D (pg. 132) A SECURITY CONDITION that does **NOT** involve a HOSTILE ACTION as reported by the Security Shift Supervision **OR** Notification of a credible security threat directed at the site **OR** A validated notification from the NRC providing information of an aircraft threat
2 Seismic Event	None	None	**POSSIBLE ALERT** Table S – EAL SA6.1 **POSSIBLE ALERT** Table C – EAL CA6.1	**IC:** Seismic event greater than OBE levels HU2.1 1 2 3 4 5 D (pg. 134) Seismic event greater than OPERATING BASIS EARTHQUAKE (OBE) as indicated by seismic instrumentation in the Control Room recording level greater than an OBE
3 Natural or Tech. Hazard	None	None	**POSSIBLE ALERT** Table S – EAL SA6.1 **POSSIBLE ALERT** Table C – EAL CA6.1	**IC:** Hazardous event HU3.1 1 2 3 4 5 D (pg. 136) A tornado strike within the PROTECTED AREA HU3.2 1 2 3 4 5 D (pg. 137) Internal room or area FLOODING of a magnitude sufficient to require manual or automatic electrical isolation of a SAFETY SYSTEM component needed for the current operating mode HU3.3 1 2 3 4 5 D (pg. 139) Movement of personnel within the PROTECTED AREA is IMPEDED due to an offsite event involving hazardous materials (e.g., an offsite chemical spill or toxic gas release) HU3.4 1 2 3 4 5 D (pg. 140) A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles (Note 7)
4 Fire	None	None	**POSSIBLE ALERT** Table S – EAL SA6.1 **POSSIBLE ALERT** Table C – EAL CA6.1	**IC:** FIRE potentially degrading the level of safety of the plant HU4.1 1 2 3 4 5 D (pg. 141) A FIRE is **NOT** extinguished within 15 min. of **ANY** of the following FIRE detection indications (Note 1): • Report from the field (i.e., visual observation) • Receipt of multiple (more than 1) fire alarms or indications • Field verification of a single fire alarm **AND** The FIRE is located within **ANY** Table H-1 area HU4.2 1 2 3 4 5 D (pg. 143) Receipt of a single fire alarm (i.e., no other indications of a FIRE) **AND** The fire alarm is indicating a FIRE within **ANY** Table H-1 area **AND** The existence of a FIRE is **NOT** verified (i.e. proved or disproved) within 30 min. of alarm receipt (Note 1) HU4.3 1 2 3 4 5 D (pg. 146) A FIRE within the plant PROTECTED AREA **NOT** extinguished within 60 min. of the initial report, alarm or indication (Note 1) HU4.4 1 2 3 4 5 D (pg. 147) A FIRE within the plant PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish
5 Hazardous Gases	None	None	**IC:** Gaseous release IMPEDING access to equipment necessary for normal plant operations, cooldown or shutdown HA5.1 1 2 3 4 5 D (pg. 148) Release of a toxic, corrosive, asphyxiant or flammable gas into **ANY** Table H-2 rooms or areas **AND** Entry into the room or area is prohibited or IMPEDED (Note 5)	None
6 Control Room Evacuation	None	**IC:** Inability to control a key safety function from outside the Control Room HS6.1 1 2 3 4 5 D (pg. 151) An event has resulted in plant control being transferred from the Control Room to the Remote Shutdown Panels **AND** Control of **ANY** of the following key safety functions is **NOT** reestablished within 15 min. (Note 1): • Reactivity • RPV water level • RCS heat removal	**IC:** Control Room evacuation resulting in transfer of plant control to alternate locations HA6.1 1 2 3 4 5 D (pg. 153) An event has resulted in plant control being transferred from the Control Room to the Remote Shutdown Panels	None
7 ED/RM Judgment	**IC:** Other conditions existing that in the judgment of the Emergency Director/Recovery Manager warrant declaration of General Emergency HG7.1 1 2 3 4 5 D (pg. 154) Other conditions exist which in the judgment of the Emergency Director/Recovery Manager indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**IC:** Other conditions existing that in the judgment of the Emergency Director/Recovery Manager warrant declaration of Site Area Emergency HS7.1 1 2 3 4 5 D (pg. 156) Other conditions exist which in the judgment of the Emergency Director/Recovery Manager indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts, (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the EMERGENCY PLAN BOUNDARY.	**IC:** Other conditions existing that in the judgment of the Emergency Director/Recovery Manager warrant declaration of an Alert HA7.1 1 2 3 4 5 D (pg. 158) Other conditions exist which in the judgment of the Emergency Director/Recovery Manager indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**IC:** Other conditions existing that in the judgment of the Emergency Director/Recovery Manager warrant declaration of a UE HU7.1 1 2 3 4 5 D (pg. 160) Other conditions exist which in the judgment of the Emergency Director/Recovery Manager indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of SAFETY SYSTEMS occurs

Notes

Note 1: The ED/RM should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded

Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then **NO** emergency classification is warranted

Note 7: This EAL does **NOT** apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents

Table H-1 Fire Areas

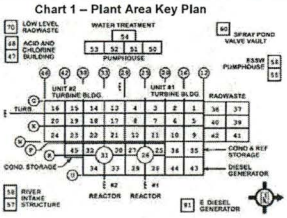
- Control Structure
- Diesel Generator Buildings
- ESSW Pump House
- Reactor Buildings
- Turbine Buildings
- Outside/Yard Areas that contain SAFETY SYSTEM Equipment

Table H-2 Safe Operation & Shutdown Areas (pg. 277)

Elevation	Unit 1 Area(s)**	Unit 2 Area(s)**	Mode(s)
670'	RB 27	RB 32	3, 4, 5
683'	RB 27, 28, 29	RB 32, 33, 34	3, 4, 5
703'	RB 28, 29	RB 33, 34	3, 4, 5
719'	RB 25, 29	RB 30, 34	3, 4, 5
749'	RB 25, 29	RB 32, 33	3, 4, 5
729'	CS 12, 21	CS 12, 21	1, 2, 3, 4, 5, D

** See Chart 1 for location of Plant Areas

Chart 1 – Plant Area Key Plan



Modes: 1 Power Operations | 2 Startup | 3 Hot Shutdown | 4 Cold Shutdown | 5 Refueling | D Defueled

Susquehanna Nuclear, LLC

Form EP-RM-004-H
Rev. 1, Page 1 of 1

ALL CONDITIONS

TABLE E – ISFSI

		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
E ISFSI	1 Confinement Boundary	None	None	None	IC: Damage to a loaded cask CONFINEMENT BOUNDARY EU1.1 1 2 3 4 5 D (pg. 208) Damage to a loaded canister CONFINEMENT BOUNDARY as indicated by a radiation reading on a loaded spent fuel cask > ANY of the following: • 800 mrem/hr at 3 ft from the HSM surface • 200 mrem/hr on contact on the outside of the HSM door centerline • 40 mrem/hr on contact on the end shield wall exterior

Modes: 1 Power Operations | 2 Startup | 3 Hot Shutdown | 4 Cold Shutdown | 5 Refueling | D Defueled

Susquehanna Nuclear, LLC

Form EP-RM-004-E
Rev. 5, Page 1 of 1

ALL CONDITIONS

TABLE C – COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
C Cold SD/ Refueling System Malfunct.	1 RPV Level	**IC**: Loss of RPV inventory affecting fuel clad integrity with Containment challenged **CG1.1** 4 5 (pg. 79) RPV level < -161 in. (TAF) for ≥ 30 min. (Note 1) **AND** **ANY** Containment Challenge indication, Table C-2: **CG1.2** 4 5 (pg. 83) RPV level **CANNOT** be monitored for ≥ 30 min. (Note 1) **AND** UNPLANNED increase in **ANY** Table C-1 sump or tank level due to a loss of RPV inventory of sufficient magnitude to indicate core uncovery **AND** **ANY** Containment Challenge indication, Table C-2	**IC**: Loss of RPV inventory affecting core decay heat removal capability **CS1.1** 4 5 (pg. 87) CONTAINMENT CLOSURE **NOT** established **AND** RPV level < -129 in. (Level 1) **CS1.2** 4 5 (pg. 90) CONTAINMENT CLOSURE established **AND** RPV level < -161 in. (TAF) **CS1.3** 4 5 (pg. 92) RPV level **CANNOT** be monitored for ≥ 30 min. (Note 1) **AND** UNPLANNED increase in **ANY** Table C-1 sump or tank level due to a loss of RPV inventory of sufficient magnitude to indicate core uncovery	**IC**: Loss of RPV inventory **CA1.1** 4 5 (pg. 94) Loss of RPV inventory as indicated by RPV level < -38 in. (Level 2) **CA1.2** 4 5 (pg. 96) RPV level **CANNOT** be monitored for ≥ 15 min. (Note 1) **AND** UNPLANNED increase in **ANY** Table C-1 sump or tank levels due to a loss of RPV inventory	**IC**: Unplanned loss of RPV inventory for 15 minutes or longer **CU1.1** 4 5 (pg. 98) UNPLANNED loss of reactor coolant results in RPV level less than a required lower limit ≥ 15 min. (Note 1) **CU1.2** 4 5 (pg. 101) RPV level **CANNOT** be monitored **AND** UNPLANNED increase in **ANY** Table C-1 sump or tank levels due to a loss of RPV inventory (Notes 1, 9)
	2 Loss of Essential AC Power	None	None	**IC**: Loss of **ALL** offsite power and **ALL** onsite AC power to essential buses for 15 minutes or longer **CA2.1** 4 5 D (pg. 103) Loss of **ALL** offsite and **ALL** onsite AC power capability to ALL 4.16 kV ESS buses on EITHER unit for ≥ 15 min. (Note 1)	**IC**: Loss of **ALL** but one AC power source to essential buses for 15 minutes or longer **CU2.1** 4 5 D (pg. 106) AC power capability to **ALL** 4.16 kV ESS buses on **EITHER** unit (Table C-7) reduced to a single power source for ≥ 15 min. (Note 1) **AND** **ANY** additional single power source failure will result in loss of **ALL** AC power to SAFETY SYSTEMS
	3 Loss of Vital DC Power	None	None	None	**IC**: Loss of Vital DC power for 15 minutes or longer **CU3.1** 4 5 (pg. 110) < 105 VDC bus voltage indications on Technical Specification **REQUIRED** 125 VDC buses on the affected unit for ≥ 15 min. (Note 1)
	4 RCS Temp.	None	None	**IC**: Inability to maintain plant in cold shutdown **CA4.1** 4 5 (pg. 112) UNPLANNED increase in RCS temperature to > 200°F for > Table C-3 duration (Notes 1, 10) **OR** UNPLANNED RPV pressure increase > 10 psig due to loss of decay heat removal capability	**IC**: UNPLANNED increase in RCS temperature **CU4.1** 4 5 (pg. 114) UNPLANNED increase in RCS temperature to > 200°F due to loss of decay heat removal capability **CU4.2** 4 5 (pg. 116) Loss of **ALL** RCS temperature and RPV level indication for ≥ 15 min. (Note 1)
	5 Loss of Comm.	None	None	None	**IC**: Loss of **ALL** onsite or offsite communications capabilities **CU5.1** 4 5 D (pg. 119) Loss of **ALL** Table C-4 onsite communication methods **OR** Loss of **ALL** Table C-4 ORO communication methods **OR** Loss of **ALL** Table C-4 NRC communication methods
	6 Hazardous Events Affecting Safety Systems	None	None	**IC**: Hazardous event affecting a SAFETY SYSTEM needed for the current operating mode **CA6.1** 4 5 (pg. 122) The occurrence of any Table C-5 hazardous event **AND** **EITHER**: Event damage has caused indications of degraded performance in a least one train of a SAFETY SYSTEM needed for the current operating mode, **OR** The event has caused VISIBLE DAMAGE to a SAFETY SYSTEM component or structure needed for the current operating mode	**POSSIBLE UNUSUAL EVENT** Table H – EALs HU2.x, HU3.x and HU4.x

Notes

Note 1: The ED/RM should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded

Note 6: If CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute time limit, declaration of a General Emergency is **NOT** required.

Note 9: If the conditions specified in this EAL last longer than 15 minutes, CA1.2 applies.

Note 10: In the absence of reliable RCS temperature indication caused by the loss of decay heat removal capability, classification should be based on the RPV pressure increase criteria when the RCS is INTACT in Mode 4 or based on time to boil data when in Mode 5 or the RCS is **NOT** INTACT in Mode 4.

CONTAINMENT CLOSURE - The procedurally defined conditions or actions taken to secure Primary or Secondary Containment and its associated structures, systems, and components as a functional barrier to fission product release under shutdown conditions.

Table C-1 Sumps & Tanks

- Drywell equipment drain tank
- Drywell sumps
- Reactor Building sump
- LRW collection tanks
- Main condenser hotwell
- Suppression pool
- Visual observation

Table C-2 Containment Challenge Indications

- CONTAINMENT CLOSURE **NOT** established (Note 6)
- PC hydrogen concentration > 6%
- UNPLANNED rise in PC pressure
- Exceeding one or more Secondary Containment Control Max Safe Radiation Levels (EO-000-104 Table 9) that can be read in the Control Room (Table C-6)

Table C-3 RCS Reheat Duration Thresholds

RCS Status	CONTAINMENT CLOSURE Status	Heat-up Duration
INTACT	N/A	60 min. *
NOT INTACT	Established	20 min. *
	NOT Established	0 min.

* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced the EAL is **NOT** applicable

Table C-4 Communication Methods

System	Onsite	ORO	NRC
• UHF Radio	X		
• Plant PA System	X		
• Dedicated Conference Lines		X	
• Commercial Telephone Systems	X	X	X
• Cellular Telephone		X	X
• FTS-2001 (ENS)		X	X

Table C-5 Hazardous Events

- Seismic event (earthquake)
- Internal or external FLOODING event
- High winds or tornado strike
- FIRE
- EXPLOSION
- Other events with similar hazard characteristics as determined by the Shift Manager

Table C-6 Max Safe Reactor Building Radiation Limits

RB AREA Elevation (ft.)	ARM Number	ARM Channel Description	Max Safe Rad Limit (R/HR)
818	49	Refuel Floor	10
749	52 54	RWCU Recirc PP Access Fuel Pool PP Area	10
719	50 51	CRD North CRD South	10
670	53	Remote Shutdown Room	10
645	48 57 55 56	HPCI PP & Turbine Room RCIC PP & Turbine Room RHR A C PP Room RHR B D PP Room	10

Table C-7: AC 4.16 kV ESS buses

Unit 1:
- 1A201
- 1A202
- 1A203
- 1A204

Unit 2:
- 2A201
- 2A202
- 2A203
- 2A204

Modes: 1 Power Operations | 2 Startup | 3 Hot Shutdown | 4 Cold Shutdown | 5 Refueling | D Defueled

Susquehanna Nuclear, LLC

Form EP-RM-004-C
Rev. 4, Page 1 of 1

COLD CONDITIONS

TABLE 5.2

EMERGENCY ACTIONS BASED ON CLASSIFICATION

Classification	Licensee Actions	Off-Site Agency Actions
1. Notification of Unusual Event **Class Description** Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of SAFETY SYSTEMS occurs. **Purpose** Purpose of offsite notification is to (1) assure that the first step in any response later found to be necessary has been carried out, (2) bring the operating staff to a state of readiness, and (3) provide systematic handling of unusual events information and decision-making.	1. Promptly notify plant emergency management personnel of event particulars and an assessment of safety significance of the event. **and** 2. Notify PEMA, LCEMA, CCEMA and NRC of "Unusual Event". Under certain security-related events, such as a site-specific credible threat, the TSC and EOF will be activated at the Unusual Event level.* **and** 3. Closeout event with verbal summary to offsite authorities (PEMA, LCEMA, CCEMA, and NRC) followed by written summary if required by 10 CFR 50.73. **or** 4. Escalate to higher emergency classification if appropriate.	1. Notify key officials and public if deemed necessary by county/state Emergency Director. **and** 2. Provide assistance if requested and able.

* Letter dated February 25, 2002 from Samuel J. Collins, Director, Office of Nuclear Reactor Regulations, to Robert G. Byram, Senior Vice President and Chief Nuclear Officer. Subject: Issuance of Order for Interim Safeguards and Security Compensatory Measures for – Susquehanna Steam Electric Station, Units 1 & 2.

TABLE 5.2

EMERGENCY ACTIONS BASED ON CLASSIFICATION

Page 2 of 7

Classification	Licensee Actions	Off-Site Agency Actions
2. Alert **Class Description** Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels. **Purpose** Purpose of offsite alert is to (1) assure that emergency personnel are readily available to respond if situation becomes more serious or to perform confirmatory radiation monitoring if required, and (2) provide offsite authorities current status information.	1. Promptly notify state/local authorities and NRC of Alert status and reason for alert. **and** 2. Promptly notify Susquehanna emergency management personnel of event particulars and an assessment of the safety significance of the event. **and** 3. Activate TSC and OSC, and dispatch monitoring team if radioactive effluent release involved. **and** 4. Provide a dedicated individual for plant status updates to offsite authorities and periodic press briefings. **and** 5. Activate the Emergency Response Data System (ERDS) within one hour. **and**	1. Provide assistance, if requested and able. **and** 2. Augment resources by activating EOC and any other primary response centers. **and** 3. Alert to Standby status key emergency personnel including monitoring teams and associated communications. **and** 4. Prepare to provide confirmatory off-site radiation monitoring and ingestion pathway dose projections if actual releases substantially exceed technical specification limits. **and** 5. Maintain alert status until verbal closeout. **or** 6. Escalate to a more severe class.

TABLE 5.2

EMERGENCY ACTIONS BASED ON CLASSIFICATION

Page 3 of 7

Classification	Licensee Actions	Off-Site Agency Actions
2. Alert (continued)	6. Closeout or recommend reduction in emergency class by verbal summary to offsite authorities followed by written summary if required by 10 CFR 50.73. **or** 7. Escalate to a more severe emergency class.	

TABLE 5.2

EMERGENCY ACTIONS BASED ON CLASSIFICATION

Page 4 of 7

Classification	Licensee Actions	Off-Site Agency Actions
3. Site Area Emergency **Class Description** Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels that exceed EPA Protective Action Guideline exposure levels beyond the site boundary. **Purpose** Purpose of the site area emergency declaration is to (1) assure that response centers are manned, (2) assure that monitoring teams are dispatched, (3) assure that personnel required for evacuation of near-site areas are at duty stations if situation becomes more serious, (4) provide consultation with offsite authorities, and (5) provide updates for the public through offsite authorities.	1. Promptly inform off-site authorities of site emergency status and reason for emergency, if known. **and** 2. Augment resources by activating TSC, OSC and EOF and near-site/off-site monitoring teams. **and** 3. Dispatch monitoring teams and associated communications for instances where radiation releases appear imminent or have occurred. **and** 4. Provide a dedicated individual for plant status updates to off-site authorities and periodic press briefings. **and** 5. Make senior technical and management staff in the EOF available for consultation with NRC and state on a periodic basis. **and**	1. Provide, if able, any assistance required. **and** 2. Augment resources by activating primary emergency response centers. **and** 3. Assure that systems for public notification of emergency status are in standby and initiate preparation for subsequent public periodic updates. **and** 4. Alert to standby status other emergency personnel and dispatch personnel to duty stations. **and** 5. Provide off-site monitoring results to licensee and others and jointly assess them. **and**

TABLE 5.2

EMERGENCY ACTIONS BASED ON CLASSIFICATION

Page 5 of 7

Classification	Licensee Actions	Off-Site Agency Actions
3. Site Area Emergency (Continued)	6. Provide meteorological and dose estimates to off-site authorities for actual releases via a dedicated individual or automated data transmission. **and** 7. Provide release and dose projections based on available plant condition information and foreseeable contingencies. **and** 8. Close out or recommend reduction in emergency class by briefing of off-site authorities at EOF by phone followed by written summary if required by 10 CFR 50.73. **or** 9. Escalate to General Emergency class.	6. Continuously assess information from licensee and off-site monitoring with regard to changes to protective actions already initiated for public and mobilizing evacuation resources. **and** 7. Recommend placing milk animals within affected area radius on stored feed and assess need to extend distance. **and** 8. Provide press briefings. **and** 9. Maintain site emergency status until close out or reduction of emergency class. **or** 10. Escalate to General Emergency class.

TABLE 5.2

EMERGENCY ACTIONS BASED ON CLASSIFICATION

Page 6 of 7

Classification	Licensee Actions	Off-Site Agency Actions
4. General Emergency **Class Description** Events are in process or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area. **Purpose** Purpose of the general emergency declaration is to (1) initiate predetermined protective actions for the public, (2) provide continuous assessment of information from licensee and offsite organization measurements, (3) initiate additional measures as indicated by actual or potential releases, (4) provide consultation with offsite authorities and (5) provide updates for the public through offsite authorities.	1. Same as for "Site Area Emergency" classification. **and** 2. Make a Protective Action Recommendation to the state based on an assessment of plant conditions and/or dose projections. **Note:** The initial recommendations may be modified on the basis of subsequent plant status assessments or dose projections.	1. Provide requested assistance, if able. **and** 2. Recommend protective actions for 10-mile EPZ population and 50 mile EPZ agricultural products. **and** 3. Dispatch key emergency personnel including monitoring teams and associated communications. **and** 4. Activate other emergency services personnel and dispatch to duty stations. **and** 5. Provide off-site monitoring results to Susquehanna and jointly assess these. **and** 6. Continuously assess information from licensee and field-monitoring teams with regard to changes to protective actions already initiated for public and evacuation resources. **and**

TABLE 5.2

EMERGENCY ACTIONS BASED ON CLASSIFICATION

Page 7 of 7

Classification	Licensee Actions	Off-Site Agency Actions
4. General Emergency (Continued)		7. Maintain General Emergency status until closeout or reduction of emergency classification.

6.0 ORGANIZATIONAL CONTROL OF EMERGENCIES

Susquehanna's Emergency Plan is based upon a four-phase approach to accident response and mitigation.

Phase I - Immediate Response (Reference Table 6.1.) Phase I consists of identification of the emergency condition, initiation of prompt corrective action and initiation of prompt notification to local, state and federal agencies as well as appropriate members of Susquehanna's ERO. This initial phase is implemented by the on-shift organization. The on-shift organization has been staffed and trained to be capable of both safely operating the units and quickly and effectively responding to an emergency condition. Initially, the Shift Manager, the highest ranking management individual on-shift, will assume the role of Emergency Director and retain that role until relieved of that responsibility by the on-call Emergency Director.

The Shift Manager, as Emergency Director:

a) Classifies the condition.

b) Initiates corrective actions and coordinates emergency management activities.

c) Designates a communicator to notify off-site agencies and initiate call-in of selected personnel.

d) Ensures plant personnel are notified via the PA system or direct manual methods for accountability and/or evacuation, if required.

e) Notifies the on-call Emergency Director, informs him of the situation, and requests relief if appropriate. For conditions under a Notification of Unusual Event the Shift Manager may remain as ED through termination of the condition, due to probable short duration or low severity of the event.

f) Ensures that on-site emergency response individuals and groups are notified, using the PA system or direct manual communications. Depending on the nature and severity of the condition, TSC, OSC and EOF staffing may be called out. Under certain security-related events, such as a site-specific credible threat, the TSC and EOF will be activated at the Notification of Unusual Event level.*

g) Ensures that initial dose projections are done and makes resulting recommendations regarding off-site protective actions, if required.

h) Ensures that off-duty station personnel are notified to assist as necessary with emergency activities. These notifications are made, via the activation of ERO response pagers or by telephone backup, to individuals designated for off-duty availability status (i.e. on-call) to fill key emergency response positions. Those key positions are identified in Sections 6.2 and 6.3. Other off-duty personnel are called in as required.

* Letter dated February 25, 2002 from Samuel J. Collins, Director, Office of Nuclear Reactor Regulations, to Robert G. Byram, Senior Vice President and Chief Nuclear Officer. Subject: Issuance of Order for Interim Safeguards and Security Compensatory Measures for – Susquehanna Steam Electric Station, Units 1 & 2.

Upon activation of Phase II, additional personnel are available, and control of the emergency and dissemination of in-plant teams shifts from the Control Room to the TSC.

Phase II - Activation of On-Site ERO - (Reference Table 6.1 and Figures 6.2 and 6.3.) Upon notification by the on-shift organization, the on-call Emergency Director reports to the site/Control Room to assume the role of Emergency Director. As specified in Figures 6.2 and 6.3, the minimum number of support coordinators and staffs also report to the site. These individuals form the nucleus of the ED's Team and activate the TSC and OSC. The TSC and OSC are fully functional within 60 minutes of event classification (Alert or higher emergency declaration). As the on-call Emergency Director and his support coordinators arrive, they are briefed and assume responsibility for their particular areas of expertise. Emergency management activities, including communications, are under the control of the Emergency Director; dose projection and assessment activities are directed by the Radiation Protection Coordinator; technical expertise is directed by the Tech Support Coordinator; the Operations Coordinator oversees Operations activities; and the Damage Control Team Coordinator oversees in-plant damage control actions. The OSC Coordinator supports the operations and damage control team coordinators by managing personnel in the OSC (back up OSC in the event the OSC is not habitable). The TSC takes over all emergency management and support activities from the on-shift organization, freeing them to devote their efforts towards establishing and maintaining the plant in a safe, stable condition.

The onsite ERO may be further augmented as shown in Figures 6.2 and 6.3 by personnel filling TSC positions and OSC positions not designated as minimum requirements. Figures 6.2 and 6.3 also designate minimum requirements for the TSC and OSC respectively.

In the event of hazards preventing site access or certain security related events, personnel who normally report to the Technical Support Center and Operations Support Center will report to the Alternate TSC and OSC at the Emergency Operations Facility. OSC personnel can be sent to the site to mitigate site damage as soon as the site is secured. The alternate TSC will be activated as soon as possible to support the site; however, it is recognized that the activation time for the alternate TSC may exceed 60 minutes. *

Phase III - Activation of Off-site ERO - (Reference Table 6.1 and Figure 6.4.) This organization staffs the Emergency Operations Facility to provide management of the overall emergency response as well as technical support, off-site radiological assessment, and communications.

Staffing of the EOF occurs following an Alert, a Site Area Emergency, or a General Emergency declaration. The EOF is required to activate following a Site Area Emergency or General Emergency classification and take over management of the emergency from the TSC or Control Room within 90 minutes of the Site Area Emergency or higher classification. Activation of the Emergency Operations Facility requires the minimum staff as identified in Figure 6.4. When the initial emergency classification is a Site Area Emergency or higher, the EOF will take over the management of the emergency within 90 minutes of the declaration of a Site Area Emergency. Due to the site response during a daytime security event that starts at the SAE level, the EOF may not be staffed within 90 minutes. With an event in progress, station personnel may be directed to take cover and therefore be unable to respond to the EOF until cleared by plant security. At the discretion of the Emergency Director, the EOF can be activated and take over management of the emergency earlier.

* Letter dated February 25, 2002 from Samuel J. Collins, Director, Office of Nuclear Reactor Regulations, to Robert G. Byram, Senior Vice President and Chief Nuclear Officer. Subject: Issuance of Order for Interim Safeguards and Security Compensatory Measures for – Susquehanna Steam Electric Station, Units 1 & 2.

Functional operation will include:

- Management of overall emergency response
- Coordination of radiological and environmental assessment
- Determination of recommended protective actions
- Communications
- Coordination of emergency response activities with Federal, State, local county and municipal agencies

The offsite ERO may be further augmented as denoted in Figure 6.4 by personnel filling EOF positions not designated as minimum requirements. Figure 6.4 designates minimum staffing.

Phase IV - Restoration - This phase leads ultimately to the return to service of the unit. The organizational and philosophical concepts that are utilized during this phase are highly dependent upon the nature of the emergency. The restoration phase does not begin until there is complete assurance that the plant is in a stable shutdown condition and that there is no inadvertent or unplanned significant release of radioactivity to the environment.

6.1 NORMAL OPERATING ORGANIZATION

FSAR Section 13.1.2 defines the normal operating organization for SSES as illustrated in FSAR Figure 13.1-3. Minimum shift response during off-hours is as follows:

1	Shift Manager (SRO)
1	Unit Supervisor (SRO)
3	Plant Control Operators (RO)
4	Non-Licensed Operators (NLO)
1	Shift Technical Advisor
2	Radiation Protection Technicians
1	Chemistry Technician
1	Emergency Plan Communicator (Proficient Licensed Operator (LO))
1	NRC Communicator (Proficient SRO)
	Fire Brigade response personnel per Technical Requirements Manual
	Security Personnel as specified in the SSES Security Plan
15	Total

Appendix K of the Emergency Plan contains a detailed on-shift staffing analysis that ensures the above on-shift staffing is adequate to take emergency actions to safely shut down the reactor, mitigate accident consequences, notify augmented ERO staff and OROs, determine PARs for site personnel and the public, perform firefighting, and provide medical assistance if needed for various emergency events and accidents until they are relieved by the augmented Emergency Response Organization (ERO). These provisions are required by 10CFR50 Appendix E section IV.A.9, delineated in NEI 10-05 and endorsed by NSIR/DPR-ISG-01.

The on-shift staffing analysis shows that the prescribed set of events or accidents does not result in an emergency plan implementing duty being assigned to an on-shift position whose other mitigation duties could adversely impact performance of their emergency plan implementing duty.

The minimum shift response during off-hours is also shown in the On Shift column on Table 6.1.

NOTE:	On-shift staffing may be less than the minimum Emergency Plan requirement for a period of time not to exceed 2 hours in order to accommodate unexpected unavailability of on-duty shift individuals provided immediate action is taken to restore shift complement to within minimum requirements. This note applies to personnel who are on-duty, not oncoming shift relief.

6.2 ON-SITE EMERGENCY ORGANIZATION-(PHASE II)

Technical Specification 5.2, FSAR Section 13.1, and FSAR Section 17.2 define qualification requirements for Susquehanna Nuclear, LLC personnel. Department implementing procedures define specific qualification and training requirements for Susquehanna ERO positions.

6.2.1 Emergency Director (Table 6.1 60 Minute Response, Figure 6.2)

The Shift Manager assumes the role of Emergency Director (ED) until he is relieved by a qualified Emergency Director or a qualified Recovery Manager (RM).

Non-delegable duties (duties the ED cannot delegate except to another qualified ED or RM) are duties related to classification of emergencies, decision to notify state and local agencies, and Protective Action Recommendations.

The ED assumes full responsibility for the implementation and administration of the Emergency Plan and is responsible for assuring continuity of resources until those responsibilities are turned over to the Recovery Manager. The responsibility and authority of the ED are set forth in Appendix E of this plan.

The ED cannot relinquish any responsibilities until the arrival of and assumption of responsibilities by the Recovery Manager at the EOF. At that time, the ED may relinquish any responsibilities except those related to maintaining the Unit in a safe shutdown condition with adequate core cooling and no uncontrolled radioactive material releases.

If the Emergency Director cannot perform this function during the emergency, he will be succeeded by the Operations Coordinator until another qualified Emergency Director arrives to assume this responsibility.

Functional responsibilities of the ED include:

a. Immediately upon notification of an existing or potential emergency, report to the Control Room and initiate assessment activities, including classification of the emergency and dose projections if appropriate.

b. Manage overall implementation of the immediate on-site corrective and protective actions to bring the incident under control and mitigate its effects.

c. Assure that appropriate notifications of emergency classification and protective action recommendations to state and local agencies are made within 15 minutes of declaration of an EAL.

d. Assure that appropriate notifications and recommendations to the NRC are made immediately after notification to state and local agencies, but not later than one hour after declaration of an emergency classification.

e. Augment the on-site ERO with duty roster personnel and other available station staff members as dictated by the emergency condition.

f. Continue reassessment of emergency status and make appropriate recommendations including protective actions to off-site organizations.

g. Ensure that information released is accurate and released through the proper channels.

h. Activate Emergency Facilities described in Section 8.0, as required.

i. Assign a technical liaison to the state EOC when requested.

j. Communicate with and provide information to the Recovery Manager and the Public Information Manager.

k. Authorize issuance of Radioprotective Drugs in accordance with prescribed procedures. This should include consultation with the Radiation Protection Coordinator and medical consultants.

l. Authorize Emergency dose extensions. This should include consultation with the Radiation Protection Coordinator.

m. Authorize taking essential corrective action that may involve the risk of emergency radiation exposure to ERO personnel. Table 7.2 provides the basic criteria for this decision.

n. Implement RCA and site evacuations as required.

o. Request Federal assistance to augment ERO capabilities as necessary. Such requests should be coordinated with PEMA and/or DEP/BRP and are normally done through the Recovery Manager and the EOF staff.

p. Provide personnel and work schedules for relieving emergency personnel.

6.2.2 Operations Coordinator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Prepare the TSC for activation if the TSC ED has relieved the Control Room ED of responsibility.

b. Advise the Shift Manager in directing the Control Room and in-plant operational activities.

c. Direct activities of the Damage Control Team Coordinator, and TSC Communicator.

d. Advise the ED on plant operations and conditions.

e. Establish and set priorities for mitigation with the concurrence of the ED.

f. Make recommendations to the Shift Manager for mitigation of the effects of Severe Accidents when Severe Accident Management (SAM) procedures are entered.

6.2.3 TSC NRC Communicator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Maintain communications with the NRC.

b. Maintain records during the emergency.

6.2.4 TSC Emergency Plan Communicator (Table 6.1 60 Minute Response, Figure 6.2)

a. Make proper notification to off-site organizations.

b. Function as liaison for emergency-related communications between the ED and on-site and off-site emergency groups.

c. Maintain records during the emergency.

6.2.5 Radiation Protection Coordinator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Ensures dose projections are performed and results are provided to the to the Dose Assessment Supervisor until relieved by the EOF.

b. Provide radiological advice to the ED concerning on-site emergency activities.

c. Provide protective action recommendations to the ED.

d. Maintain communication with and provide information to the EOF Dose Assessment Supervisor.

e. Maintain communication with and provide radiological information to DEP/BRP until relieved by the EOF.

f. Provide on-site radiation monitoring personnel for effluent release assessment.

g. Provide radiation monitoring personnel for emergency team efforts.

h. Direct personnel and area contamination control and decontamination activities.

i. Perform initial off-site environmental assessment until relieved by the EOF.

j. Ensure radiological data is communicated to the NRC via the Health Physics Network.

k. Advise the Emergency Director and organization on use of KI and emergency dose extensions.

6.2.6 Technical Support Coordinator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Analyze mechanical, electrical, and instrument and control problems; determine alternate solutions, design and coordinate the installation of short-term modifications.

b. Analyze thermo hydraulic and thermodynamic problems and develop solutions.

c. Assist in the development of procedures necessary for conducting emergency operations and damage control.

d. Analyze conditions and develop guidance for the ED and operations personnel.

e. Resolve questions concerning Operating License requirements with NRC representatives.

f. Maintain lead technical responsibility, coordinate technical information with the EOF as appropriate, and request technical support from the EOF or other engineering/technical resources.

g. Maintain communication with and provide technical information to DEP/BRP Technical, as required, until relieved by the EOF.

h. Provide core damage estimates.

i. Until relieved, provide direction to Chemistry Technician to perform emergency plan actions.

6.2.7 Security Coordinator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Maintain plant security and institute appropriate contingency measures.

b. Account for personnel as directed by EP-PS procedures.

c. Act as liaison with outside groups in providing additional resources such as manpower, equipment, supplies, and transportation.

d. Coordinate provisions for transportation, food, and other logistical support for emergency personnel.

6.2.8 OSC Coordinator (Table 6.1 60 Minute Response, Figures 6.2 & 6.3)

Responsibilities:

a. Report to the OSC.

b. Organize, brief, dispatch, and direct, as necessary, the onsite damage control teams.

c. Coordinate the availability and assignment of personnel supporting activities for the ED and other ERO managers.

d. Organize and manage emergency response personnel in the OSC.

e. Ensure communications with all in-plant teams is maintained.

6.2.9 Damage Control Team Coordinator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Participate in briefings with the TSC ED and helping to set priorities.

b. Ensure damage control resources are allocated on the correct priorities by providing priorities to the OSC Coordinator and monitoring INDIA Team assignments.

c. Communicate with Operations Coordinator, the Technical Support Coordinator, and the OSC Coordinator.

6.2.10 RP Specialist – RAD Assessment Staff (Table 6.1 60 Minute Response, Figure 6.3)

Responsibilities:

a. Determine and maintan up-to-date status for radiological conditions in the plant.

b. Assess on-site habitability.

c. Provide guidance and brief teams on radiological and ALARA considerations.

d. Monitor in-plant team exposures.

6.2.11 "A" Radiological Monitoring Team (Table 6.1 60 Minute Response, Figures 6.2 & 6.4)

One team with two people who perform monitoring of areas around the plant as directed.

6.2.12 Engineering Staff (Core Thermal Hydraulic Engineer, Electrical Engineer, Mechanical Engineer) (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities

a. Provide core damage estimates. (Core Thermal Hydraulic Engineer)

b. Analyze mechanical problems and other discipline related issues and determine solutions and provide support for implementation of required mechanical actions. (Mechanical Engineer)

c. Analyze electrical and instrumentation and control problems and other discipline related issues. Determine alternate solutions and provide support for implementation of required electrical/I&C actions. (Electrical Engineer)

6.2.13 Non - Operations Support Personnel (Table 6.1 60 Minute Response, Figure 6.3)

Four RP Technicians, One Chemistry Technician, One Mechanical Maintenance worker and One (Electrical Maintenance worker or I&C Technician) provide support of accident assessment and repair/corrective actions.

As designated, maintain radio communications with in-plant teams.

One of the above RP Technicians may function as the RP Radio Communicator in the TSC to relieve the on-shift RP II Dose Calculator of that function if determined by the Radiation Protection Coordinator.

6.2.14 Non - Operations Support Personnel (Table 6.1 90 Minute Response, Figure 6.3)

Four RP Technicians and One (Electrical Maintenance worker or I&C Technician) provide support of accident assessment and repair/corrective actions as directed by the OSC Coordinator.

If the position is not already filled, one of the above RP Technicians may function as the RP Radio Communicator in the TSC to relieve the on-shift RP II Dose Calculator of that function if determined by the Radiation Protection Coordinator.

All responders are notified to provide for full augmentation of resources at the TSC and OSC for the positions in Figures 6.2 and 6.3. The augmented response may be greater than 60 minutes and may occur after the TSC has activated.

6.3 OFF-SITE RESOURCES AND ACTIVITIES (PHASE III)

Technical Specification 5.3, FSAR Section 13.1, and FSAR Section 17.2 define the qualification requirements for Susquehanna Nuclear, LLC personnel. Department implementing procedures define specific qualification and training requirements for Susquehanna ERO positions.

Notification of the Recovery Manager is made via notification of key managers for the Notification of Unusual Event and via ERO activation for higher levels by the Communicators in the Control Room or TSC. An on-call duty roster is available in the Susquehanna Information Management System.

At the discretion of the Emergency Director, the EOF can be manned or activated at a Notification of Unusual Event level.

Staffing of the EOF occurs following an Alert, a Site Area Emergency, or a General Emergency declaration. The EOF is required to activate following a Site Area Emergency or General Emergency classification for the purpose of taking over management of the emergency from the TSC or Control Room within 90 minutes of the Site Area Emergency or higher classification.

When these responders are briefed on the emergency situation and verify that necessary equipment is functioning properly, the Recovery Manager will assume responsibility for overall management of the emergency response. The following functions are provided:

- Management of overall emergency response
- Coordination of radiological and environmental assessment
- Determination of recommended protective actions
- Communications
- Coordination of emergency response activities with Federal, State, local county and municipal agencies.

All responders are notified to provide for full augmentation of resources at the EOF for the positions in Figure 6.4. The augmented response may be greater than ninety minutes and may occur after the EOF has activated.

6.3.1 EOF Organization

6.3.1.1 Recovery Manager (Table 6.1 90 Minute Response, Figure 6.4)

If the Recovery Manager cannot perform this function during the emergency, he will be succeeded by the Engineering Support Supervisor until another qualified Recovery Manager arrives.

Non-delegable duties (duties the RM cannot delegate except to another qualified ED or RM) are duties related to classification of emergencies, decision to notify state and local agencies, and Protective Action Recommendations.

Responsibilities:

a. Upon activation of the EOF, initiate assessment activities, including classification of the emergency and dose projections if appropriate.

b. Provide continuous coordination and evaluation of Susquehanna activities during an emergency having or potentially having environmental consequences.

c. Manage overall Susquehanna emergency response and assuring continuity of resources.

d. Act as lead interface with off-site government agency officials.

e. Assure appropriate notifications and recommendations to offsite organizations are timely.

f. Continue reassessment of emergency status and make appropriate recommendations including protective actions to off-site organizations.

g. Ensure that information released is accurate and made through proper channels.

h. Direct the activities of all other EOF managers.

i. Request Federal assistance to augment ERO capabilities as necessary. Such requests should be coordinated with PEMA and/or DEP/BRP.

j. Notify PEMA Emergency Operations Center of Protective Action Recommendations.

k. When requested, send a representative to the State EOC. If conditions result in implementation of the Federal Radiological Emergency Response Plan, assign a representative to the Federal Response Center, to the Federal Radiological Monitoring and Assessment Center, and to the Joint Information Center (most likely the PIM).

l. Authorize issuance of Radioprotective Drugs in accordance with prescribed procedures. This should include consultation with the Dose Assessment Supervisor and medical consultants.

m. If necessary, authorize Emergency dose extensions for monitoring field teams members under EOF command and control. This should include consultation with the Dose Assessment Supervisor.

6.3.1.2 Engineering Support Supervisor
(Table 6.1 90 Minute Response, Figure 6.4)

Responsibilities:

a. Manage engineering support resources in the EOF.

b. Provide technical support to aid in decision making process.

c. Keep BRP informed concerning technical status of the plant and any mitigating actions being considered or in progress.

d. Provide technical information concerning plant status and mitigating actions to the off-site agencies.

6.3.1.3 EOF Support Supervisor (Table 6.1 90 Minute Response, Figure 6.4)

Responsibilities:

a. Provide support to the Recovery Manager in review of plant data.

b. Oversee formal communications leaving the EOF.

c. Oversee proper facility set up.

d. Provide administrative support.

e. Support the Recovery Manager with off-site agency interface.

6.3.1.4 Dose Assessment Supervisor (Table 6.1 90 Minute Response, Figure 6.4)

Responsibilities:

a. Ensure dose projections are performed.

b. Evaluate the magnitude and effects of actual or potential radioactive releases from the plant.

c. Recommend appropriate off-site protective measures to the Recovery Manager.

d. Recommend appropriate emergency classifications to the Recovery Manager.

e. Communicate with the Radiation Protection Coordinator in the TSC and with DEP/BRP radiological personnel.

f. Control field monitoring teams.

g. Perform off-site environmental assessment.

h. Advise the Recovery Manger and organization on use of KI and emergency dose extensions, if necessary, for the monitoring field team members under EOF command and control.

6.3.1.5 Emergency Plan Communicator
(Table 6.1 90 Minute Response, Figure 6.4)

Responsibilities:

a. Assume responsibility from the TSC for off-site notifications (except ENS communications).

b. Transmit information about the emergency to off-site organizations.

c. Function as liaison for questions received from other organizations.

d. Maintain a record of emergency notifications.

6.3.1.6 Radiological Support Staff (Dose Assessment Staffer, Field Team Director, "B" Radiological Monitoring Team)
(Table 6.1 90 Minute Response, Figure 6.4)

Responsibilities:

a. Perform dose calculations, as required. (Dose Assessment Staffer)

b. Monitor and control field teams. (Field Team Director)

c. Perform monitoring of areas around the plant as directed. ("B" Radiological Monitoring Team)

6.3.2 Joint Information Center

The ED ensures that the JIC (Figure 6.4) is promptly notified and provided with available details of the emergency. The JIC staff provides information regarding the emergency and items of public interest to municipal groups, initiates appropriate news releases, and responds to questions from the media officials. After the Recovery Manager assumes control of the EOF, the Public Information Manager reports to the Recovery Manager.

6.3.2.1 Public Information Manager

Responsibilities:

a. Serve as official company spokesperson.

b. Prepare and disseminate SSES information to the public via the news media.

c. Interpret plant status information for the news media and other agencies.

d. Arrange for news media conferences.

e. Manage rumor control.

f. Establish interfaces and coordinates news releases with the federal and state agencies in the JIC.

6.3.3 Local Off-Site Support Services

The Emergency Director, and the Recovery Manager as appropriate, ensures that appropriate off-site emergency support groups are contacted to provide the type and level of assistance that may be necessary to deal with the existing emergency condition. Organizations that may be contacted for assistance during an emergency condition at SSES are listed in Appendix A, Letters of Agreement. Methods available for contacting these support groups include direct telephone communications with individual organizations, use of the 911 telephone system for emergency services, and message relay through LCEMA or CCEMA.

6.3.4 Off-Site Support Services

An emergency at SSES may require additional technical services and equipment. This type of assistance may be obtained from the organizations listed in Table 6.2 and Appendix A.

6.4 COORDINATION WITH PARTICIPATING GOVERNMENT AGENCIES

The ED and the RM ensure that off-site authorities are notified and apprised of emergency events at SSES when their respective facilities are managing the emergency.

Notification of a NOUE (Notification of Unusual Event) is primarily to ensure that the authorities are cognizant of the details of events that may arouse public concern and initiate inquiries by news media or members of the public.

6.4.1 County Agencies

LCEMA and CCEMA provide for:

- Planning and coordination with municipal, State, and Federal authorities.
- Initial response to notification by SSES.
- Alert and warning of local populations within the 10 mile EPZ.
- Evacuation and other protective measures for local populations within the 10 mile EPZ.
- Emergency services.
- Situation analysis.
- Operation of county EOC.

LCEMA and CCEMA also provide direction for the local organizations that are assigned action or support responsibilities under their plans.

The primary method of notification to LCEMA and CCEMA is via the Centrex Telephone Network (CTN). Secondary methods are radio and regular telephone.

6.4.2 State Agencies

PEMA provides for:

- Issuance of planning guidance.
- Coordination of State response to nuclear incidents.
- Coordination of multi-county Emergency Response Planning.
- Operation of PEMA EOC.
- Provision for emergency public information.
- Coordination of State agencies and departments.

DEP/BRP provides for:

- Technical consultation on Radiological and Plant conditions.
- Accident assessment.
- Recommendations for protective actions.
- Recommendations for protection of potable water and food.
- Recommendations for recovery and re-entry (off-site).
- Operation of DEP/BRP EOC.

Initially, SSES notifies PEMA, who, in turn, notifies DEP/BRP. DEP/BRP calls back to SSES to obtain radiological and plant condition information and establish a communication link with SSES. If the emergency warrants, DEP/BRP responds to the EOF.

The primary method of notification to PEMA is via the Centrex Telephone Network (CTN). CTN communications between SSES and DEP/BRP are used for transmitting radiological and technical information/recommendations.

6.4.3 Federal Agencies

As detailed in the Federal Radiological Emergency Response Plan (FRERP), the Federal government maintains extensive capabilities to assist states and licensees in responding to radiological emergencies. The ED and, upon EOF activation, the RM are authorized to request Federal assistance. Such requests should be coordinated with PEMA and/or DEP/BRP.

NRC - designated Lead Federal Agency (LFA) under the National Response Plan (NRP).

The primary method of notification to the NRC is via the Emergency Notification System (ENS). Upon notification of an emergency classification, the NRC will enter one of several response modes based on the severity of the event. Response modes include:

Normal (Increased Regional Monitoring)
Monitoring
Activation
Expanded Activation

In the Normal and Monitoring modes, NRC site presence is provided by the Resident Inspectors who typically observe activity in the Control Room and TSC. Upon Activation, a site team will be dispatched that can arrive at the site within several hours. Response assignments are primarily at the EOF, with a few individuals located at the JIC, TSC, Control Room and OSC. If conditions warrant, the NRC can go to Expanded Activation that has a much larger response to staff shift type operations and additional team support personnel.

DOE - provides radiological monitoring and assessment assistance.

The primary method of notification to DOE is by telephone, although assistance is typically requested through the Lead Federal Agency (NRC) or through the State (DEP/BRP). Initial DOE response is by a Radiological Assistance Program (RAP) team dispatched from the DOE Brookhaven Area Office. This team can arrive within eight hours and would operate primarily out of the EOF.

If the situation necessitates additional technical assistance, DOE can set up and staff a Federal Radiological Monitoring and Assessment Center (FRMAC) in the vicinity of SSES. A FRMAC, which draws DOE resources and personnel from its Nevada Operations Office, can be operational within about 24 hours. The location of such a center would be selected based on actual radiological deposition patterns. The Federal FRMAC team is initially managed by DOE, with personnel also provided by NRC, EPA, USDA, HHS, and other agencies. The State and Susquehanna would assign personnel to the FRMAC to coordinate monitoring activity.

DHS – FEMA - responsible for coordinating all Non-technical Federal response.

If the emergency situation has warranted implementation of the National Response Plan (NRP), DHS-FEMA will set up and staff a Federal Response Center in the vicinity of SSES. The location of such a center would be selected based on current needs and conditions. Access to all Federal non-technical assistance is through the Federal Response Center where representatives of participating agencies are based.

Other Federal Agencies

In addition to NRC, DOE, and DHS-FEMA, other Federal agencies are available to provide assistance under the National Response Plan (NRP). The extent of participation depends on the nature and magnitude of the event. A full listing of these agencies and description of their missions is found in the National Response Plan (NRP).

Additional information on available resources can be found in NUREG-1442/ FEMA-REP-17, "Post-Emergency Response Resources Guide."

Joint Information Center (JIC)

The National Response Plan (NRP) provides for each participating agency to be represented at a Joint Information Center, along with the State and the facility licensee. For Susquehanna SES, it is expected that these parties will agree to utilize Susquehanna's JIC to fulfill this on-scene Joint Information Center role.

Resources Available to Support Federal Response

A. Lodging and Food Service - Lodging and food service for personnel operating from the FRMAC, Federal Response Center, and JIC are available from local commercial resources in the Wilkes-Barre, Hazleton, and Bloomsburg areas.

B. Communications - Capability provided by DOE and DHS-FEMA, supplemented by standard telephone service to be established when facilities are selected, are adequate for the FRMAC and Federal Response Center.

C. Security - Security arrangements for the FRMAC and Federal Response Center can be made by the DOE and DHS-FEMA, respectively, with local resources.

D. Transportation - Federal response personnel will provide their own transportation by renting commercially available vehicles.

E. Airport - Wilkes-Barre/Scranton International Airport, Avoca, Pennsylvania.

6.5 RESTORATION

The Susquehanna ERO continues to provide appropriate emergency response functions until such time as the emergency has been terminated or the Talen Corporate Leadership Council (CLC) has approved the implementation of a long-range restoration organization. Termination from an emergency condition is through joint evaluation by the organizations involved. In the case of a severe emergency involving off-site consequences, this would include the Recovery Manager, DEP/BRP, and NRC. The Senior Vice President and Chief Nuclear Officer requests that the Talen Corporate Leadership Council establish a restoration organization when the following guidelines have been met:

- In-plant systems are stable, adequate core cooling established and contingency systems and plans available.
- In-plant radiation levels are stable or are decreasing with time.
- Releases of radioactive material to the environment are under control or have ceased.
- Any fire, flooding or similar emergency conditions are under control or have ceased.

Although planning for restoration varies according to the emergency, a long-term restoration organization that is general in nature has been defined. The restoration organization is a project-type organization with their major activities conducted from the EOF. This organization is depicted in Figure 6.6 and major responsibilities are defined below.

- Restoration Manager - A designated officer or senior manager from Susquehanna to manage SSES restoration operations.
- Plant Operations Manager - A designated manager from Susquehanna qualified to control plant operations including security.
- Technical Support Manager - A designated manager from Susquehanna qualified to manage a technical group.
- Radiological Manager - A designated manager qualified to manage the radioactive waste and radiological control aspects.

- Maintenance Manager - A designated manager qualified to coordinate the activities of Susquehanna, NSSS supplier, and construction forces on proposed plant modifications or other construction support.

- Advisory Support Function - Advisory support consists of senior representatives of the NSSS supplier, the NRC, and special consultants.

- Scheduling/Planning Manager - A designated manager to coordinate plans and schedules for the Restoration Manager.

- Administration and Logistics Manager - A designated manager who is responsible for providing administrative, logistic, communications and personnel support.

- Public Information Manager - A designated manager qualified to manage public relations activities.

During restoration operations, the radiation exposure limits of 10CFR20 apply. Compliance with those limits is the responsibility of the Restoration Manager via the applicable Radiation Protection organization.

At the time of declaring that an emergency has entered the restoration phase, the Restoration Manager is responsible for providing notification to all applicable agencies.

Restoration actions that plan for, or may result in, radioactive release are evaluated by the Restoration Manager as far in advance of the event as is possible. Such events and data are reported to the appropriate off-site emergency response organizations and agencies prior to initiating release.

Table 6.1

STATION EMERGENCY PLAN MINIMUM STAFFING REQUIREMENTS

Major Functional Area	Major Tasks	Position Title or Expertise	On Shift	Capability for Additions (Note A) 60 min	90 min
Plant Operations and Assessment of Operational Aspects		Shift Manager (SRO)	1	--	--
		Unit Supervisor (SRO)	1 (Note B)	--	--
		Plant Control Operators (RO)	3 (Note C)	--	--
		Non-Licensed Operators (NLO)	4	--	--
Emergency Direction and Control (Emergency Director)		Emergency Director	(Note D)	1	--
Notification/Communication	Notify licensee, State, Local, and Federal personnel & maintain communication	Emergency Plan Communicator	1 (Note E)	1	1
		EOF Support Supervisor	--	--	1
		NRC communicator	1 (Note F)	1	--
Radiological Accident Assessment and Support of Operational Accident Assessment	Emergency Operations Facility (EOF) Director	Recovery Manager	--	--	1
	Radiation Protection & Dose Assessment	Radiation Protection Coordinator	--	1	--
		Dose Assessment Supervisor	--	--	1
		Rad Assessment Staff	--	1 (Note I)	2 (Note J)
	Offsite Surveys (Field Teams)	Radiological Monitoring Team Personnel	--	2 (Note K)	2 (Note L)
	Onsite [out-of-plant (RP Tech)]	Survey Team Personnel	--	1	1
	Radiation Protection & Dose Assessment: a. Access Control b. RP coverage for repair, corrective actions, search and rescue, first aid, & firefighting c. Personnel Monitoring d. Dosimetry e. Dose Assessment f. In-Plant Surveys	RP Technicians	2	3	3
	Chemistry/Radiochemistry	Chemistry Technicians	1	1	--

Table 6.1

STATION EMERGENCY PLAN MINIMUM STAFFING REQUIREMENTS

Major Functional Area	Major Tasks	Position Title or Expertise	On Shift	(Note A) Capability for Additions 60 min	90 min
Plant System Engineering	Technical Support	Shift Technical Advisor	1	--	--
		Operations Coordinator	--	1	--
		Core/Thermal Hydraulics Engr.	--	1	--
		Electrical Engr.	--	1	--
		Mechanical Engr	--	1	--
		Technical Support Coordinator	--	1	--
		Engineering Support Supervisor	--	--	1
Repair and Corrective Actions	Management of Damage Control Teams	Damage Control Team Coordinator	--	1	--
		OSC Coordinator	--	1	--
	Repair and Corrective Actions (onshift requirements may be fulfilled by NLOs)	Mechanical Maintenance/ Rad Waste Operator	(Note G)	1	--
		Electrical Maintenance/ Instrument and Control Technician	(Note G)	1	1
Firefighting	Firefighting communications	--	Fire Brigade per Technical Requirements Manual	Local Support	
Rescue Operations and First Aid	--	--	(Note H)	Local Support	
Site Access Control and Personnel Accountability	Security, personnel accountability	Security Personnel	All per Security plan		
		Security Coordinator	--	1	--
			15	22	14

Plus Fire Brigade and Security Plan Required Personnel

STATION EMERGENCY PLAN MINIMUM STAFFING REQUIREMENTS

Notes for Table 6.1

Note A The Capability for Additions column refers to reporting times. Reporting location may be the OSC, TSC or EOF.

Note B As a result of having a common control room, the Unit Supervisor can be shared between the two units. See Appendix K for staffing assignments during various events or accidents.

Note C One PCO will be assigned to each unit. See Appendix K for staffing assignments during various events or accidents.

Note D The role of Emergency Director is fulfilled by the Shift Manager position. See Appendix K for staffing analysis.

Note E The Emergency Plan Communicator position is a proficient Licensed Operator (LO). See Appendix K for staffing analysis.

Note F The NRC Communicator position is a proficient Senior Reactor Operator (SRO). See Appendix K for staffing analysis.

Note G Fulfilled by one of the NLO's on-shift to provide initial damage control repair activities until additional support arrives. Such activities include racking breakers, changing fuses manipulating valves, moving equipment, and starting equipment locally.

Note H Minimum of two individual's on-shift with the capability of performing Rescue Operations/First Aid and is a collateral duty of Fire Brigade and Security personnel. See Appendix K for staffing analysis.

Note I RP Specialist in the OSC.

Note J Dose Assessment Staffer and Field Team Director in the EOF.

Note K "A" Radiological Monitoring Team personnel (see Figure 6.2 and 6.4) – One team with two people who are 60 minute responders that which are then dispatched from the vicinity of the plant within 60 minutes. Team is then turned over from the TSC to the EOF. This team is not required for TSC activation but is required for EOF activation.

Note L "B" Radiological Monitoring Team personnel (see Figure 6.4) – One team with two people who are 90 minute responders that are dispatched from the EOF. This team is not required for EOF activation unless the "A" team is unavailable, in which case it will be used for EOF activation.

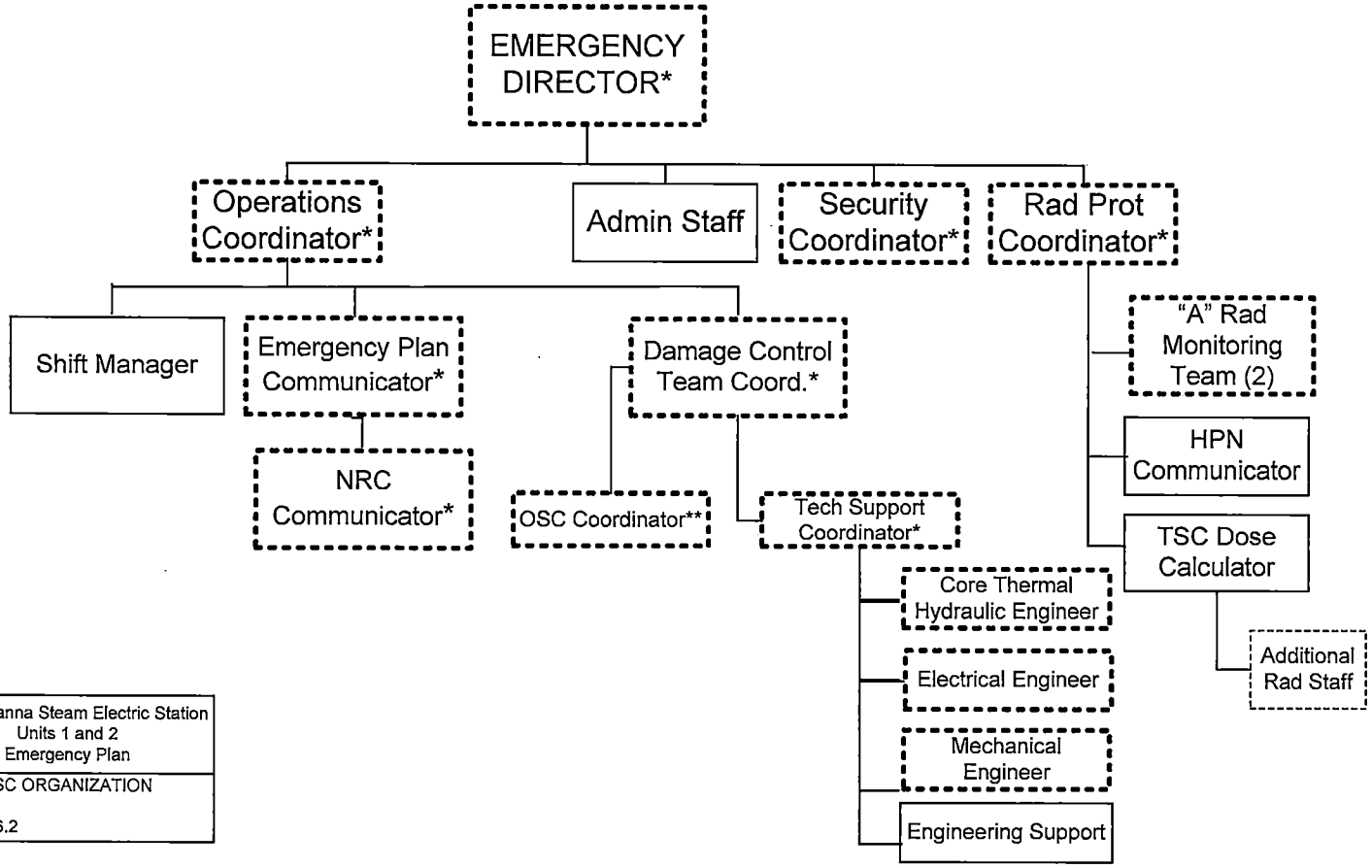
TABLE 6.2

ADDITIONAL ASSISTANCE FROM OUTSIDE SUSQUEHANNA NUCLEAR, LLC

Name/Address	Emergency Function	Availability (Hours)	Reporting Location
1. Committed Resources			
• General Electric	Engineering advise and analysis for NSSS equipment	N/A	GE Facilities
	Operations and Maintenance expertise on NSSS equipment	48	EOF
• INPO Atlanta, GA	Operations and Maintenance expertise	On call 24 hrs. a day	INPO HQ in Atlanta
	Dissemination of information	N/A	INPO HQ in Atlanta
• Other Nuclear Utility Support	Operations, Maintenance, Radiological personnel for augmenting emergency staffing	4	EOF

NOTE: Information necessary to contact appropriate vendors in case of an emergency is maintained in the Emergency Telephone Instructions and Directory.

TSC ORGANIZATION



Susquehanna Steam Electric Station
Units 1 and 2
Emergency Plan

TSC ORGANIZATION

FIGURE 6.2

Designates minimum requirements in accordance with Table 6.1 for 60-minute response.

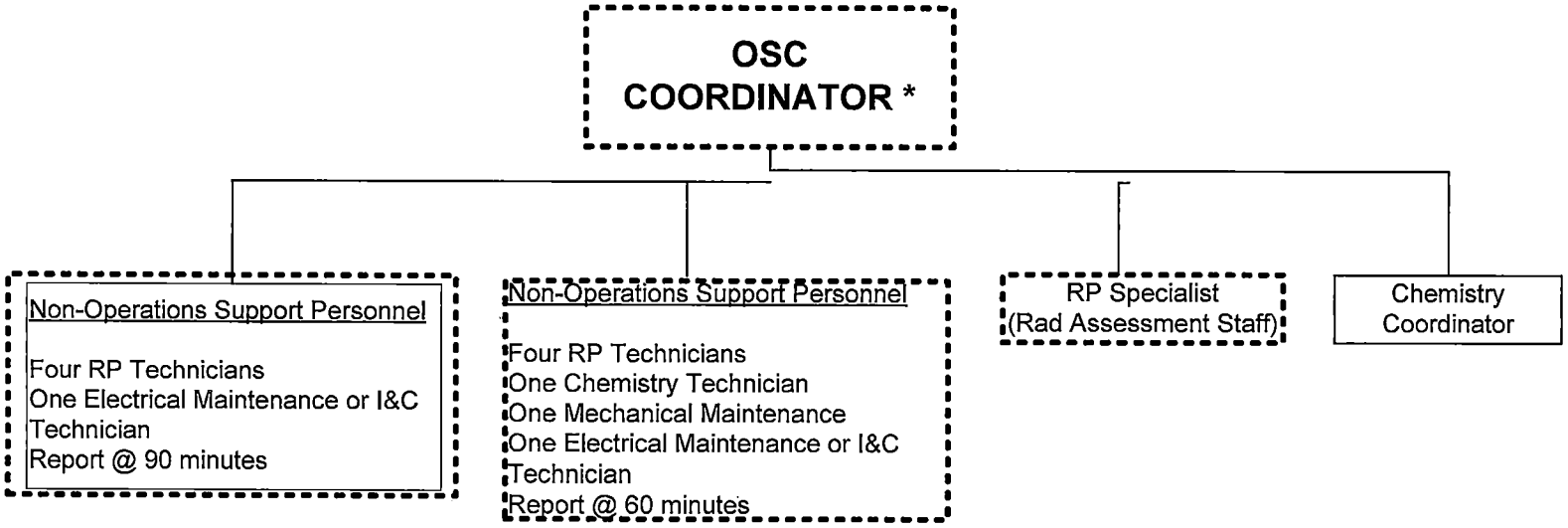
- - - - - Individuals may be located in the OSC, TSC, or Field.

* Designates positions required for TSC activation.

** Located in the OSC. See Figure 6.3

Note: Rad Monitoring Team (2) refers to 1 team with 2 people.

OSC ORGANIZATION



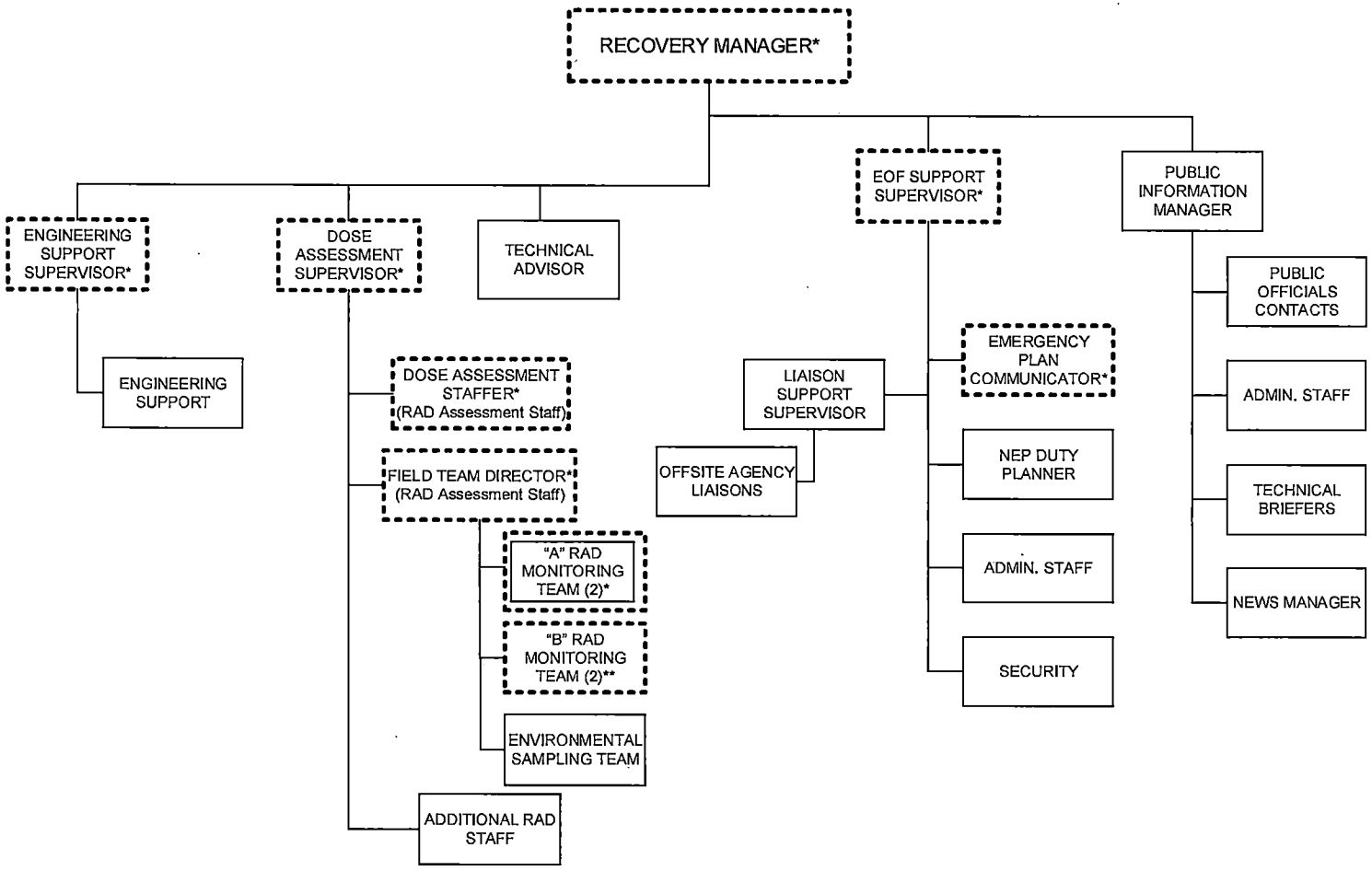
* Designates positions required for OSC activation.

Designates minimum requirements in accordance with Table 6.1 for 60-minute response.

Designates minimum requirements in accordance with Table 6.1 for 90-minute response.

Susquehanna Steam Electric Station Units 1 and 2 Emergency Plan
OSC ORGANIZATION FIGURE 6.3

EOF ORGANIZATION



Designates minimum requirements in accordance with Table 6.1 for 90 minute response.

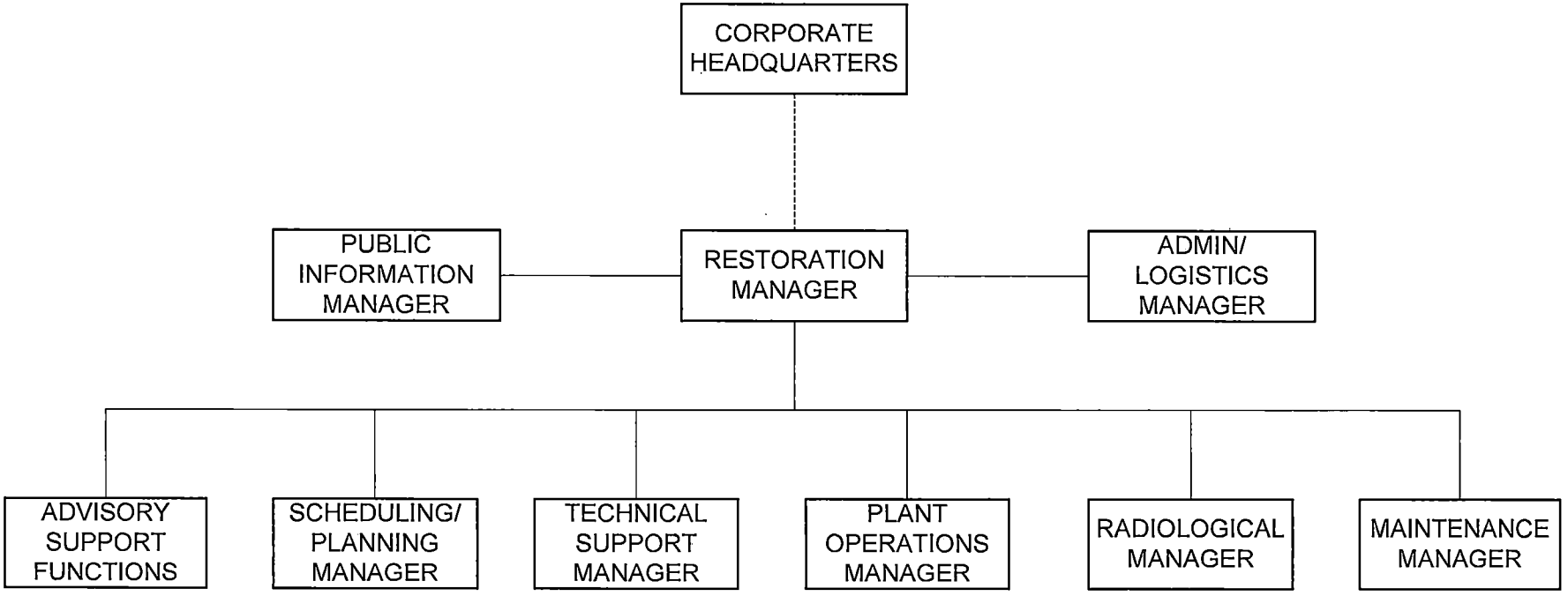
* Designates positions required for EOF activation.

** Not required for activation unless "A" team unavailable.

NOTE: RAD Monitoring Team (2) refers to 1 Team with 2 people.

Designates minumum requirements in accordance with Table 6.1 for 60 minute response.

Susquehanna Steam Electric Station Units 1 and 2 Emergency Plan
EOF ORGANIZATION FIGURE 6.4

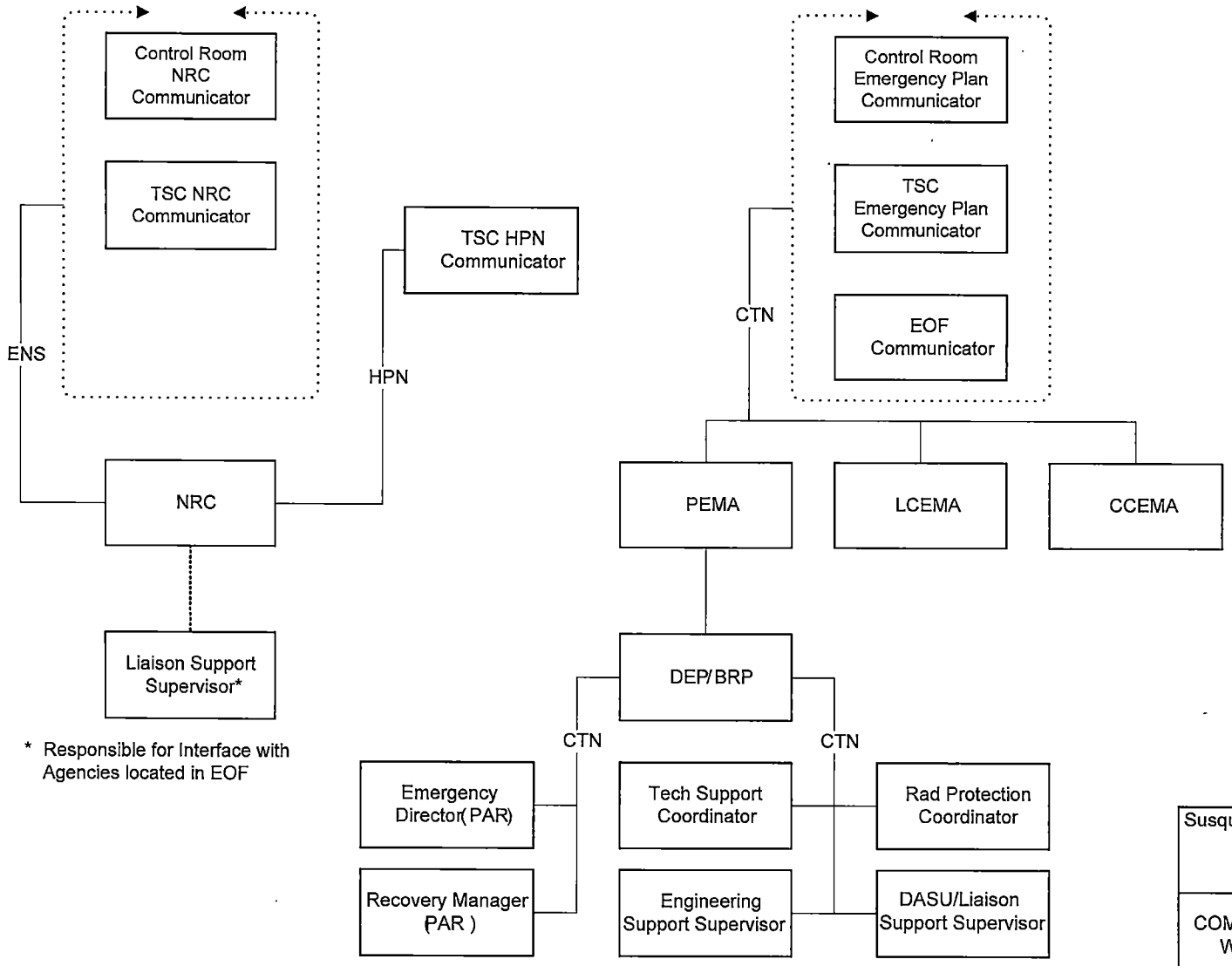


Susquehanna Steam Electric Station
Units 1 and 2
Emergency Plan

LONG TERM RESTORATION ORGANIZATION

FIGURE 6.6

COMMUNICATION INTERFACES WITH OFF - SITE AGENCIES



Susquehanna Steam Electric Station
Units 1 and 2
Emergency Plan

COMMUNICATION INTERFACES WITH OFF-SITE AGENCIES

FIGURE 6.7

7.0 EMERGENCY MEASURES

7.1 ASSESSMENT ACTIONS FOR ALL EMERGENCY CLASSIFICATIONS

Provisions are made for assessment through the course of an emergency to ensure effective coordination, direction and upgrading of emergency activities in a timely manner. The assessment actions are described in detail in Emergency Plan Position Specific Instructions (EP-PSs).

Continuous assessment of the status of plant systems and radiological conditions is provided by plant instrumentation and is supplemented by routine surveillance functions. The occurrence of an Unusual Event is recognized by instrument alarms or indications, surveillance results, or other observation of an off-normal condition by an individual at the station.

Assessment actions are described below. For a Notification of Unusual Event, one or more of the actions listed below will be initiated; for higher emergency classifications, actions are continued, intensified, and increased in frequency.

Table 7.1 provides a Summary of Notification & Response Actions outlined in Section 7.1.

- Perform surveillance of in-plant instrumentation.
- Initial and continued observation of off-normal conditions.
- Obtain assistance from off-duty personnel and/or off-site support groups.
- Deploy on-site damage control teams.
- Perform reactor coolant sampling and analysis.
- Deploy field radiological monitoring teams to perform direct radiation measurements and air sampling.
- Perform dose calculation activities. Correlate with field team data.
- Perform sampling and analysis of environmental media.

7.1.1 Off-Site Dose Calculations

The Emergency Director is responsible for initiating off-site dose calculation and assessment activities. These activities are performed by Radiation Protection trained personnel who report to the Technical Support Center (TSC) (or the Control Room for all initial entries into the Emergency Plan). Data from the vent effluent monitors and the meteorological towers serve as inputs for the off-site dose calculation methods.

The ED is responsible for calling in personnel to the TSC to perform off-site dose assessment activities. The Radiation Protection Coordinator reports to the TSC within 60 minutes of notification.

Field monitoring teams are directed to selected monitoring location(s) by either the Radiation Protection Coordinator, Dose Assessment Supervisor, Dose Assessment Staffer, or Field Team Director via radio and/or phone communication. The results of the teams' surveys are used to update projected doses and dose calculational assumptions.

The initial field monitoring team is staffed within 60 minutes and is dispatched from the vicinity of the plant within 60 minutes. An additional field monitoring team is staffed within 90 minutes and dispatched from the EOF. See Table 6.1 and Figures 6.2 and 6.4.

Each radiological monitoring team is supplied with a survey meter and low volume air sampler. TLDs are located at 17 sites around the station to provide early information on accumulated off-site doses. Two sets of TLDs are provided at each of these sites; one set for dose accumulation during the period of releases and one set maintained for the normal monitoring period or exchanged early at the Dose Assessment Supervisor's discretion to meet information needs.

The ED and Recovery Manager recommend appropriate protective actions to PEMA Operations Center, Harrisburg, based upon the results of the off-site dose assessment activities.

7.1.1.1 Meteorology

The SSES on-site meteorological measurement system is based upon an on-site primary meteorological tower located to the east southeast of the station. The primary tower provides measurements of wind speed, wind direction, and wind direction variability at its 10 and 60-meter levels, temperature differential between the 10 and 60-meter levels, and ambient temperature and dew point at the 10-meter level. Precipitation is measured at ground level. In case of primary tower failure, a 10-meter on-site backup meteorological tower will provide measurements of wind speed, wind direction, and wind direction variability.

The meteorological systems are instrumented to provide continuous data to the control room and the Plant Integrated Computer System (PICSY) for utilization in the TSC and EOF. Data that enters PICSY is viewable through various display formats and is also transmitted to the NRC via ERDS. Digital dataloggers are present at all of the SSES meteorological towers. All data is stored locally and is available for acquisition by interrogation across telephone lines. Primary and backup tower strip chart recorders are located in the control room.

Site specific, meteorological information for emergency dose assessment purposes can also be obtained by contacting either a meteorologist or the National Weather Service Station using the phone numbers provided in the SSES Emergency Telephone Directory.

7.1.1.2 Radiation Protection Considerations

In the event of an unplanned radioactive release from either the reactor building vents, the turbine building vents, or the standby gas treatment vent; continuous gross noble gas readings are available from the vent monitors. Each monitor is also equipped with in-line iodine and particulate sampling capability. These in-line samples are periodically removed and analyzed in order to provide iodine and particulate release rate information. Event declarations are based on Noble Gas readings or iodine and particulate sample results.

The following Radiation Protection considerations are taken into account: selection of the accident type to closely approximate the isotopic mix and average gamma energies of the release occurring, radioactive decay from time of reactor shutdown, plume decay-in-transit and iodine and particulate depletion due to precipitation.

7.1.1.3 Dose Calculations for Airborne Releases

A dose calculation model is used to make current, site specific estimates and predictions of atmospheric effluent transport and diffusion during and immediately following an accidental airborne radioactivity release. The purpose of the prediction is to provide an input to the assessment of the consequences of accidental radioactive releases to the atmosphere and to aid in the implementation of emergency response decisions.

The dose calculation model used is a fast running, time-dependent, variable trajectory plume segment "B" model with the following capabilities:

NOTE: A class "B" model is a numerical model that represents the actual spatial and temporal variations of plume distribution.

- Computes atmospheric dispersion at the site based on atmospheric stability as a function of site specific terrain conditions with 15-minute upgrades of source term and meteorological conditions.

- Provides estimates of deposition and relative concentration of radioactivity within the plume exposure and ingestion EPZs for the duration of the release.

- Incorporated in the calculations is wet and dry deposition which enables dose estimates from three pathways - plume, ground shine, and ingestion.

The dose program complies with the "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," (EPA-400), adopting the dose calculation methodology in ICRP #26/30. The accident dose assessments are based on the adult physiology per EPA 400, except for one case-that is, child thyroid dose conversion factors are used in calculating thyroid CDE. However adult physiology is used in calculating thyroid CDE for purposes of evaluating the need for a sheltering only PAR when evaluating controlled venting of containment. Calculations of TEDE are made using the (adult) dose factors provided in EPA-400. The following calculational options are available:

- TEDE (Total Effective Dose Equivalent) integrated doses consisting of the sum of external doses from plume shine, 50 year committed effective dose equivalent from inhalation (CEDE), and 4 day ground shine doses.

- EDE and CDE dose rates for field team management.

- Fifty year thyroid committed dose (CDE), from inhalation of radioactive materials.

- Population dose (person rem) out to 50 miles.

- Summary print of projected doses for each of four projection times.

- Integrated ground dose for projected times specified by the user.

The dose calculation program is a standalone program running on PCs located in the TSC and EOF.

7.1.1.4 Liquid Release Calculations

Estimates of downstream river water concentrations are made by employing effluent sample analysis or discharge monitor data, discharge flow rates and river elevation readings. The river elevation is used to estimate the travel time to the point of interest. The calculated degree of mixing, together with the discharge monitor data and the discharge flow rates are used to calculate downstream concentrations.

7.2 CORRECTIVE ACTIONS

Detailed operating procedures and plant procedures are utilized by the plant operating personnel to assist them in recognizing emergency events and taking the corrective actions necessary to place the plant in a safe condition. Table 6.1 shows personnel available to respond to an emergency. Additionally, EP-PSs describe subsequent and supplemental corrective actions for the scope of potential situations within each of the emergency classifications. These procedures are designed to guide the actions of the personnel to correct or mitigate the condition as early and as near to the source of the problem as feasible.

Some essential corrective actions may involve the risk of emergency exposure to ERO personnel. Such actions could involve preventing the release of large quantities of radioactive material, reducing damage to major equipment or lifesaving actions. Table 7.2 specifies the limits for emergency exposure and other relevant criteria to be considered. The ED is responsible for all corrective actions taken to mitigate the consequences of the accident on-site.

7.3 PROTECTIVE ACTIONS

Protective actions are implemented to prevent or mitigate consequences to individuals during or after a radiological incident. Protective action recommendations within the SSES Exclusion Area and Site Boundary are the responsibility of the ED, but may include assistance by the EOF. Protective actions outside the Site Boundary are primarily the responsibility of State and local emergency organizations, but may include coordination of activities, dissemination of appropriate data, and recommendations by the ED or Recovery Manager. Effective integration of SSES procedures and implementation plans with State and local implementation plans ensure that all members of the public, including those located on Susquehanna property but outside the emergency plan boundary, will be notified of protective actions to be taken and that the actions can be implemented in a timely manner. Protective action recommendations are outlined in Table 7.3.

7.3.1 On-Site Protective Actions

The primary protective measure for on-site personnel in an emergency is prompt evacuation from areas that may be affected by significant radiation, contamination, or airborne radioactivity.

Respiratory protective equipment and clothing are provided at the plant and in the various emergency equipment kits for personnel who may be required to perform emergency activities.

Control of in-plant contamination is in accordance with SSES Radiation Protection procedures. In the event of radioactive contamination outside fenced security areas, but within the exclusion area, access to such areas is controlled by Susquehanna with assistance from the PSP.

7.3.1.1 Local Area Evacuation

This category refers to evacuation from one area to another area within the same building. The initiation of a Local Area Evacuation results from ARM or CAM alarm(s) sounding in the same area within a building or from observed conditions such as smoke or toxic gas, which may indicate a possible habitability problem. The initial response for individuals is to evacuate to an unaffected area of the building, notify the plant Control Room of the conditions, and await further instruction. The ED assesses the situation, activates appropriate procedures to rectify the condition and informs the personnel when to return to their respective work area via the PA system or direct manual communication.

7.3.1.2 Radiologically Controlled Area Evacuation

The initiation of a Radiologically Controlled Area Evacuation results from ARM, CAM, or other applicable monitor alarms, (i.e., fire alarms). Notification for personnel to proceed with a Radiologically Controlled Area Evacuation is announced over the plant PA system. If all or part of the PA system is unavailable then alternate manual methods may be used to notify personnel of the need for evacuation and/or accountability. The initial mandatory response by individuals is evacuation to an unaffected area. In this case, however, the nearest such area may not be in the same building, and multiple ARM, CAM, or fire alarms are probable.

The decision to implement a Radiologically Controlled Area Evacuation is the responsibility of the ED. Factors to be considered include the apparent levels of radiation and/or airborne radioactivity involved and the exposure to personnel that would result from evacuating to Accountability Areas.

7.3.1.3 Security and Accountability

Accountability of on-site personnel during an emergency is accomplished through the use of the physical security system and station procedures. The physical security system clearly establishes who is within the protected area. Personnel are notified to report to accountability areas during an emergency via an alert signal transmitted over the PA system. If all or part of the PA system is unavailable then alternate manual methods may be used to notify personnel of the need for evacuation and/or accountability. The names of the personnel reporting in are compared to those logged through the security system in order to ensure total accountability.

If not completed earlier, accountability will be initiated immediately after declaration of a Site Area Emergency and will be completed within 30 minutes of the declaration of a Site Area Emergency.

For certain security-related events, an evacuation of non-essential personnel may be conducted prior to performing accountability. Security will collect badges upon egress from the site and then perform accountability.*

7.3.1.4 Site Evacuation

A Site Evacuation requires that all individuals on-site, except for Control Room operations personnel and others with specific emergency assignments, leave the site. If the ED requires off-site assembly, personnel will go to the Remote Assembly Area. The Primary Remote Assembly Area is the Susquehanna Energy Information Center (NE Sector), as shown in Figure 8.1. The alternate Remote Assembly Area is the West Building (WSW Sector). Assembly area leaders will coordinate accountability at Remote Assembly Areas.

Implementation of a Site Evacuation is the responsibility of the ED. That decision is based on the severity of the incident, the likelihood of escalation, and the radiation and airborne radioactivity levels throughout the station. Notification is made via the PA system. If all or part of the PA system is unavailable then alternate manual methods may be used to notify personnel of the need for evacuation and/or accountability.

Accountability is accomplished in passage through the security gate. Personnel and vehicle contamination surveys are performed at the Remote Assembly Area, using portable survey instruments.

For certain events such as some security events, on-site personnel may be directed to remain in place due to personal safety concerns until a more appropriate time for accountability and evacuation. Station procedures specify those security contingencies. *

* Letter dated February 25, 2002 from Samuel J. Collins, Director, Office of Nuclear Reactor Regulations, to Robert G. Byram, Senior Vice President and Chief Nuclear Officer. Subject: Issuance of Order for Interim Safeguards and Security Compensatory Measures for – Susquehanna Steam Electric Station, Units 1 & 2.

7.3.2 Off-Site Protective Actions

The responsibility for actions to protect off-site individuals rests with the Commonwealth of Pennsylvania.

DEP/BRP is responsible for evaluating information obtained from SSES and other sources and recommending appropriate off-site protective actions to PEMA. Such recommendations include:

* Shelter for affected populations
* Evacuation of affected populations
- Administration of thyroid prophylaxis
- Control of contaminated agricultural products

The principal off-site local coordinating agency is LCEMA. Since the area and population inside the ten-mile EPZ are partially within Columbia County, parallel emergency response functions are provided by CCEMA. Upon notification by PEMA of a situation that may require protective actions for off-site populations, LCEMA and CCEMA initiate appropriate actions. If PEMA has lost communication or is otherwise unavailable, it is possible that the ED or Recovery Manager may contact LCEMA and CCEMA directly with protective action recommendations. If time permits, LCEMA and CCEMA obtain a review and verification by PEMA of recommendations made by the ED or Recovery Manager.

LCEMA and CCEMA protective actions include:

* Prompt alerting of the population within ten miles of the SSES through the use of the Alert Notification System (described in Section 8.0) and Route Alerting Teams, a supplement to the siren system that is implemented, as necessary, in the event of siren failure or to alert persons or areas that may not be within the sound of the sirens. Route alerting is a municipal responsibility and is accomplished by municipal route alert teams traveling in vehicles along preplanned routes delivering the following message: "There is an emergency at the Susquehanna Steam Electric Station; please tune to your Emergency Alert Station."
* Transmission of specific instructions to potentially affected populations via the Emergency Alert System.
* Assistance for evacuation of the population within the ten-mile EPZ.

Appendix G includes the estimated times to evacuate all or segments of the population from the 10-mile EPZ, identifies potential problem areas and provides contingencies for dealing with adverse conditions. It was utilized in the development of detailed evacuation plans by PEMA, LCEMA, and CCEMA.

7.4 AID TO AFFECTED PERSONNEL

7.4.1 Emergency Exposure

All reasonable measures are taken to maintain the radiation exposure of emergency personnel who provide rescue, first aid, decontamination, ambulance, firefighting, law enforcement or medical treatment services within applicable limits specified in Table 7.2. "Guidance on Dose Limits for Workers Performing Emergency Services". Table 7.2 summarizes the emergency exposure criteria for entry or re-entry into areas for purposes of undertaking protective or corrective actions. Actions taken to provide the support activities listed above are considered commensurate with the activities listed in Tale 7.2. Methods and conditions for permitting volunteers to receive emergency radiation exposures are described in EP-PS procedures, and provide for expeditious decisions with consideration to known and reasonable balance of associated risks.

7.4.2 Decontamination and First Aid

Personnel contamination in emergency situations is controlled to the extent feasible by the normal methods of using protective clothing and surveying for contamination following the removal of such clothing. Personnel decontamination areas are available in-plant and decontamination efforts involving significant amounts of contamination are performed under the direction of Radiation Protection personnel.

At least two persons who are qualified in first aid methods are on-site at all times. First aid to injured personnel can be performed in conjunction with any necessary decontamination methods. However, if immediate treatment of the injury is vital, that treatment takes precedence over decontamination. This philosophy also extends to off-site emergency assistance involving radioactive contamination. For that purpose, measures are established to ensure timely off-site medical treatment.

7.4.3 Medical Transportation and Treatment

Arrangements and agreements have been made for the transportation and treatment of patients from SSES, who may have injuries complicated with radioactive contamination or who may have been involved in a radiation incident.

CODE:

Notification of Unusual Event	=	1
Alert	=	2
Site Area Emergency	=	3
General Emergency	=	4

TABLE 7.1
SUMMARY OF IMMEDIATE NOTIFICATION AND RESPONSE FOR ALL CLASSIFICATIONS

ONSITE		OFFSITE	
IMMEDIATE NOTIFICATIONS	**ACTIONS**	**IMMEDIATE NOTIFICATIONS**	**ACTIONS**
Fire Brigade (1-4)	Fight Fire (1-4)	Fire Units (1-4)	Fight Fire (1-4)
Damage Control Team (1-4)	Repairs (1-4)		
First Aid/Rescue Team (1-4)	Rescue (1-4) First Aid (1-4)	Rescue Assistance (1-4) Ambulance (1-4) Hospital (1-4)	Rescue (1-4) Transport (1-4) Treatment (1-4)
Security Force (1-4)	Security Measures (1-4) Personnel Evacuation (1-4)	PSP (1-4)	Assist Security (1-4)
Dose Assessment Personnel (1-4)	Dose Calculations (1-4) Dose Assessment (1-4)	Talen Headquarters (1-4)	Confirmatory Calculations (2-4) Maintain Communications (2-4)
Field Monitoring Teams (1-4)	Field Monitoring (1-4)		Field Monitoring and Continuous Evaluation of Dose Projections (2-4)
All Other Station Personnel (1-4)	Augment Shift Resources/Activate TSC (2,3,4) Augment Resources/Activate Offsite ERO (2,3,4)* Personnel Evacuation (as appropriate) (3,4)	Talen Headquarters(1-4) Site personnel designated as off-site response (2,3,4)*	Alert Key Personnel (1) Activate and Staff Offsite ERO (2,3,4) Recommend Offsite Action (4)

* TSC and EOF (or alternate TSC) will be activated for certain security events such as a site-specific credible security threat.
Letter dated February 25, 2002 from Samuel J. Collins, Director, Office of Nuclear Reactor Regulations, to Robert G. Byram, Senior Vice President and Chief Nuclear Officer. Subject: Issuance of Order for Interim Safeguards and Security Compensatory Measures for – Susquehanna Steam Electric Station, Units 1 & 2.

TABLE 7.1 SUMMARY OF IMMEDIATE NOTIFICATION AND RESPONSE FOR ALL CLASSIFICATIONS			
ONSITE		OFFSITE	
IMMEDIATE NOTIFICATIONS	ACTIONS	IMMEDIATE NOTIFICATIONS	ACTIONS
		SEIC/JIC (1-4)	Provide Info to Public via Media (1-4)
		LCEMA, CCEMA, PEMA, NRC (1-4)	Place ANS & Procedures on Standby (2) Activate and Staff Response Centers (2-4) Activate the Emergency Response Data System (2-4) Implement Off-site Protective Measures (4)

NOTES: 1. Notification is required to LCEMA, CCEMA, and PEMA within 15 minutes of indication and verification of the event for Unusual Event, Alert, Site Area, and General Emergency.

2. Initial notification for all levels of emergencies are to LCEMA, CCEMA, PEMA, and NRC.

TABLE 7.2
EMERGENCY EXPOSURE CRITERIA

Planned exposure to the whole body and/or specific organs should not exceed the following recommendations of the National Council on Radiation Protection and Measurements and the Manual of Protective Action Guides and Protective Actions for Nuclear Incidents (EPA-400). Guidance on dose limits for workers performing emergency services is summarized in tabular format below.

NOTE: These limits apply to doses incurred over the duration of an emergency, treated as a once in a lifetime exposure, and not added to occupational exposure accumulated under non-emergency conditions.

Doses to all workers including local offsite support agencies such as firefighting, ambulance services or Local Law Enforcement Agencies during emergencies should, to the extent practical, be limited to 5 rem. There are some emergency situations for which higher exposure limits may be justified. The need for authorization of potential doses greater than 5 rem should be evaluated based on the criteria specified below under "Guidance on Dose Limits for Workers Performing Emergency Services." Justification of any such exposure must include the presence of conditions that prevent the rotation of workers or other commonly used dose reduction methods.

NOTE: Exposure of workers that is incurred for the protection of large populations may be considered justified for situations in which the collective dose avoided by the emergency operation is significantly larger than that incurred by the workers involved.

Persons undertaking any emergency operation in which the dose will exceed 25 rem to the whole body should do so only on a voluntary basis and with full awareness of the risks involved, including the numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of risk of delayed effects.

Guidance on Dose Limits for Workers Performing Emergency Services

Dose Limit [a] (rem)	Activity	Condition
5 rem	All	
10 rem	Protecting Valuable Property	Lower Doses Not Practicable
25 rem	Lifesaving or protection of large populations	Lower Doses Not Practicable
>25 rem	Lifesaving or protection of large populations	Only on a voluntary basis to persons fully aware of the risks involved (see attached tables)

[a] Sum of external effective dose equivalent and committed effective dose equivalent to non-pregnant adults from exposure and intake during an emergency situation. Workers performing services during emergencies should limit dose to the lens of the eye to three times the listed value and doses to any other organ (including skin and body extremities) to ten times the listed value. These limits apply to all doses from an incident, except those received in unrestricted areas as members of the public during the intermediate phase of the incident.

TABLE 7.2
EMERGENCY EXPOSURE CRITERIA

Additional General Criteria

- Only volunteers are given planned emergency exposure.
- Attached tables provide information concerning acute and delayed health effects.
- Whenever practical, consideration is given to dividing exposure among as many personnel as possible.
- Potassium Iodide utilization for iodide prophylaxis requires the approval of the Emergency Director or the Recovery Manager in consultation with the Radiation Protection Coordinator or the Dose Assessment Supervisor and medical consultants, if available. It is recommended that potassium iodide be administered in situations where potential exposure of the thyroid is anticipated to exceed 10 rem or at lower dose levels if judged as needed by the RPC or DASU.
- All reasonable measures must be taken to control contamination and internal exposure.
- Persons performing emergency activities should be familiar with exposure consequences.
- Women capable of reproduction should not take part in these actions.
- Retrospective doses are evaluated on an individual case basis.
- As in the case of normal occupational exposure, doses received under emergency conditions should be maintained as low as reasonably achievable.

Health Effects Associated with Whole Body Absorbed Doses Received Within a Few Hours[a]

Whole Body Absorbed Dose (rad)	Early Fatalities[b] (percent)	Prodromal Effects[c] (percent affected)
050		2
100		15
140	5	
150		50
200	15	85
250		98
300	50	
400	85	
460	95	

a Risks will be lower for protracted exposure periods.

b Supportive medical treatment may increase the dose at which these frequencies occur by approximately 50 percent.

c Forewarning symptoms of more serious health effects associated with large doses of radiation.

TABLE 7.2
EMERGENCY EXPOSURE CRITERIA

Approximate Cancer Risk to Average Individuals from 25 rem Effective Dose Equivalent Delivered Promptly

Age at Exposure (years)	Approximate Risk of Premature Death (deaths per 1,000 persons exposed)	Average Years of Life Lost if Premature Death Occurs (years)
20 to 30	9.1	24
30 to 40	7.2	19
40 to 50	5.3	15
50 to 60	3.5	11

TABLE 7.3

PROTECTIVE ACTION RECOMMENDATIONS

Emergency Conditions	Susquehanna Actions	Susquehanna Recommendations
A. Airborne Release 1. General Public	Determine the following: 1. Plant status and prognosis. • Degree of fuel damage • Containment integrity • Decay heat removal • Ventilation systems • Remedial, mitigating actions in progress 2. Status of radioactive releases. • Release path, monitored, unmonitored, both • Duration of release • Trend of release, increasing, decreasing, constant • Treatment availability, filtered, unfiltered • Type of release, gap, fuel melt • Prognosis for changes in above	SSES will provide an initial PAR based on site-specific wind persistence study to the Senior State Official within 15 minutes from the declaration of a General Emergency as follows: 1. For a Rapidly Progressing Severe Accident (RPSA): a. Evacuate 2 mile radius; b. Evacuate affected sectors 2-10 miles downwind. 2. For a Hostile Action Based (HAB) GE event: a. Shelter 5 mile radius. 3. For all other General Emergencies: a. Evacuate 2 mile radius; b. Evacuate affected sectors 2-5 miles downwind. 3.1 When there is a Controlled Containment Venting of less than an hour AND a valid dose assessment projects doses less than 1000 mrem TEDE and less than 5000 mrem Adult Thyroid CDE at EPB AND the PAR is issued by extended ERO (TSC or EOF): a. Shelter 2 mile radius; b. Shelter affected sectors 2-5 miles downwind. Initial PAR shall also advise citizens to take KI in accordance with the state's emergency plans and advise remainder of the EPZ to monitor and prepare. Continue assessment based on available plant and field monitoring information and evaluate for subsequent PARs in accordance with: 1. Until RPSA conditions do not apply any more, ERO shall consider the following subsequent PARs based on dose assessment results or changes in wind direction affecting new sectors, if conditions exist which would require classification of a General Emergency per EALs: a. Evacuate additional affected sectors 2-10 miles downwind b. Evacuate all sectors where PAGs were exceeded or are expected to be exceeded. 2. Until HAB conditions do not apply any more, ERO shall consider the following subsequent PARs based on dose assessment results: a. Evacuate 2 mile radius b. Evacuate all sectors where PAGs were exceeded.

TABLE 7.3

PROTECTIVE ACTION RECOMMENDATIONS

Emergency Conditions	Susquehanna Actions	Susquehanna Recommendations
A. Airborne Release (Cont'd) 1. General Public (Cont'd)	Determine the following: 3. Weather Conditions, effect on dose projections. 4. Dose projections and avoided dose.	3. If RPSA or HAB conditions do not apply, or for all other General Emergencies, ERO shall consider the following subsequent PARs based on dose assessment results or changes in wind direction affecting new sectors, if conditions exist which would require classification of a General Emergency per EALs: a. Evacuate additional affected sectors 2-5 miles downwind b. Evacuate all sectors where PAGs were exceeded or are projected to be exceeded. c. Evacuate 2 mile radius, IF NOT previously recommended 3.1 When there is a Controlled Containment Venting of less than an hour AND a valid dose assessment projects doses less than 1000 mrem TEDE and less than 5000 mrem Adult Thyroid CDE at EPB AND the PAR is issued by extended ERO (TSC or EOF): a. Shelter additional affected sectors 2-5 miles downwind. If the state has informed SSES of impediments to evacuation, recommend shelter "in place" instead of "evacuate" The PAR methodology described above complies with 10CFR50.47(b)(10), Appendix E to Part 50, Section IV Paragraph 3 and NUREG-0654, Supplement 3, Rev 1.

Emergency Conditions	Susquehanna Action	Results	Susquehanna Recommendations
A. Airborne Release (Cont'd.) 2. Dairy Cows	1. Determine the following: a. Peak activity for I^{131}	a. Forage Concentration .05 micro Ci/kg Milk .015 micro Ci/l 1.5 Rem projected dose to the infant thyroid whichever is first.	
	b. Meteorological Conditions (1) Wind Speed (2) Precipitation (3) Stability Class (4) Wind Direction	b. Known sectors potentially affected	DEP/BRP to recommend appropriate protective action to affected farmers.

TABLE 7.3

PROTECTIVE ACTION RECOMMENDATIONS

Emergency Conditions	Susquehanna Action	Results	Susquehanna Recommendations
B. Liquid Radioactive Release Into Susquehanna River	1. Determine the following: a. Source of release b. Volume (approx.) of release c. Anticipated length of time release will continue 2. Notify: a. DEP/BRP b. Danville Water authority c. NRC 3. Initiate sampling of: a. Release point b. Susquehanna River 4. Initiate projections of radionuclide activity concentrations at the Danville Water Authority.	A single isotope exceeds its specific effluent concentration (EC) value from Column 2 of Table 2 of Appendix B to 10CFR20 or diluted sum of EC fractions at Danville is greater than 0.85.	1. Recommend to DEP/BRP that consideration be given to termination of user intake of all downstream users. 2. Assess additional results of sampling and analyses of radionuclide activity concentrations of SSES liquid effluent and/or Susquehanna River water upstream of the Danville Water Authority, and provide appropriate updated recommendations to DEP/BRP based on that assessment.

8.0 EMERGENCY FACILITIES AND EQUIPMENT

8.1 ON-SITE EMERGENCY CENTERS

8.1.1 Control Room

The Control Room is the primary location for the initial assessment and coordination of corrective actions for all emergency conditions. The Control Room is equipped with the display and controls for all critical plant systems, radiological and meteorological monitoring systems, and all station communication systems. Reference Appendix D, Enclosure 7.

Off-site emergency functions initially served by the Control Room are transferred to the TSC or EOF for an Alert, a Site Area Emergency, or a General Emergency as deemed appropriate by the ED. If the TSC and/or EOF are staffed, the functions may also be transferred at the Notification of Unusual Event level. The primary consideration is to ensure that the number of personnel involved with the emergency in the Control Room shall not impair the safe and orderly shutdown of the reactor or the operation of plant safety systems.

8.1.2 Operations Support Center

The OSC is the primary on-site assembly area for operations support team personnel during an emergency. There are 2 OSC areas-a primary OSC located separate from the TSC and Control Room and a backup OSC located in the Control Structure. The primary OSC is located on the first floor of the South (Administrative) Building. The backup OSC occupies 340 square feet adjacent to the Control Room on Elevation 729'-1" of the control structure.

The OSC is utilized initially as the central location for assembly and accountability of on-shift emergency team personnel required to perform such functions as: firefighting, first aid, search and rescue, damage control, and on-site radiation monitoring. If and when the TSC is activated, all non-operations support team personnel assemble and are accounted for in the OSC (or CR if the backup OSC is being utilized.) TSC personnel assess the need for emergency team personnel and based on this assessment, the OSC dispatches available team personnel and call in additional personnel as needed. The OSC and TSC assembly areas will be monitored continuously for habitability. If these areas become uninhabitable, retained personnel will be directed to alternate holding areas. Control and dispatch of these teams is the responsibility of the OSC Coordinator. The OSC Coordinator manages operations and other support personnel.

Equipment required for these teams to perform their functions, as outlined in Appendix D is stored and maintained in the Control Room, Operations Support Center, Radiation Protection access control points and Maintenance tool areas.

In the event of hazards preventing site access such as certain security events, personnel who normally report to the Operations Support Center will report to the Alternate OSC at the Emergency Operations Facility. The alternate OSC will be activated as soon as possible to support the site; however, it is recognized that the activation time in the alternate OSC may exceed 60 minutes. *

8.1.2.1 The Primary OSC

The primary OSC is located on the first floor of the South (Administration) Building. The OSC facilities may be used for normal daily activities that do not degrade OSC emergency preparedness.

8.1.2.1.1 Habitability

8.1.2.1.1.a Allowable Post-Accident Radiation Doses

The primary OSC is monitored for radiation exposure using a local ARM and Continuous Air Monitor. The radiation dose will be limited to less than 5 Rem TEDE, at which time the primary OSC will be relocated to the backup OSC. Applicable criteria are specified in General Design Criterion 19, Standard Review Plan NUREG 0800 Section 6.4, and NUREG-0737, Item II.B.2.

8.1.2.1.1.b Postulated Post Accident Radiation Doses

The primary OSC is monitored for radiation exposure using a local ARM and Continuous Air Monitor. The radiation dose will be limited to less than 5 Rem TEDE, at which time the OSC will be relocated to the backup OSC. Applicable criteria are specified in General Design Criterion 19, Standard Review Plan NUREG 0800 Section 6.4, and NUREG-0737, Item II.B.2.

8.1.2.1.1.c Radiation Monitoring

A portable ARM will be installed in the primary OSC area and a Continuous Air Monitor is installed in the South (Administration) Building cafeteria, which is adjacent to the primary OSC. This area serves as an accountability area and a holding area for essential personnel.

* Letter dated February 25, 2002 from Samuel J. Collins, Director, Office of Nuclear Reactor Regulations, to Robert G. Byram, Senior Vice President and Chief Nuclear Officer. Subject: Issuance of Order for Interim Safeguards and Security Compensatory Measures for – Susquehanna Steam Electric Station, Units 1 & 2.

8.1.2.1.2 HVAC

The primary OSC is subject to normal South (Administration) Building ventilation.

8.1.2.1.3 Shielding

There is no special shielding installed. The primary OSC is located in an area with no outside walls.

8.1.2.1.4 Occupant Accommodations

Since the primary OSC is located in an administration building, toilet facilities and water are available.

8.1.2.1.5 Communications

The primary OSC communication system includes the plant PA system and telephone lines tied through the plant switchboard.

8.1.2.1.5.a Telephone

The normal telephone service for the primary OSC uses the plant ETN system, and can reach on and offsite locations.

8.1.2.1.5.b Public Address System

The PA system is part of the plant PA system. The system provides two-way communications at handset stations. Each station may originate and receive communications by switching to either a page channel or to one of five non-interfering party line channels.

8.1.2.2 Backup OSC

A backup OSC area exists in the Control Structure and would be used in the event the primary OSC becomes uninhabitable. During normal plant operations, this area serves as an operations staff work area for shift changeover purposes as well as shift work assignment area. The Non-Emergency use of the OSC does not degrade its primary purpose.

8.1.2.2.1 Habitability

8.1.2.2.1.a Allowable Post-Accident Radiation Doses

Back-up OSC personnel are protected from radiological hazards, including direct shine and airborne activities for postulated accident conditions to the same degree as Control Room personnel. Applicable criteria are specified in General Design Criterion 19, Standard Review Plan NUREG 0800 Section 6.4, and NUREG-0737, Item II.B.2

8.1.2.2.1.b Postulated Post Accident Radiation Doses

The radiation dose to personnel occupying the backup OSC is the same as the Control Room personnel. The doses from controlling accidents are summarized in Chapter 15.0 of the FSAR.

8.1.2.2.1.c Radiation Monitoring

To ensure adequate radiological protection of the backup OSC personnel, a commercial grade monitor located in the center of the Control Room alarms on high gross gamma radiation dose rates.

8.1.2.2.2 HVAC

The backup OSC HVAC system is a part of the Control Room HVAC system which is described in FSAR Section 9.4.1.

8.1.2.2.3 Shielding

Shielding requirement for the backup OSC is the same as for the Control Room for total dose to occupants from direct shine and airborne. Exposure does not exceed 5 Rem TEDE for the duration of the accident. This is in accordance with General Design Criterion 19, USNRC Standard Review Plan NUREG 0800 Section 6.4, and NUREG-0737, Item II.B.2. Duration of occupancy and method of analysis is the same as that used for the Control Room. Access control may need to be applied within five feet of the east wall of the Control Structure (including the backup OSC) as described in Emergency Plan position specific procedures.

8.1.2.2.4 Occupant Accommodations

No toilet facilities are provided in the backup OSC. Facilities are available in the Control Room and at grade level of the control structure for washing and toilet accommodations.

8.1.2.2.5 Communications

The backup OSC communication system includes the plant PA system and telephone lines tied through the plant switchboard.

8.1.2.2.5.a Telephone

The normal telephone service for the backup OSC uses the plant ETN and CTN systems. Both systems have the capability to reach on and offsite locations.

8.1.2.2.5.b Public Address System

The PA system is part of the plant PA system. The system provides two-way communications at handset stations. Each station may originate and receive communications by switching to either a page channel or to one of five non-interfering party line channels.

8.1.3 Technical Support Center

The TSC is a controlled access area that provides working space and facilities for approximately 25 ERO personnel. These personnel provide guidance to plant operations personnel for management of emergency conditions and accident mitigation.

The TSC is located in the existing Control Room mezzanine above the Control Room at elevation 741'-1" of the control structure and occupies approximately 2500 square feet. The TSC is within approximately two minutes travel time of the Control Room by elevator or stairs.

The TSC facilities may be used for normal daily activities that do not degrade TSC emergency preparedness. The TSC provides office space for Operations and Technical personnel. Other station personnel may also use the facilities as a research or reference area.

In the event of hazards preventing site access such as certain security events, personnel who normally report to the Technical Support Center will report to the Alternate TSC at the Emergency Operations Facility. The alternate TSC will be activated as soon as possible to support the site; however, it is recognized that the activation time in the alternate TSC may exceed 60 minutes.*

8.1.3.1 Spatial Layout Description

The TSC includes areas for work, conferencing (NRC & Susquehanna), document control, and computer monitoring. Housed components are PICSY terminals, associated copiers, and VERMS Maintenance Interface Terminal. (Reference Figure 8.2.)

8.1.3.2 Fire Protection

Smoke detection and automatic pre-action sprinkler system are provided.

8.1.3.3 Structural Design Criteria

The TSC is part of the control structure that is a Seismic Category I structure, as defined in NRC Regulatory Guide 1.29. It is designed in accordance with Chapter 3.0 of the FSAR.

* Letter dated February 25, 2002 from Samuel J. Collins, Director, Office of Nuclear Reactor Regulations, to Robert G. Byram, Senior Vice President and Chief Nuclear Officer. Subject: Issuance of Order for Interim Safeguards and Security Compensatory Measures for – Susquehanna Steam Electric Station, Units 1 & 2.

8.1.3.4 Habitability

8.1.3.4.1 Post-Accident Radiation Doses

8.1.3.4.1.a Allowable

TSC personnel are protected from radiological hazards, including direct shine and airborne activities for postulated accident conditions to the same degree as control room personnel. Applicable criteria are specified in General Design Criterion 19, Standard Review Plan NUREG 0800 Section 6.4, and NUREG-0737, Item II.B.2.

8.1.3.4.1.b Postulated

The radiation dose to personnel is the same as the Control Room personnel. The doses from controlling accidents are summarized in Section 15 of the FSAR.

8.1.3.4.1.c Radiation Monitoring

Commercial grade monitors are provided to alarm on high gross gamma radiation dose rates. In addition, airborne radioactivity concentrations are monitored by portable monitors. Iodine detection capability is provided.

8.1.3.4.2 HVAC

The TSC HVAC system is a part of the Control Room HVAC system which is described in FSAR Section 9.4.1.

8.1.3.4.3 Shielding

Shielding is the same as for the Control Room for total dose to occupants from direct shine and airborne. Exposure will not exceed 5 Rem TEDE for the duration of the accident. This is in accordance with General Design Criterion 19, USNRC Standard Review Plan NUREG 0800 Section 6.4, and NUREG-0737, Item II.B.2. Duration of occupancy and method of analysis is the same as for the control room. Access control may need to be applied within five feet of the east wall of the Control Structure (including impacted TSC areas) as described in Emergency Plan position specific procedures.

8.1.3.4.4 Occupant Accommodations

No sleeping accommodations or toilet facilities are provided. Use of the plant's existing facilities at grade level of the control structure for washing and toilet accommodations is available. Self-contained breathing apparatus are available for personnel who are qualified in their use.

8.1.3.5 Communication Links

The TSC communications system is comprised of three telephone networks (ETN, CTN, and FTS), VHF and UHF radios, and the plant PA system. They provide reliable primary and back-up communication links to emergency response facilities on- and off-site.

8.1.3.5.1 Telephones

The TSC uses the CTN system as primary communications with the ETN system available at various locations and the FTS 2001 reserved for federal government agencies.

8.1.3.5.2 Radio

The TSC has a four-channel 450 MHz UHF and a two-channel 150 MHz VHF radio system with digital voice privacy capability. The VHF radio is an emergency backup for communication with LCEMA and CCEMA, and to communicate with the field monitoring teams. The UHF radio provides primary and backup security, emergency, operational and maintenance communication links.

8.1.3.5.3 Public Address System

The PA system is part of the plant PA system. The system provides two way communications at handset stations. Each station may originate and receive communications by switching to either a page channel or to one of five non interfering party line channels.

8.1.3.6 Power Supply

The TSC is part of the existing power block as described in Chapter 8.0 of the FSAR.

8.1.3.7 Instrumentation

The TSC utilizes the same field sensors and signal conditioning equipment that is provided to monitor plant systems. TSC instrumentation is identical to the field instrumentation used to operate the plant. A detailed description of this instrumentation is provided in Chapter 7.0 of the FSAR.

8.1.3.8 TSC Data Presentation

The TSC includes human factors engineered man-machine capabilities to allow personnel to determine:

* plant conditions during normal operation
* plant steady-state conditions prior to an accident
* transient conditions producing an initiating event
* plant system dynamic behavior during an accident
* projected behavior and effects of offsite airborne radioactivity releases.

The man-machine interface is provided by the Plant Integrated Computer System (PICSY), located in the TSC. (Reference Figure 8.2.)

8.1.3.9 Records and Documents

The TSC contains up-to-date records and references for use during emergency conditions. (Reference Appendix D.) Records are updated and managed by DCS utilizing Plant Administrative Procedures.

8.1.3.10 Security

The TSC is located within a plant vital area and is subject to the vital area access controls as identified in the Security Plan.

8.2 SUSQUEHANNA OFF-SITE EMERGENCY CENTERS

8.2.1 Joint Information Center

For a Notification of Unusual Event, the Susquehanna Energy Information Center, located on U.S. Route 11, is utilized as the Joint Information Center. For other event classifications, the East Mountain Business Center, Plains Township, will be activated as the Joint Information Center.

8.2.2 Emergency Operations Facility

The EOF is an emergency response facility that provides continuous management of Susquehanna activities during radiological emergencies that may have offsite impact.

The EOF is located on East Mountain Boulevard in Plains Township, off PA Route 115 five miles north of exit 105 of the Northeast Extension of the Pennsylvania Turnpike and one mile south of exit 170A of Interstate 81. As the EOF is located beyond 10 miles from the site, the NRC Commission approval was required prior to the relocation. This was granted April 17, 1996 (see REFERENCES, Section 3.19).

The non-emergency activities of the EOF are such that its main function is not degraded.

8.2.2.1 Architecture

The EOF is a one-story, rectangular structure. The building was constructed using standard building codes.

8.2.2.1.1 Spatial Layout Description

Reference Figure 8.3.

8.2.2.1.2 Fire Protection

Automatic wet pipe sprinklers are provided throughout the building.

8.2.2.2 Structural Classification

The EOF is classified as a structure, the failure of which would not result in release of significant radioactivity, and is not required for reactor shutdown. This structure is classified as Non-Category I.

8.2.2.3 Habitability

The EOF is located outside the EPZ; therefore, no special habitability needs are required.

8.2.2.4 Communications

The EOF communications system is comprised of three telephone networks (ETN, CTN, and FTS), VHF radios, and a PA system. They provide a reliable primary and back-up communications network.

8.2.2.4.1 Telephones

The EOF uses a combination of the CTN and ETN systems with the FTS system available for federal governmental agencies. Cellular telephones may also be used as needed.

8.2.2.4.2 Radio

The EOF has a two-channel 150 MHz VHF radio system that is used as an emergency backup to the telephone system to communicate with the field monitoring teams, the TSC, CCEMA, and LCEMA.

8.2.2.5 Power Reliability

Power is supplied to the EOF via two independent underground power lines that supply the industrial park complex. Upon experiencing a loss of power from the normal supply, a diesel generator starts and supplies power to the building.

8.2.2.6 EOF Data Presentation

The EOF includes human factors engineered man-machine interface capabilities to allow personnel to:

* access environmental conditions
* coordinate radiological monitoring activities
* recommend implementation of off-site emergency plans
* monitor Emergency Response Data System

8.2.2.7 Records and Documents

The EOF contains up-to-date references and records. Documents are managed by DCS using plant administrative procedures.

8.2.2.8 Security

EOF access during an emergency is limited to authorized personnel. Intrusion detection devices monitor the EOF during unoccupied periods.

8.2.3 Alternate Operations Support Center (OSC)

The alternate OSC is accessible even if the site is under threat of or experiencing hostile action since it is located within the Emergency Operations Facility. It functions as a staging area for OSC staff and has the capability for communication with the emergency operations facility, control room, and plant security. The alternate OSC provides the OSC staff with the capability for damage control team planning and preparation when the primary OSC and backup OSC cannot be safely accessed during hostile action.

8.2.4 Alternate Technical Support Center (TSC)

The alternate TSC is accessible even if the site is under threat of or experiencing hostile action since it is located within the Emergency Operations Facility. It functions as a staging area for TSC staff and has the capability for communication with the emergency operations facility, control room, and plant security. The alternate TSC provides the TSC staff with the capability to perform offsite notifications and for engineering assessment activities when the primary TSC cannot be safely accessed during hostile action.

8.3 COUNTY AND STATE EMERGENCY CENTERS

8.3.1 County Emergency Centers

Both LCEMA and CCEMA have EOCs that meet or exceed the minimum Federal criteria for sufficient space, communications, warning systems, self-sufficiency in supplies and accommodations and radiological protection factor. Both counties maintain full-time employees, providing 24-hour per day coverage either at their EOC or their "911" Centers, to coordinate emergency planning and evaluation. "CTN" telephone connections exist between SSES and each County EOC.

Location of the county EOCs:

* Luzerne County
  Emergency Management Building
  Wilkes-Barre, Pennsylvania
* Columbia County
  Columbia County Courthouse 911 Annex
  Bloomsburg, Pennsylvania

8.3.2 State Emergency Center

The Commonwealth Response Coordination Center (CRCC) is located at 1310 Elmerton Avenue in Harrisburg. This center has 24 hour per day coverage and is equipped with a reliable communications system that includes "CTN" telephone connections between the CRCC and SSES, and ties to all area and county EOCs. During an emergency, representatives from appropriate State agencies will assemble at the CRCC to manage and support the emergency response activities. Facilities are also available at the EOF for PEMA personnel.

8.4 ASSESSMENT CAPABILITIES

8.4.1 Radiation Monitoring System

This on-site system, consisting of ARMs, CAMs, and process monitors, contributes to personnel protection, equipment monitoring and accident assessment by measuring and recording radiation levels and concentrations at selected locations throughout the station. Reference Appendix D.

8.4.2 Fire Protection

Fire protection at SSES is provided by a network of fire detection, suppression, and extinguishing systems. These systems and associated fire alarms are activated by a variety of fire and smoke detection devices throughout the plant. Types of detectors include combustion product, smoke, thermal, and flame. For more detail, reference the SSES Fire Protection Review Report.

8.4.3 Natural Phenomena Monitors

Monitors are provided for detecting and recording natural phenomena events that could result in plant damage due to ground motion or structural vibration. Reference Appendix D.

8.4.4 Environmental Monitoring

This program establishes the pre-operational background levels, detects any gradual buildup of long-lived radionuclides, and verifies that operation of the plant has no detrimental effect on the health and safety of the public or the environment. Reference Appendix D.

8.4.5 Radiological Monitoring Team Equipment

Reference Appendix D.

8.5 PROTECTIVE FACILITIES

8.5.1 Control Room

Protective features (Reference the SSES FSAR):

a. Adequate shielding by concrete walls.

b. CREOASS.

c. ARM system indications.

d. Emergency and essential lighting and power.

e. Basic protection equipment for emergency teams (Appendix D), and listings/locations of additional emergency supplies/equipment.

f. Communications systems.

8.5.2 Station Accountability Areas

Specific locations are designated for accountability of all station personnel. They are located on the basis of logical access routes and physical separation from likely areas of radiation and/or airborne radioactivity.

8.5.3 Remote Assembly Areas

Upon declaration of a Site Evacuation, the ED may send personnel to their homes or to Remote Assembly Areas. These areas are designated for assembly of personnel who can be used to augment the plant staff. Locations were selected on the basis of:

a. Space availability for all personnel who may be within the exclusion area at the time of an evacuation.

b. Assurance of a controlled area for contamination surveys and for possible establishment of decontamination stations.

8.5.4 Alert Notification System

An ANS consisting of sirens with ratings of 121 dB at 100' exists within the ten-mile EPZ around SSES. Siren location (see Figure 8.4) was determined by a detailed study including field surveys, actual determination of average background noise level, and consideration of population distribution within the 10-mile EPZ.

Activation of the ANS is via radio control from either the LCEMA Emergency Operations Center or CCEMA Emergency Operations Center. A back-up satellite system can also activate the sirens from LCEMA or CCEMA. A redundant control station located at the EOF has full radio control capabilities, and will be used for the purpose of testing and maintenance activities. Direct Current (DC) batteries provide a back-up source of power to the normal Alternating Current (AC) supply. The Nuclear Emergency Alert signal is a 3 minute steady tone. Public response to this signal is to proceed indoors and tune their radio or television to the Emergency Alert System Network serving their local area for additional information.

Testing of the system takes place annually and includes verification of the system's ability to alert the general public.

8.6 ADDITIONAL COMMUNICATIONS SYSTEMS

8.6.1 Commercial Telephone System

Two independent telecommunications networks exist to provide primary and backup telephone communications between ERFs and offsite agencies. These systems are the Centrex Telephone Network (CTN) and Electronic Tandem Network (ETN).

CTN extension locations include: Control Room, TSC, EOF, JIC, SEIC, DEP/BRP, PEMA, LCEMA, and CCEMA. This is the primary system for emergency communications.

8.6.2 Plant Emergency Alarm System

A plant emergency alarm system provides audible warning of emergency conditions to plant personnel. The system consists of a multi-tone generator, tone selector switch, area selector switch, and message tape recorder. The Emergency Alarm System is integral to the PA System and is powered via the Vital AC UPS. The Plant Emergency Alarm System is tested at least weekly.

8.7 ON-SITE FIRST AID AND MEDICAL FACILITIES

A first aid treatment facility, equipped with normal industrial first aid supplies, is located on the first floor of the S&A Building. Standard first aid kits are at designated locations throughout the station. Inventories are performed regularly.

8.8 DAMAGE CONTROL EQUIPMENT

Damage control equipment consists of normal and special purpose tools and devices used for maintenance functions throughout the station. The ED has access to keys for maintenance tool cribs, shops and other locations where damage control equipment is stored. Inventories are performed regularly.

8.9 INFORMATION SYSTEMS

8.9.1 Plant Integrated Computer System

The PICSY is used for emergency data configuration for the following reasons:

* It contains graphic and trending capabilities.
* It provides for historical data recording and retrieval.
* It has flexibility to permit interfacing to additional I/O equipment and other sources of data.
* Its design provides for a high degree of reliability.
* It is capable of displaying and reporting plant data needed in the EOF and TSC.
* It is located in a secure area within the control structure.
* It has a redundant system design.
* The ERDS and SPDS functions are integrated into its design.
* All of the PICSY data and functions are easily made available at locations remote from SSES.

8.9.1.1 Data Acquisition

Data is acquired from I/O hardware in the plant as well as over data interfaces to various other plant equipment. All data is checked for validity and errors before being displayed to the user. Isolation is applied to all safety-related inputs. All data is archived. Both short term and long term data are available for retrieval at any PICSY SDS. Long term data is available for at least the previous fuel cycle.

8.9.1.2 Data Preparation

Display formats needed by the ERF are generated and stored within the PCS using standard proven PICSY software. A configuration management software system is employed to track changes to all formats and the database itself.

Proven system and application software has been developed which performs data display and system security. The database includes raw data, data converted to engineering units, data checked on a real-time basis, and various types of calculated data.

User interaction from the PICSY SDS is independent from each station and controlled by multiple copies of the identical software.

8.9.1.3 Data Presentation

Three SDSs are available in the TSC for display of Unit 1, Unit 2, and Common data. Procedures and methods for call-up and error indications of TSC function are identical to those used in the control room with one exception. Control Room monitors are usually fitted with touch screens in lieu of track balls and keyboards.

Data is presented in formats that are easy to understand and interpret. Variables not in a normal condition are presented with an indication of that condition. Alarms are represented by using the same color coding techniques as in the control room. Output formats are designed according to human factors engineering criteria, and include pattern and coding techniques.

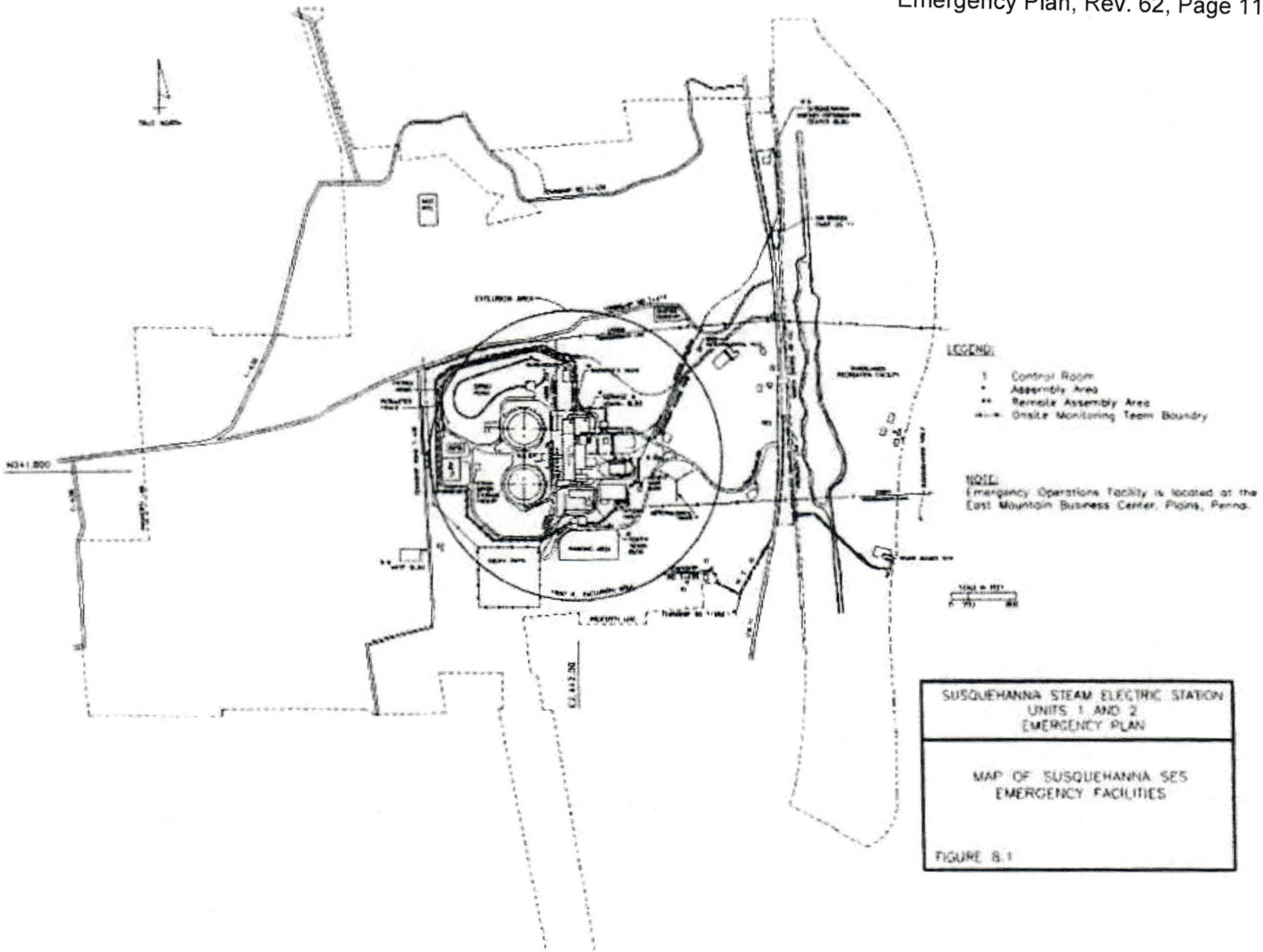
8.9.1.4 Availability

A minimum system availability of 99% or greater can be expected, based on analytical calculations.

TABLE 8.1

RELATIONSHIP OF THE PRIMARY PARAMETER, SECONDARY DISPLAY, AND ALGORITHMS ON SPDS

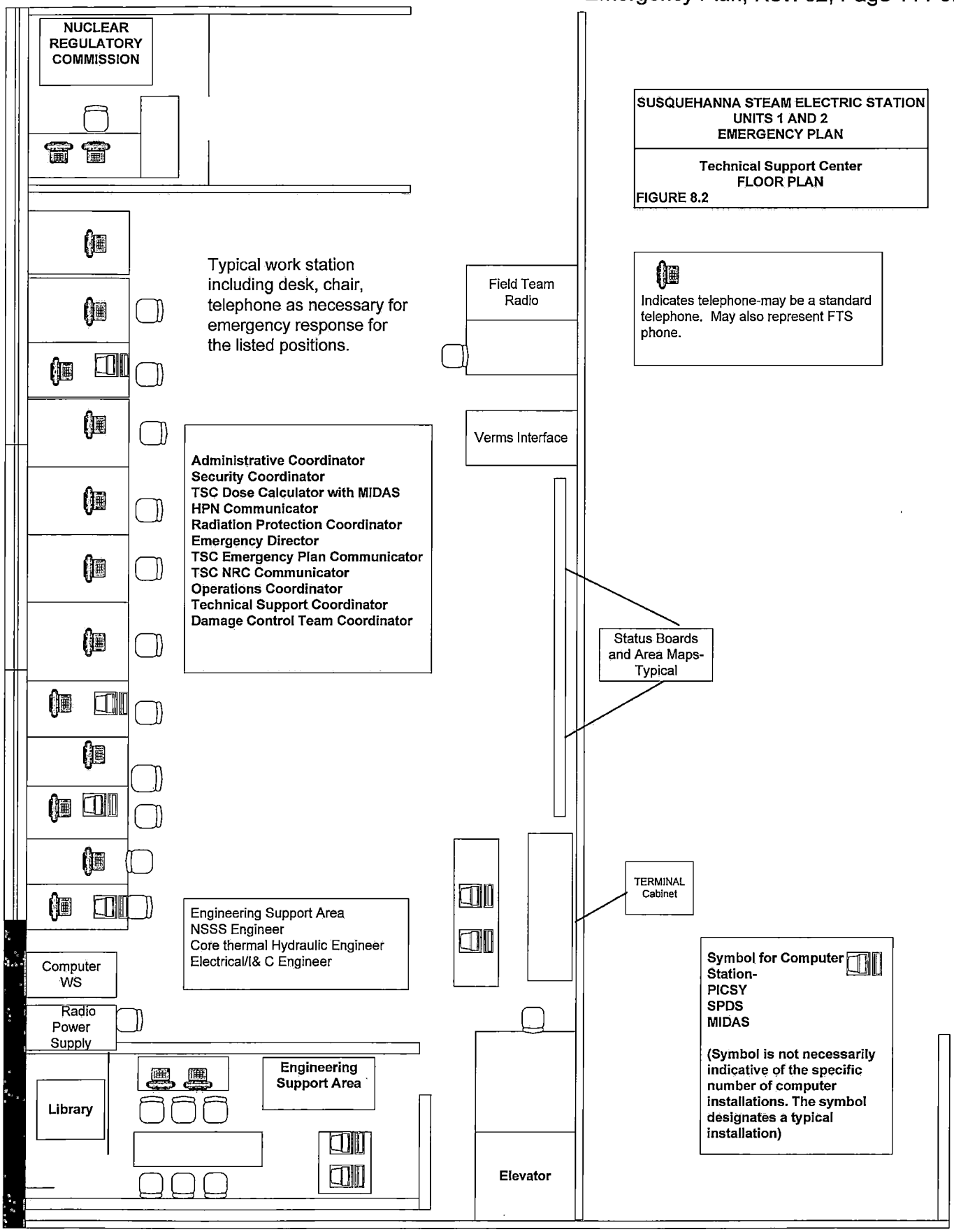
Primary Parameter	Secondary Display	Algorithm
Reactor Power	1. Reactor Core Status	a. Reactivity Monitoring b. Core Flow c. Core Spray
Reactor Water Level	1. Reactor Water Level History	a. Reactor Water Level
Reactor Pressure	1. Reactor Pressure History 2. S/R Valve Lifts	a. Reactor Pressure a. S/RV Positions (non-ADS)
Drywell Pressure	1. Drywell Pressure and Temperature History 2. Containment Status 3. Containment Hydrogen/Oxygen Limits	a. Drywell Pressure b. Drywell Temperature a. Suppression Pool Water Level b. Suppression Chamber Pressure c. Suppression Pool Water Temperature d. Suppression Chamber Atmosphere Temperature e. S/RV Positions (ADS) a. Containment Atmosphere Control
Noble Gas Effluent Release	1. Radioactive Effluent Release 2. Containment Isolation	a. Off-Gas Pretreatment b. Primary Containment Activity c. Reactor Building Vent d. Turbine Building Vent e. Liquid Effluent f. Standby Gas Treatment a. Containment Isolation



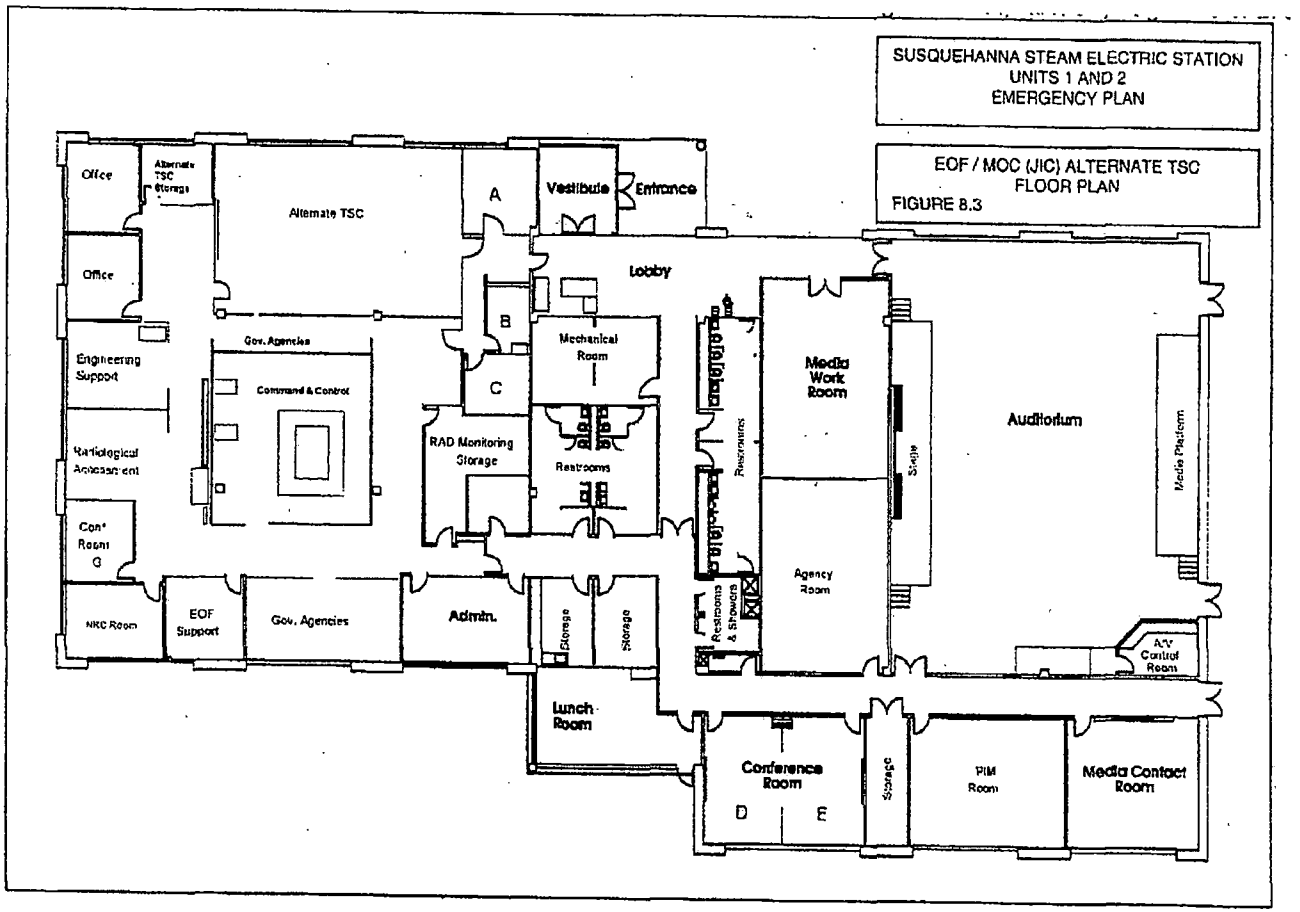
SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
EMERGENCY PLAN

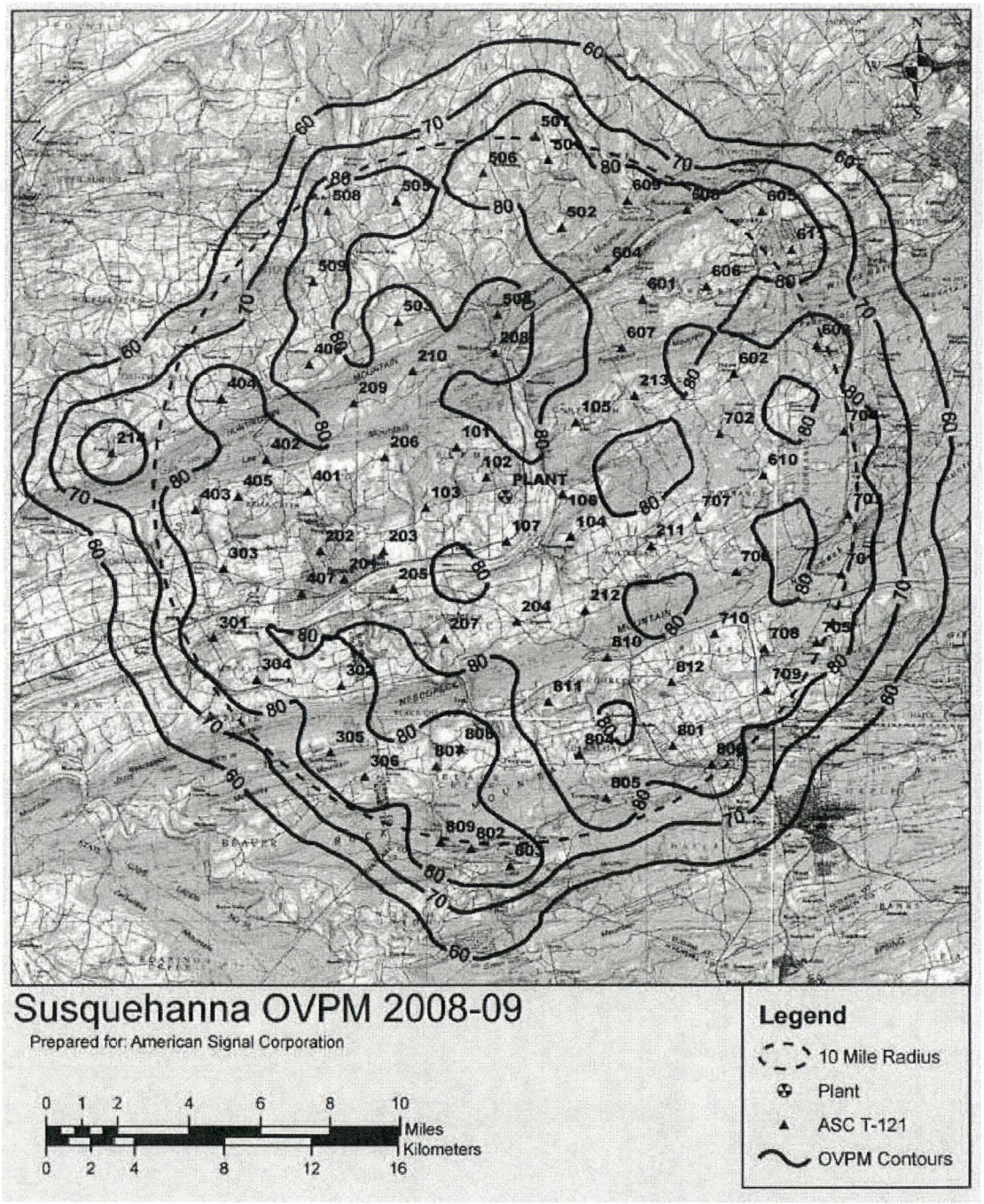
MAP OF SUSQUEHANNA SES
EMERGENCY FACILITIES

FIGURE 8.1


NUCLEAR REGULATORY COMMISSION
SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
EMERGENCY PLAN
Technical Support Center
FLOOR PLAN
FIGURE 8.2
Typical work station including desk, chair, telephone as necessary for emergency response for the listed positions.
Field Team Radio
Indicates telephone-may be a standard telephone. May also represent FTS phone.
Verms Interface
Administrative Coordinator
Security Coordinator
TSC Dose Calculator with MIDAS
HPN Communicator
Radiation Protection Coordinator
Emergency Director
TSC Emergency Plan Communicator
TSC NRC Communicator
Operations Coordinator
Technical Support Coordinator
Damage Control Team Coordinator
Status Boards and Area Maps-Typical
TERMINAL Cabinet
Engineering Support Area
NSSS Engineer
Core thermal Hydraulic Engineer
Electrical/I& C Engineer
Computer WS
Radio Power Supply
Library
Engineering Support Area
Elevator
Symbol for Computer Station-
PICSY
SPDS
MIDAS
(Symbol is not necessarily indicative of the specific number of computer installations. The symbol designates a typical installation)

East Mountain Business Center / Floor Plan
EOF/JIC





SUSQUEHANNA STEAM ELECTRIC STATION
Units 1 and 2
EMERGENCY PLAN
SIREN LOCATION
Figure 8.4

9.0 MAINTAINING EMERGENCY PREPAREDNESS

9.1 ORGANIZATIONAL PREPAREDNESS

9.1.1 Training

a. All unescorted personnel entering or working within the SSES Radiologically Controlled Area receive as a minimum, the following instruction:

- Appropriate portions of the SSES EP.
- Use of emergency facilities and equipment, familiarization with station alarms and personnel response, and station communications systems.
- Personnel accountability, evacuation, and radiation exposure criteria.
- Radiation protection, emphasizing protective clothing, equipment, and personnel dosimetry.

b. Those individuals working on the SSES site, inside the protected area, but outside the Radiologically Controlled Area, are provided with instructions on warning signals, accountability areas, and evacuation routes.

c. Personnel assigned to the Susquehanna ERO receive specialized training for their respective assignments. (Reference Table 9.1)

d. PEMA conducts a training program throughout the State and assists the counties in developing training policy for disaster operational readiness. The county and local EMAs are responsible for planning and conducting disaster preparedness training of respective emergency response personnel. Susquehanna works closely with PEMA and the county EMAs in coordinating training programs. In addition, orientation training for State and county agencies and personnel involved in SSES emergency planning efforts is made available by Susquehanna.

e. Annually, DEP/BRP and state, county, and municipal EMAs are invited to participate in a training program conducted by Susquehanna. The initial training program relates the importance of emergency planning and the interface between the Susquehanna and offsite emergency organizations with an emphasis on classification; EALs; reporting requirements; assessment, protective, and corrective actions; and communications networks. In addition, DEP/BRP is offered a specific review of dose calculations/projections, protective actions guides, and reportable information.

f. The State Police, annually, are invited to participate in a training program on appropriate EP-PSs, with emphasis on the classification of emergencies, communications, and specific areas of responsibility.

g. Susquehanna provides training annually to local off-site support organizations. These local organizations are encouraged to become familiar with the SSES, key station personnel, and are invited to attend training conducted by or for Susquehanna.

Initial core training for local fire companies and ambulance associations includes:

- Interface with the Site Security Force
- Basic radiation protection indoctrination and training
- SSES facility layout

Fire companies also receive training in the following areas:

- On-site fire protection system equipment
- Differences between on-site firefighting equipment and fire company supplied equipment
- Communications system
- Review of sections of the SSES EP and EP-PSs
- The on-site ERO with emphasis on the interface between the SSES fire brigade and fire company personnel

h. Personnel assigned to the Emergency Planning Organization receive training as required by EP administrative procedures. Emergency Planning experience may be used in lieu of training.

Each year a fire drill, which includes local fire company support, is held to test these areas.

Annually local ambulance associations are invited to attend specialized training regarding the handling of contaminated/injured victims.

9.1.2 Drills and Exercises

Each drill or exercise is conducted to: (1) ensure that the participants are familiar with their respective duties and responsibilities, (2) verify the adequacy of the SSES EP procedures, (3) test communications networks and systems, (4) determine availability and operability of emergency supplies and equipment, and (5) every two years verify the adequacy of off-site agency plans.

Drills and exercises are conducted to simulate actual emergency conditions as closely as possible and may be scheduled such that more than one type of the following drills or exercises can be conducted simultaneously to meet the guidance of NUREG-0654, NSIR/DPR-ISG-01 Section IV.G and the requirements of 10CFR50 Appendix E:

- Annual medical drill involving offsite support
- Annual fire drill involving offsite support
- Annual radiological drill to site area or general emergency level with offsite participation biennially
- Annual full-scale ANS test
- Annual environmental monitoring drill
- Semi-annual Health Physics drill testing survey sampling and analysis techniques
- Annual drill that tests ability to obtain and analyze a post accident coolant sample
- Perform augmentation exercise every eight years
- Hostile Action Based exercise every eight years

All ERO teams (not necessarily each individual) shall be provided the opportunity to develop and maintain key emergency response skills within the scope of their duties during each exercise cycle. Additionally, the ERO (not necessarily each ERO team) shall be provided the opportunity to demonstrate key skills in response to the following scenario elements in drills or exercises during each exercise cycle. Drills are considered to be performance-enhancing experiences (exercises, drills, functional drills, tabletop drills, mini-drills, etc.) that reasonably simulate the interactions between appropriate ERFs and/or individuals that would be expected to occur during emergencies.

- All functions in each ERF (e.g., all ERFs that are responsible for dose assessment perform those duties in response to a radiological release).
- Use of alternative facilities to stage the ERO for rapid activation during hostile action.
- Real-time staffing of facilities during off-hours (i.e., 6:00 p.m. to 4:00 a.m.).
- Providing medical care for injured, contaminated personnel (every two years).
- Response to essentially 100 percent of initiating conditions identified in the site emergency plan implementing procedure for classification of emergencies.
- Response to actual industry event sequences appropriate for the nuclear plant technology (e.g., BWR or PWR).
- All ERO teams must be provided the opportunity to demonstrate key skills within the scope of their duties.
- Use of procedures developed in response to an aircraft threat and in compliance with 10 CFR 50.54(hh)(1).
- Use of the strategies associated with 10 CFR 50.54(hh)(2) to mitigate spent fuel pool damage scenarios (all strategies, such as makeup, spray, and leakage control, but not every variation of a given strategy).
- Use of the strategies associated with 10 CFR 50.54(hh)(2) to mitigate reactor accidents and maintain containment (10 strategies for boiling water reactors, but not every variation of a given strategy).

Additional non-integrated drills and tests are conducted as follows:

- Bi-weekly Silent Tests for sirens
- Quarterly Growl Tests for sirens
- Quarterly fire drills
- Monthly communications drills with state and county agencies
- Monthly communications tests with the NRC

Drill scenarios for major drills are prepared to involve participation of several emergency teams and all or specific parts of the ERO including varying degrees of participation of State, County, and Federal agencies and local off-site support organizations.

Following the conduct of drills, critiques are held to clearly identify deficiencies and action plans for resolution. Procedures are established to assure the timely implementation of corrective actions.

Ingestion pathway exercises are conducted by the offsite agencies in accordance with PEMA Annex E. Susquehanna Steam Electric Station personnel provide support as required.

9.1.3 Overall Coordination of Nuclear Emergency Preparedness

The Manager-Security/Emergency Preparedness is responsible for the overall coordination of all nuclear emergency planning activities. The Manager-Security/Emergency Preparedness is assisted in this effort by: the Plant Manager for activities involving the Susquehanna Site, the General Manager-Nuclear Engineering for engineering issues, the Manager-Nuclear Training for on-site training, the Community Relations Manager-Susquehanna for communications with the public and news media, and the Manager-Nuclear Oversight for audits of Emergency Planning.

The Manager-Security/Emergency Preparedness is typically responsible for:

- Revising of the SSES Emergency Plan
- Revising of EP-PSs and other Emergency Planning Administrative procedures
- Conducting of integrated drills and exercises and communication drills
- Defining EP training scope for ERO
- Defining EOF and JIC EP Training
- Coordinating EP interface between State and Federal agencies
- Coordinating maintenance and testing of ANS
- Coordinating interface between state, county, municipal, and Susquehanna ERO
- Assuring operational readiness of Emergency Response Facilities

9.2 REVIEW AND UPDATING

9.2.1 SSES Emergency Plan

The Manager-Security/Emergency Preparedness is responsible for the review and revision of the SSES Emergency Plan, ensuring:

- A review of the SSES Emergency Preparedness Program is performed periodically by persons who have no direct responsibility for implementation of the program in accordance with 10CFR50.54t.
- Annual review of the SSES Emergency Plan.
- Annual review of Letters of Agreement.
- Recommendation of Emergency Plan changes to PORC.
- PORC review of Emergency Plan changes and submission of changes to NSRB.
- Revisions or a report of change to the Emergency Plan that do not change the effectiveness of the plan are submitted to the NRC within 30 days from the implementation of such change(s).
- Perform an annual review of the Evacuation Time Estimate (ETE) to ensure 10CFR50 Appendix E Section IV and NUREG 0654 Element J.8 requirements are maintained. Update the full ETE should the criteria from Appendix E be met and re-submit the ETE to the NRC.

9.2.2 Emergency Plan Procedures

The Manager-Security/Emergency Preparedness is responsible for the review and revision(s) of the Emergency Plan Procedures, ensuring:

- The periodic review is accomplished in accordance with established plant procedures.
- Revisions to procedures are done in accordance with established plant procedures.
- Controlled copies of procedure revisions are issued by station document control programs.
- ERO personnel are briefed on revisions as required.

9.3 MAINTENANCE AND INVENTORY OF EMERGENCY EQUIPMENT/SUPPLIES

The Manager-Security/Emergency Preparedness is responsible for periodic inventory and inspection of emergency equipment and supplies, and for periodic testing of emergency communications systems. This testing includes verification of phone numbers that are contained in Emergency Plan procedures.

Equipment, supplies, and parts having limited shelf lives are checked and replaced as necessary. Monthly communications drills and tests are also conducted from Susquehanna ERFs and offsite agencies.

Any deficiencies found during these activities are either cleared immediately or documented for corrective action.

9.4 PUBLIC EDUCATION AND INFORMATION

Under the direction of the Manager-Security/Emergency Preparedness, the following methods are utilized to ensure that emergency planning information and education is provided and transmitted to residents and transients in the EPZ annually.

9.4.1 Telephone Directory Inserts

With the cooperation of Pennsylvania Emergency Management Agency, Luzerne County Emergency Management Agency, and Columbia County Emergency Management Agency, emergency information is provided in all telephone directories distributed within the ten mile EPZ. This information includes:

* explanation of Emergency Classifications
* what to do when you hear the sirens
* public Protective Actions
* student pick-up points
* evacuation routes to reception centers
* evacuation Plan Map
* callback number for special needs

9.4.2 Programs are Offered to Acquaint the News Media With:

* SSES Emergency Plan
* information concerning radiation
* points of contact for the release of public information during an emergency

9.4.3 Educational Training Programs

Educational training programs on emergency preparedness are made available to the general public through the staffs of the Susquehanna Energy Information Center and Nuclear Emergency Preparedness.

9.4.4 Other Distributed Publication(s)

This information includes:

* explanation of Emergency Classifications
* what to do when you hear the sirens
* public Protective Actions
* student pick-up points
* evacuation routes to reception centers
* evacuation Plan Map
* callback number for special needs

TRAINING OF SUSQUEHANNA SES EMERGENCY RESPONSE PERSONNEL

Personnel Category	Involved Personnel	Initial Training and Periodic Retraining
1. Emergency Directors	Shift Managers, and currently assigned Emergency Directors	Initial training: EP and EP PSs. Retraining: Changes in responsibilities. Frequency: Annual
2. Personnel responsible for accident assessment/ management	Emergency Director; Emergency Coordinators, Recovery Manager, Dose Assessment Personnel	Initial training: EP and EP PSs. Retraining: Applicable EP PSs and changes. Frequency: Annual
3. Radiation Monitoring Teams	Radiation Protection Supervision; Radiation Protection Technicians; and Site Personnel	Initial training: Radiation monitoring EP PSs and applicable Radiation Protection Procedures Retraining: Hands-on instrument usage. Frequency: Annual
4. Fire Brigade	Unit Supervisors - Fire Brigade Leader, Maintenance Site Support Services personnel - Fire Brigade Members	Training and retraining are outlined in the SSES Fire Protection Review Report.
5. Damage Control Teams	Non-Licensed Operators; Maintenance Supervision; Maintenance Personnel; Radiation Protection Technicians; I&C Supervision; I&C Personnel	Repair and Damage Control are a normal part of the job functions. Initial training: Availability of damage control equipment, use of communication systems, and interfaces with other emergency teams. Retraining: Review of the above topics. Frequency: Annual

TRAINING OF SUSQUEHANNA SES EMERGENCY RESPONSE PERSONNEL

Personnel Category	Involved Personnel	Initial Training and Periodic Retraining	
6. First Aid and Rescue Personnel (Emergency Medical Response Teams)	Work Groups having 24-hour coverage at Susquehanna: (supplemental team members directed by Team Leader)		
	Security Force Members	Training and retraining:	Communication system and interfaces with local medical support personnel.
	Non-Licensed Operators	Training and retraining:	First Aid, CPR Training, and availability of on-site medical treatment supplies and equipment; (see Note)
	Radiation Protection	Training and retraining:	CPR Training and radiological hazards (see Note)
	Chemistry	Training and retraining:	CPR Training (see Note)
	Maintenance Site Support Services	Retraining frequency:	See Note
7. Fire Support Personnel	Local Fire Companies	Training and retraining are outlined in Section 9 of the SSES EP.	
8. Medical Support Personnel	Berwick Hospital Staff; Ambulance Companies; Geisinger Medical Center Staff	Initial training:	Treatment and handling of contaminated/injured personnel, communication systems, radiological hazards and interfaces with SSES personnel.
		Retraining:	Review of the above topics.
		Retraining frequency:	Annual
9. Corporate Support Personnel	Corporate Management Personnel; including Nuclear Fuel and Analysis, Nuclear Design Engineering and Technology	Initial training:	EP and appropriate EP PS's.
		Retraining:	Applicable EP-PSs and changes.
		Retraining frequency:	Annual
10. Security Personnel	Security Supervision; Security Force Members	Training is outlined in the SSES Training and Qualification Plan.	
11. Public Information Personnel	Joint Information Center Personnel	Initial training:	EP and Public Information EP PS.
		Retraining:	Applicable EP-PSs and changes.
		Retraining frequency:	Annual

NOTE: Specific training and retraining requirements are identified in the Training Matrices for Emergency Planning, Security, Radiation Protection, Chemistry, Operations, Maintenance Site Support Services and all ERO members.
Security – Communications/Interface, First Aid, CPR annually
NLO – First Aid and CPR biennially
RP - Communications/Interface, First Aid, CPR biennially
CHEM - First Aid and CPR biennially
MSSS - First Aid and CPR biennially

APPENDIX A

LETTERS OF AGREEMENT

LETTERS OF AGREEMENT

Letters of Agreement have been established with those State and Local agencies as well as local and industry support service groups that are responsible to ensure a high level of emergency preparedness for the SSES. These agreements have been established to assure all parties are aware of their commitment to SSES and the public in the vicinity of the SSES during an emergency including a HOSTILE ACTION event.

The following list of agencies and support groups have signed letters of agreement:

Agency/Support Group

Berwick Ambulance Association
Berwick Hospital Center
Berwick Volunteer Fire Department
Columbia County Commissioners
Dan E. Bower, Inc
Department of Energy
Department of Environmental Protection/Bureau of Radiation Protection
Federal Radiation Monitoring and Assessment Center (FRMAC)
GE BWR Emergency Support
Geisinger Medical Center
Hobbie Volunteer Fire Co. - EMS
Hunlock Creek Ambulance Association
Institute of Nuclear Power Operations
Lackawanna County Commissioners
Latona Trucking
Luzerne County Council
Medico Industries
Mocanaqua Volunteer Fire Company
Nanticoke Ambulance/Medic 25
Nanticoke Fire Department
National Weather Service
Pennsylvania Emergency Management Agency
Pond Hill-Lily Lake Ambulance Association
Salem Township Volunteer Fire Co.
Shickshinny Volunteer Ambulance Assoc.
Stell Enterprises
Summerhill Fire Department
Wilkes Barre Scranton International Airport

These letters of agreement provide for:

- Coordination of planning efforts by State and local agencies; industry support groups; fire ambulance and hospital support services; and Susquehanna.
- Appropriate emergency response to assure employee and public safety during an emergency condition at SSES.
- Mutual notification capabilities.
- Appropriate training and exercising of emergency response capabilities.
- Fire, first aid and medical support.
- Environmental monitoring and assessment support.
- Other emergency support services as deemed necessary

The Manager-Security/Emergency Preparedness is responsible for renewing letters of agreement every year where applicable. In some instances, where the letter of agreement is for a specified duration longer than 1 year, letters need not be renewed until the end of the specified duration. Copies are maintained and controlled within Document Control Services to assure appropriate review and updating takes place.

NOTE:	Reference Action Request 1066721 for why separate LOA is not needed for Pennsylvania State Police.

APPENDIX B

WIND ROSES, DOSE/DISTANCE PLOTS AND JOINT FREQUENCY DISTRIBUTION

ORIGINAL DOCUMENT ISSUED 01/1992
SPECIFIC FIGURES MAY HAVE OTHER ISSUE DATES.

INTERPRETATION OF WIND ROSES

Perhaps the best way to discuss the interpretation is to take a specific example. Let us consider the wind rose for Spring (Figure I). This wind rose represents the average wind conditions at the 10 meter level for a total of 4 Springs (1973-1976). Spring is defined as the months of March, April, and May. Similarly Summer consists of June, July, and August, Autumn is September, October, and November, and Winter is December, January, and February.

In looking at Figure I we see that the winds are most frequently from the West. Thus they will carry plant effluents towards the East. We also see that 11.5% of all the winds are from the West. Winds from the West at speeds of 0-1.5 meters per second (mps) comprise 1.6% of all winds; winds from the West at speeds of 1.5-5.0 mps comprise 6.9% of all winds; winds from the West at speeds of greater than 5 mps comprise 3.0% of all winds.

We can also see that 0.8% of all the winds are calm and therefore are not assigned a direction. In addition the least frequent winds are from the Southeast.

It is also apparent that the lightest winds (0-I.5 mps) most frequently are associated with winds from the East-Northeast and East while the strongest winds (greater than 5 mps) are most frequently associated with winds from the West.

INTERPRETATION OF DOSE/DISTANCE PLOTS

The dose/distance plots have been removed and reference to the use of MIDAS as the approved methodology/tool for determining magnitude of and for continually assessing the impact of the release.

MIDAS has the capability to provide assessments using event-specific fuel damage estimates. Additionally, MIDAS can provide information at additional distances than were provided in the deleted Dose/Distance nomographs. The system performs estimates and predictions of atmospheric effluent transport and diffusion during and immediately following an accidental airborne radioactive release from the facility.

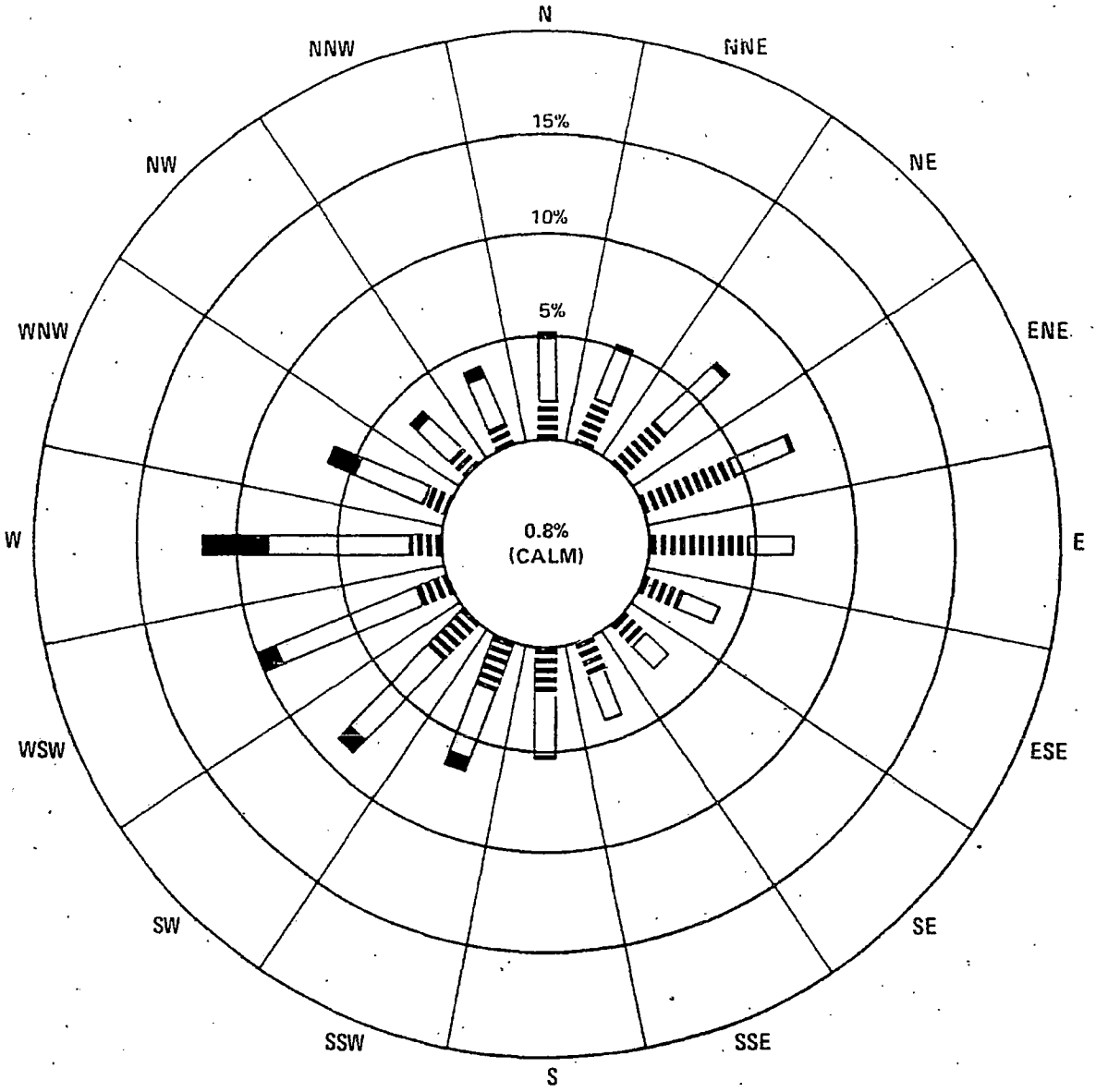
INTERPRETATION OF JOINT FREQUENCY DISTRIBUTION

The data in Tables B-6 through B-13 are from meteorological measurements taken at the Susquehanna site during the time period from 1999 through 2003.

Examples are provided of the way that a joint frequency distribution may be interpreted. The first example relates to the likelihood of a specific stability class occurring on the Susquehanna site. Table B-7 for Stability Class B shows that this Moderately Unstable class occurs about 1363/43823 (=0.031) or 3.1% of the time. Table B-9 for Stability Class D shows that this Neutral class occurs about 17841/43823 (=.407) or about 40.7% of the time. Looking at all of the information, the reader will see that the more common stability classes that occur at Susquehanna are the D (Neutral) and E (Slightly Stable) stability classes.

The second example relates to the wind speeds that are more common for specific stability classes occurring on the Susquehanna site. Table B-7 for Stability Class B shows that for this Moderately Unstable class, the most common wind speed is in the range from 3.1-5.0 m/s (6.9-11.2 mph), a relatively high wind speed. Table B-10 for Stability Class E shows that for this Slightly Stable class, the most common wind speed is in the range from 1.1-1.5 m/s (2.5-3.4 mph), a relatively lower wind speed.

The third example relates to the wind directions that are more common for the Susquehanna site. The Table B-13 of the Joint Frequency Distribution presents a summary for all stability classes observed at the Susquehanna site. The most common wind direction is ENE, meaning that most commonly, the wind is blowing from the ENE over the Susquehanna site. The second most common wind direction is SW, meaning that next most commonly, the wind is blowing from the SW over the Susquehanna site. As can be seen from review of the table, upriver and downriver winds occur quite commonly at the site.

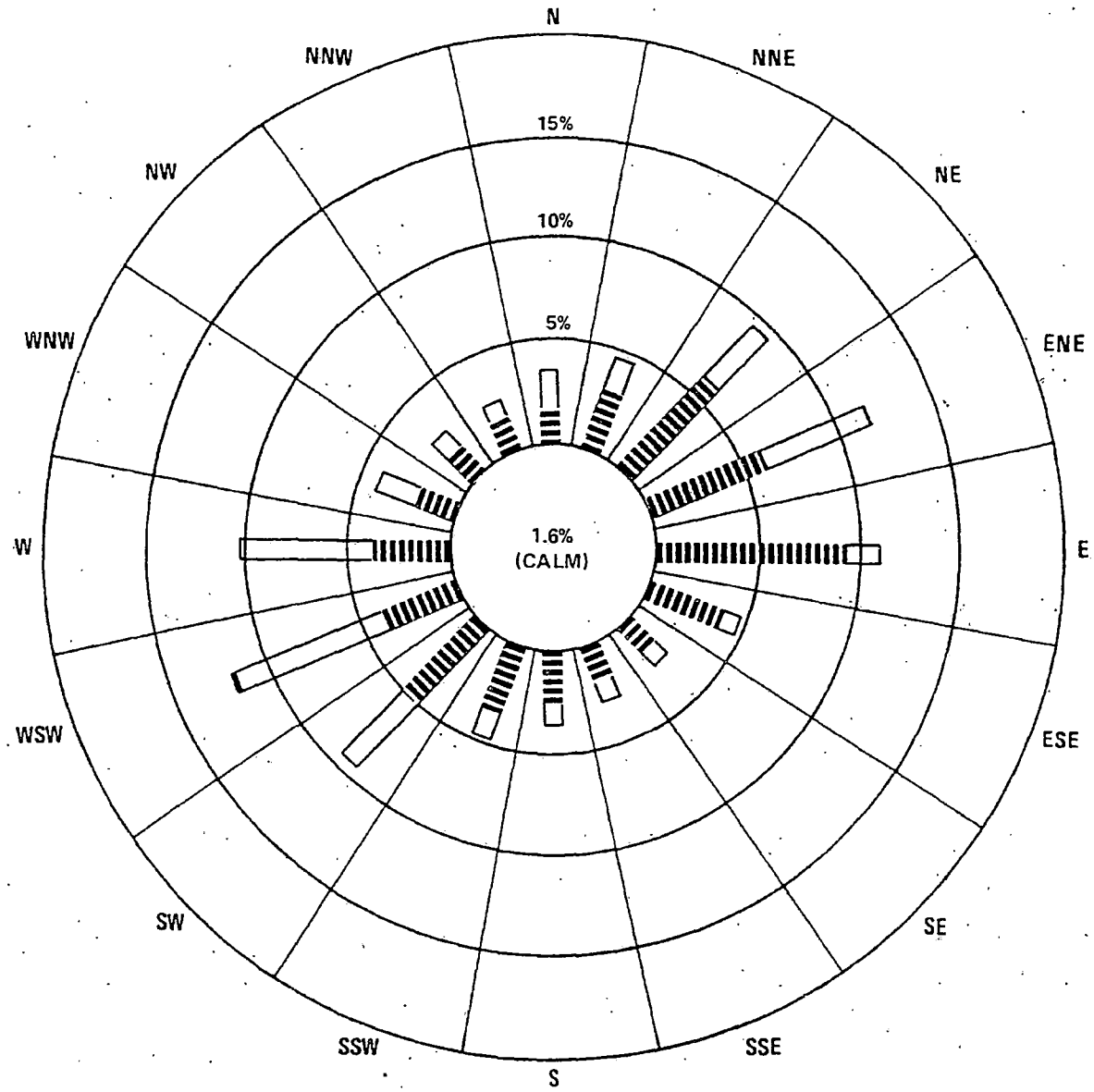


Rev. 11, 10/88

SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 AND 2 EMERGENCY PLAN
WIND FREQUENCY DISTRIBUTION IN PERCENT PERIOD OF RECORD-1973-1976 (SPRING SEASON) FIGURE B-1

LEGEND:

0-1.5 1.5-5.0 >5 Meters Per Second

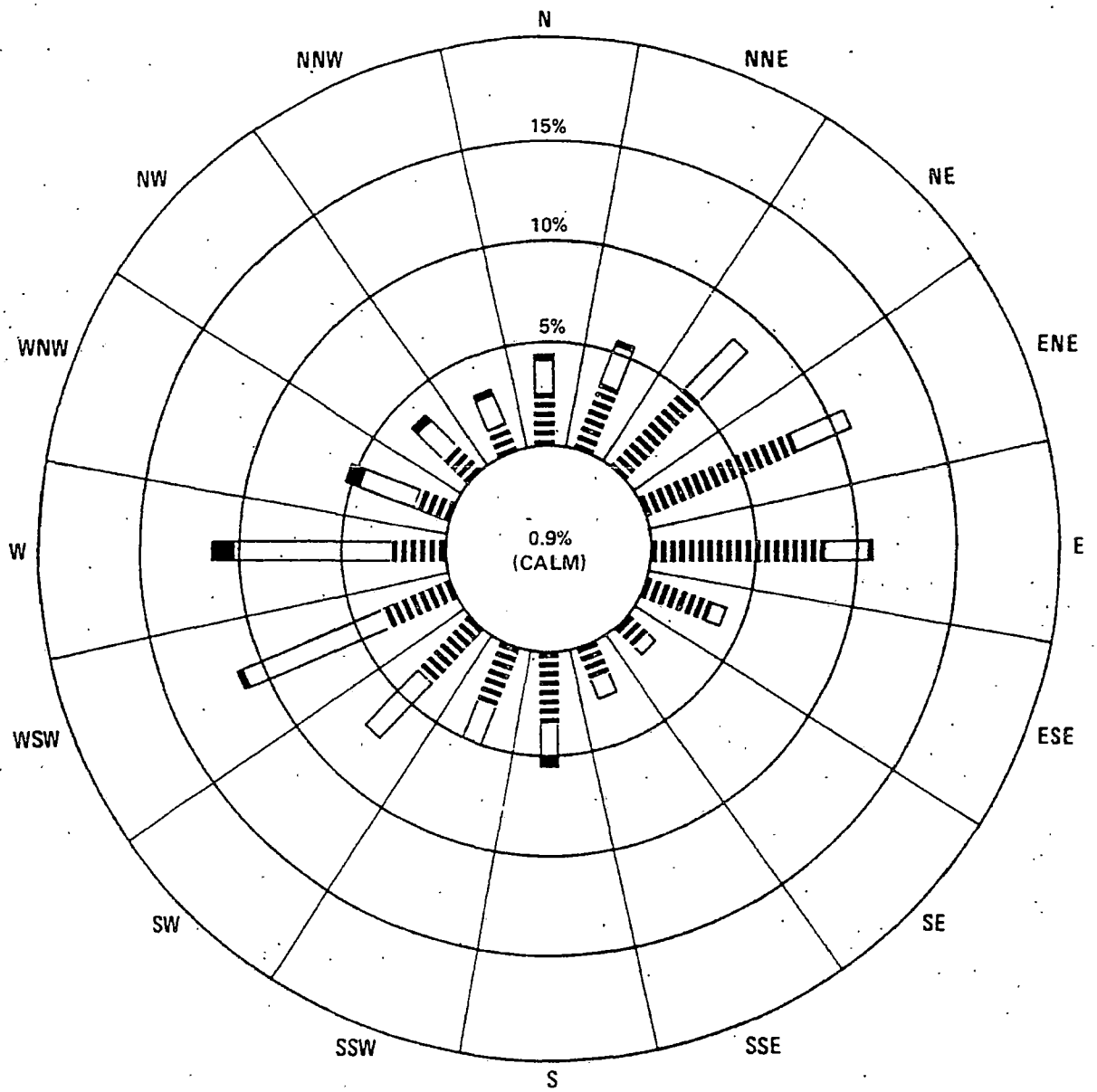


Rev. 11, 10/88

SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 AND 2 EMERGENCY PLAN
WIND FREQUENCY DISTRIBUTION IN PERCENT PERIOD OF RECORD-1973-1976 (SUMMER SEASON) FIGURE B-2

LEGEND:

0-1.5 1.5-5.0 [illegible]-5 Meters Per Second

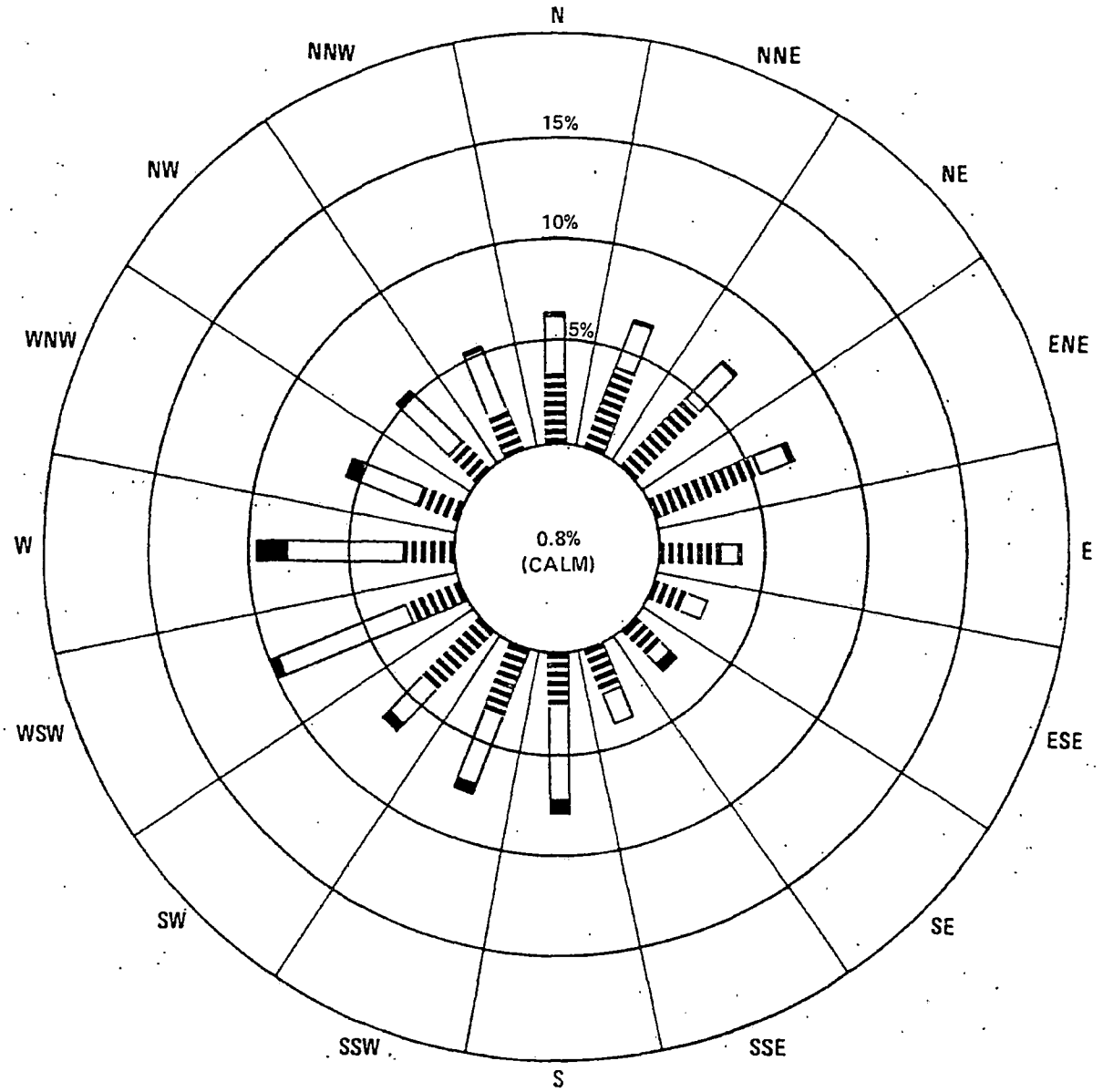


Rev. 11, 10/88

SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 AND 2 EMERGENCY PLAN
WIND FREQUENCY DISTRIBUTION IN PERCENT PERIOD OF RECORD-1973-1976 (AUTUMN SEASON) FIGURE B-3

LEGEND:

0-1.5 1.5-5.0 >5 Meters Per Second

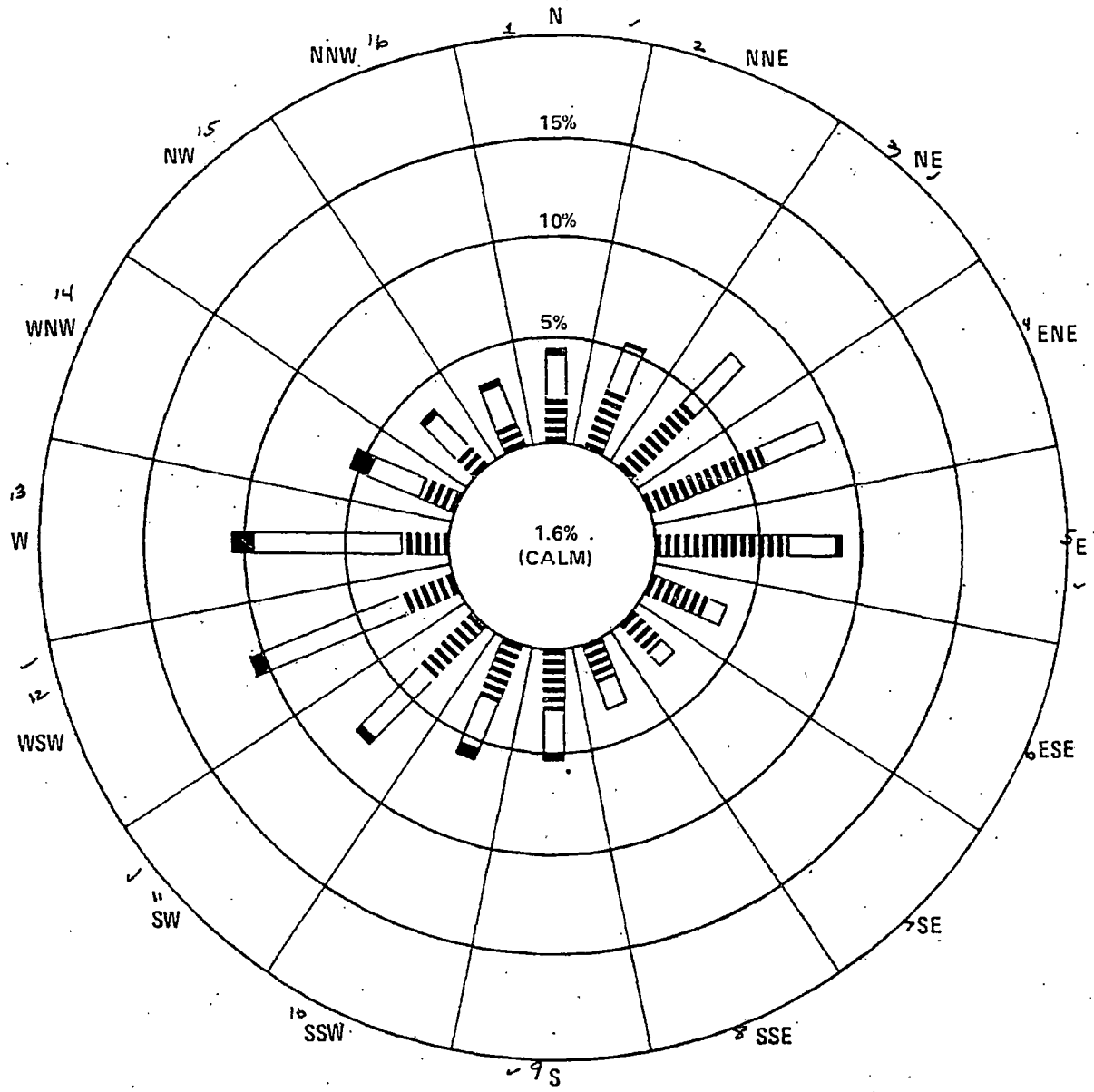


Rev. 11, 10/88

SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 AND 2 EMERGENCY PLAN
WIND FREQUENCY DISTRIBUTION IN PERCENT PERIOD OF RECORD-1973-1976 (WINTER SEASON) FIGURE B-4

LEGEND:

0-1.5 1.5-5.0 >5 Meters Per Second



Rev. 11, 10/88

SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 AND 2 EMERGENCY PLAN
WIND FREQUENCY DISTRIBUTION IN PERCENT PERIOD OF RECORD-1973-1976 (ANNUAL AVERAGE) FIGURE B-5

LEGEND:

0-1.5 1.5-5.0 >5 Meters Per Second

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = 01/01/99 1:00 - 12/31/03 23:00 Total Period
Elevation: Speed: 10M SPD Direction: 10M WD Lapse: DT60-10

Stability Class: **A** Delta Temperature: Extremely Unstable

Wind Speed (m/s)

Wind Direction from	0.23-0.50	0.51-0.75	0.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	> 18.0	Total
N	1	0	0	2	3	11	28	4	0	0	0	0	49
NNE	0	0	0	3	1	28	58	4	0	0	0	0	94
NE	0	0	0	7	15	45	23	0	0	0	0	0	90
ENE	0	0	1	8	17	11	4	0	0	0	0	0	41
E	0	0	4	26	8	4	1	0	0	0	0	0	43
ESE	0	1	7	12	7	8	6	0	0	0	0	0	41
SE	0	0	2	6	14	33	20	0	0	0	0	0	75
SSE	0	0	2	6	19	36	14	1	0	0	0	0	78
S	0	0	2	10	28	62	63	1	0	0	0	0	166
SSW	0	0	0	12	38	105	88	4	0	0	0	0	247
SW	0	0	1	10	38	177	261	28	1	0	0	0	516
WSW	0	0	0	4	7	29	125	35	2	0	0	0	202
W	0	0	0	1	2	4	48	5	0	0	0	0	60
WNW	0	0	0	1	2	6	12	0	0	0	0	0	21
NW	0	0	0	0	1	0	6	3	0	0	0	0	10
NNW	0	0	0	1	0	1	12	4	0	0	0	0	18
Totals	1	1	19	109	200	560	769	89	3	0	0	0	1751

Number of Calm Hours for this Table	18
Number of Variable Direction Hours for this Table	0
Number of Invalid Hours	297
Number of Valid Hours for this Table	1751
Total Hours for the Period	43823

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
EMERGENCY PLAN

JOINT FREQUENCY DISTRIBUTION

FIGURE B-6

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = 01/01/99 1:00- 12/31/03 23:00 Total Period
Elevation: Speed: 10M SPD Direction: 10M WD Lapse: DT60-10

Stability Class: **B** Delta Temperature: Moderately Unstable

Wind Speed (m/s)

Wind Direction from	0.23-0.50	0.51-0.75	0.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	> 18.0	Total
N	0	1	0	1	5	9	42	8	0	0	0	0	66
NNE	0	0	0	3	20	47	34	3	0	0	0	0	107
NE	0	0	0	12	16	46	24	0	0	0	0	0	98
ENE	0	0	1	24	13	10	2	0	0	0	0	0	50
E	0	0	9	15	7	10	3	0	0	0	0	0	44
ESE	0	0	4	11	14	5	5	0	0	0	0	0	39
SE	0	0	2	10	11	16	11	0	0	0	0	0	50
SSE	0	0	0	4	11	11	6	0	0	0	0	0	32
S	0	0	2	11	14	38	21	0	0	0	0	0	86
SSW	0	0	1	11	39	55	28	3	0	0	0	0	137
SW	0	0	0	4	36	105	175	31	4	0	0	0	355
WSW	0	0	1	1	7	23	100	43	2	0	0	0	177
W	0	0	0	0	1	8	34	4	0	0	0	0	47
WNW	0	0	0	0	1	1	18	1	0	0	0	0	21
NW	0	0	0	0	1	5	10	2	0	0	0	0	18
NNW	0	0	0	0	4	8	19	3	2	0	0	0	36
Totals	0	1	20	107	200	397	532	98	8	0	0	0	1363

Number of Calm Hours for this Table	18
Number of Variable Direction Hours for this Table	0
Number of Invalid Hours	297
Number of Valid Hours for this Table	1363
Total Hours for the Period	43823

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
EMERGENCY PLAN

JOINT FREQUENCY DISTRIBUTION

FIGURE B-7

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = 01/01/99 1:00- 12/31/03 23:00 Total Period
Elevation: Speed: 10M SPD Direction: 10M WD Lapse: DT60-10

Stability Class: **C** Delta Temperature: Slightly Unstable

Wind Speed (m/s)

Wind Direction from	0.23-0.50	0.51-0.75	0.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	> 18.0	Total
N	0	0	0	3	7	23	73	6	0	0	0	0	112
NNE	0	0	1	8	21	52	59	6	0	0	0	0	147
NE	0	0	0	12	24	45	20	0	0	0	0	0	101
ENE	0	0	2	25	20	14	4	0	0	0	0	0	65
E	0	1	7	19	8	8	3	0	0	0	0	0	46
ESE	0	1	6	15	16	10	3	0	0	0	0	0	51
SE	1	0	7	9	17	13	11	0	0	0	0	0	58
SSE	0	1	4	12	18	21	12	0	0	0	0	0	68
S	0	0	4	26	28	50	28	0	0	0	0	0	136
SSW	0	0	1	24	35	76	17	2	0	0	0	0	155
SW	0	0	1	18	43	146	186	37	1	0	0	0	432
WSW	0	0	1	3	11	38	139	61	7	0	0	0	260
W	0	0	0	8	7	7	51	21	1	0	0	0	95
WNW	0	0	0	0	2	14	31	1	0	0	0	0	48
NW	0	0	1	0	3	9	30	4	0	0	0	0	47
NNW	0	0	0	1	1	19	31	16	2	0	0	0	70
Totals	1	3	35	183	261	545	698	154	11	0	0	0	1891

Number of Calm Hours for this Table	18
Number of Variable Direction Hours for this Table	0
Number of Invalid Hours	297
Number of Valid Hours for this Table	1891
Total Hours for the Period	43823

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
EMERGENCY PLAN

JOINT FREQUENCY DISTRIBUTION

FIGURE B-8

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = 01/01/99 1:00- 12/31/03 23:00 Total Period
Elevation: Speed: 10M SPD Direction: 10M WD Lapse: DT60-10

Stability Class: **D** Delta Temperature: Neutral

Wind Speed (m/s)

Wind Direction from	0.23-0.50	0.51-0.75	0.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	> 18.0	Total
N	2	7	23	74	119	433	716	98	0	0	0	0	1472
NNE	1	16	64	214	267	519	324	15	0	0	0	0	1420
NE	9	33	119	276	281	418	164	6	0	0	0	0	1306
ENE	8	51	130	219	153	158	54	3	0	0	0	0	776
E	10	85	158	202	124	119	32	5	0	0	0	0	735
ESE	15	67	144	144	117	146	58	7	3	1	0	0	702
SE	7	53	110	219	169	200	121	14	1	0	0	0	894
SSE	10	38	74	163	158	179	89	9	1	0	0	0	721
S	3	26	84	210	204	257	106	7	0	0	0	0	897
SSW	0	15	54	220	242	368	139	2	0	0	0	0	1040
SW	1	8	29	193	242	594	864	170	7	0	0	0	2108
WSW	0	3	15	87	132	254	627	425	90	1	0	0	1634
W	0	1	6	38	80	196	396	172	35	0	0	0	924
WNW	0	2	4	23	49	157	314	108	19	0	0	0	676
NW	1	2	11	31	45	225	632	178	6	0	0	0	1131
NNW	0	4	8	33	52	268	752	280	8	0	0	0	1405
Totals	67	411	1033	2346	2434	4491	5388	1499	170	2	0	0	17841

Number of Calm Hours for this Table	18
Number of Variable Direction Hours for this Table	0
Number of Invalid Hours	297
Number of Valid Hours for this Table	17841
Total Hours for the Period	43823

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
EMERGENCY PLAN

JOINT FREQUENCY DISTRIBUTION

FIGURE B-9

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = 01/01/99 1:00- 12/31/03 23:00 Total Period
Elevation: Speed: 10M SPD Direction: 10M WD Lapse: DT60-10

Stability Class: **E** Delta Temperature: Slightly Stable

Wind Speed (m/s)

Wind Direction from	0.23-0.50	0.51-0.75	0.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	> 18.0	Total
N	1	14	28	90	138	144	53	2	0	0	0	0	470
NNE	3	33	112	324	269	254	79	1	0	0	0	0	1075
NE	13	124	289	551	197	159	54	0	0	0	0	0	1387
ENE	20	279	467	493	87	29	7	3	0	0	0	0	1385
E	41	378	361	154	33	29	5	0	0	0	0	0	1001
ESE	45	265	207	99	30	24	8	5	0	0	0	0	683
SE	37	201	229	152	48	50	23	10	4	0	0	0	754
SSE	19	109	183	213	95	63	40	6	0	0	0	0	728
S	10	75	216	413	193	151	49	18	0	0	0	0	1125
SSW	3	42	126	397	334	309	84	4	0	0	0	0	1299
SW	2	14	39	188	209	343	210	10	1	0	0	0	1016
WSW	0	4	12	64	80	83	61	14	3	0	0	0	321
W	2	1	9	36	33	37	19	4	0	0	0	0	141
WNW	0	2	7	16	23	34	13	0	0	0	0	0	95
NW	1	2	4	19	42	87	24	2	0	0	0	0	181
NNW	0	5	6	21	41	116	35	2	0	0	0	0	226
Totals	197	1548	2295	3230	1852	1912	764	81	8	0	0	0	11887

Number of Calm Hours for this Table	18
Number of Variable Direction Hours for this Table	0
Number of Invalid Hours	297
Number of Valid Hours for this Table	11887
Total Hours for the Period	43823

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
EMERGENCY PLAN

JOINT FREQUENCY DISTRIBUTION

FIGURE B-10

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = 01/01/99 1:00- 12/31/03 23:00 Total Period
Elevation: Speed: 10M SPD Direction: 10M WD Lapse: DT60-10

Stability Class: F Delta Temperature: Moderately Stable

Wind Speed (m/s)

Wind Direction from	0.23-0.50	0.51-0.75	0.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	> 18.0	Total
N	1	5	6	25	11	5	2	0	0	0	0	0	55
NNE	5	21	34	66	32	9	1	0	0	0	0	0	168
NE	13	92	198	257	50	1	1	0	0	0	0	0	612
ENE	21	361	806	994	149	6	0	0	0	0	0	0	2337
E	44	371	356	149	9	0	0	0	0	0	0	0	929
ESE	23	160	122	15	0	0	0	0	0	0	0	0	320
SE	14	82	82	25	2	0	0	0	0	0	0	0	205
SSE	8	32	78	49	6	1	0	0	0	0	0	0	174
S	2	29	78	121	14	1	1	0	0	0	0	0	246
SSW	1	16	24	81	37	4	1	0	0	0	0	0	164
SW	1	4	15	38	21	19	2	0	0	0	0	0	100
WSW	0	0	5	6	4	3	1	0	0	0	0	0	19
W	2	2	3	5	0	1	0	0	0	0	0	0	13
WNW	1	0	0	2	2	1	0	0	0	0	0	0	6
NW	0	0	2	1	1	2	1	0	0	0	0	0	7
NNW	1	0	3	2	5	2	2	0	0	0	0	0	15
Totals	137	1175	1812	1836	343	55	12	0	0	0	0	0	5370

Number of Calm Hours for this Table	18
Number of Variable Direction Hours for this Table	0
Number of Invalid Hours	297
Number of Valid Hours for this Table	5370
Total Hours for the Period	43823

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
EMERGENCY PLAN

JOINT FREQUENCY DISTRIBUTION

FIGURE B-11

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = 01/01/99 1:00- 12/31/03 23:00 Total Period
Elevation: Speed: 10M SPD Direction: 10M WD Lapse: DT60-10

Stability Class: **G** Delta Temperature: Extremely Stable

Wind Speed (m/s)

Wind Direction from	0.23-0.50	0.51-0.75	0.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	> 18.0	Total
N	1	2	2	3	1	0	0	0	0	0	0	0	9
NNE	1	16	17	17	3	1	0	0	0	0	0	0	55
NE	2	71	168	162	19	1	0	0	0	0	0	0	423
ENE	8	167	690	1065	186	4	0	0	0	0	0	0	2120
E	13	120	219	102	3	0	0	0	0	0	0	0	457
ESE	4	63	55	9	0	0	0	0	0	0	0	0	131
SE	3	31	35	12	2	1	0	0	0	0	0	0	84
SSE	0	14	23	15	3	0	0	0	0	0	0	0	55
S	0	5	12	17	0	0	0	0	0	0	0	0	34
SSW	1	2	8	7	5	1	0	0	0	0	0	0	24
SW	0	2	3	1	0	1	0	0	0	0	0	0	7
WSW	0	1	0	0	0	0	0	0	0	0	0	0	1
W	0	0	0	0	0	1	0	0	0	0	0	0	1
WNW	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	0	1	0	0	0	0	0	0	0	0	0	0	1
NNW	0	2	0	1	0	0	0	0	0	0	0	0	3
Totals	33	497	1232	1411	222	10	0	0	0	0	0	0	3405

Number of Calm Hours for this Table	18
Number of Variable Direction Hours for this Table	0
Number of Invalid Hours	297
Number of Valid Hours for this Table	3405
Total Hours for the Period	43823

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
EMERGENCY PLAN

JOINT FREQUENCY DISTRIBUTION

FIGURE B-12

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = 01/01/99 1:00- 12/31/03 23:00 Total Period
Elevation: Speed: 10M SPD Direction: 10M WD Lapse: DT60-10

Summary of All Stability Classes Delta Temperature

Wind Speed (m/s)

Wind Direction from	0.23-0.50	0.51-0.75	0.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	> 18.0	Total
N	6	29	59	198	284	625	914	118	0	0	0	0	2233
NNE	10	86	228	635	613	910	555	29	0	0	0	0	3066
NE	37	320	774	1277	602	715	286	60	0	0	0	0	4017
ENE	57	858	2097	2828	625	232	71	6	0	0	0	0	6774
E	108	955	1114	667	192	170	44	5	0	0	0	0	3255
ESE	87	557	545	305	184	193	80	12	3	1	0	0	1967
SE	62	367	467	433	263	313	186	24	5	0	0	0	2120
SSE	37	194	364	462	310	311	161	16	1	0	0	0	1856
S	15	135	398	808	481	559	268	26	0	0	0	0	2690
SSW	5	75	214	752	730	918	357	1	0	0	0	0	3066
SW	4	28	88	452	589	1385	1698	276	14	0	0	0	4534
WSW	0	8	34	165	241	430	1053	578	104	1	0	0	2614
W	4	4	18	88	123	254	548	206	36	0	0	0	1281
WNW	1	4	11	42	79	213	388	110	19	0	0	0	867
NW	2	5	18	51	93	328	703	189	6	0	0	0	1395
NNW	1	11	17	59	103	414	851	305	12	0	0	0	1773
Totals	436	3636	6446	9222	5512	7970	8163	1921	200	2	0	0	43508

Number of Calm Hours for this Table	18
Number of Variable Direction Hours for this Table	0
Number of Invalid Hours	297
Number of Valid Hours for this Table	43508
Total Hours for the Period	43823

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
EMERGENCY PLAN

JOINT FREQUENCY DISTRIBUTION

FIGURE B-13

APPENDIX C

SSES EMERGENCY PLAN
POSITION SPECIFIC PROCEDURES
(TYPICAL)

APPENDIX C
SSES EMERGENCY PLAN POSITION SPECIFIC PROCEDURES (TYPICAL)

EMERGENCY PLAN POSITION SPECIFIC PROCEDURES (Response Procedures)	
CR Procedures	**EOF Procedures**
Emergency Director	Recovery Manager
Emergency Plan Communicator	EOF Support Supervisor
NRC Communicator	NEP Duty Planner
	EOF Emergency Plan Communicator
TSC Procedures	Environmental Sampling Team
Emergency Director	Radiological Monitoring Team
TSC Technical Support Coordinator	EOF Administrative Assistant
TSC Operations Coordinator	EOF Liaison Support Supervisor
Radiation Protection Coordinator	EOF Dose Assessment Staffer
TSC Dose Calculator	EOF Dose Assessment Supervisor
RP Tech I (Oscar)	Field Team Director
Security Coordinator	EOF Environmental Sampling Director
TSC Administrative Coordinator	EOF Technical Advisor
TSC E Plan Communicator	Engineering Support Supervisor
HPN Communicator	Fuels Lead Engineer / Core Thermal Hydraulics Engineer
RP II Dose Calculator	EOF Systems Lead Engineer
Damage Control Team Coordinator	EOF Support Engineer
Severe Accident Management Coordinator	
TSC NRC Communicator	
TSC Information Coordinator	**JIC Procedures**
Fuels Lead Engineer / Core Thermal Hydraulics Engineer	Public Information Manager
TSC RP Radio Communicator	News Manager
	JIC Technical Briefer
	Support Services Manager
OSC Procedures	Media & Public Officials Contact
OSC Coordinator	JIC Logkeeper
RP Specialist	JIC Writer
Maintenance Foreman/Field Unit Supervisor	JIC Administrative Coordinator
Chemistry Coordinator	
OTHER EMERGENCY PLAN RESPONSE PROCEDURES	
Offsite Organization Response to Plant Events	
Emergency Telephone Instructions and Directory	Susquehanna Offsite Organization Response to Plant Events
Remote Assembly Area Contamination Control	Termination and Restoration
Brief Non-Technical Description of EALs	EAL Classification Bases
SSES MIDAS-NU User Manual	Personnel Accountability

APPENDIX D

EQUIPMENT INFORMATION LISTINGS

CONTENTS OF APPENDIX D

Equipment Information Listings

Enclosure 1	Typical Station Decontamination Area Equipment Typical Damage Control Equipment Storage Box Contents
Enclosure 2	Onsite Search and Rescue/First Aid, Typical Ambulance and Hospital Radiation Emergency Equipment and Supplies
Enclosure 3	Natural Phenomena Monitors
Enclosure 4	Radiological Monitors
Enclosure 5	Environmental Monitoring Systems
Enclosure 6	Typical Radiation Protection Van Radiation Emergency Monitoring Equipment
Enclosure 7	Emergency Classification Dependent Instrumentation
Enclosure 8	Typical Initial Emergency Equipment for Initial Incident Response Typical TSC Equipment
Enclosure 9	Typical EOF Equipment

ENCLOSURE 1 TO APPENDIX D

Typical Station Decontamination Area Equipment

Decontamination Procedures
Coveralls
Decontamination Soap
Disposable Bath Towels
Plastic Gloves + Cotton Inserts
Frisker
Hand Brushes
Masking Tape
Paper Towels
Shoe Covers, paper
Sponge

Typical Damage Control Equipment Storage Box Contents

Amprobe
Bars, Pry, Large
Bars, Pry, Rolling Lead
Black Wire, 1/4 lb. Rolls, 16 Gauge
Box, Tool, 23"
Bucket, 14 quart, Plastic
Cable Cutters
Clamps, C, Medium
Clamps, C, Large
Clamps, C, Small
Electricians Pouch with Miscellaneous Hand Tools
Enerpac, Rescue Unit
Flashlight, 5 cell
Hammer, Ball Peen, 16 oz.
Hammer, Sledge, 10 lb.
Hammer, Sledge, 8 lb.
Multimeter
Nylon Rope, 100' coils, 3/4"
Nylon Rope, 25' coils, 3/8"
Nylon Rope, 50' coils, 3/8"
Nylon Rope, 50' coils, 3/4"
Plastic Sheet, 20' X 20', Fire Retardant
Pliers, Lineman
Pliers, Water Pump
Plugs, Wood, 1" & 6"
Plugs, Wooden Box, 1", 1¼', 1½', 2", 2½", 3"
Rubber, Roll 1/16" thick, 10' X 3'
Screwdrivers, Large Standard
Screwdrivers, Medium Standard
Screwdrivers, Phillips, Large
Screwdrivers, Phillips, Medium
String, Ball
Twine, Bale
Wedges, Wooden
Wrench, Adjustable, 12"
Wrench, Adjustable, 8"
Wrench, Allen Pac 3/16", 7/32", 1/4", 5/16", 3/8"
Wrench, Allen Pac .050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", 5/32", 3/16", 7/32"
Wrench, Chain
Wrench, Hex, #110
Wrench, Hex, #17
Wrench, Hex, 24"
Wrench, Pipe, 18"
Wrench, Pipe, 14"

ENCLOSURE 2 TO APPENDIX D

Typical Onsite Search and Rescue/First Aid, Ambulance, and Hospital Radiation Emergency Equipment and Supplies

Onsite Search Rescue/First Aid:

Adjustable Litter
Basket Stretcher (Stokes)
First Aid Team Initial Response Kit with Inventory Sheet
Folding Litter
Portable Oxygen-Demand Valve (size D tank With assorted airways, cannulas, and masks)
Scoop Stretcher
Trauma Kit
Assorted Splinting Devices

Ambulance Kit:

Masking Tape
Waste "Rad" Bags
Plastic Gloves
Cotton Gloves
Herculite
Shoe Covers
Portable Frisker and Probe
Lab Coats

Hospital:

Dosimeter Charger
Survey Meter
Frisker with Probe
Herculite
Lead Container, high activity samples
Self Reading Dosimeters
Set of Radiation Signs and Ribbon
Stanchions/Pylons
Step-off Pad
Thermoluminescent Dosimeters, badge type
Thermoluminescent Dosimeters, ring type

ENCLOSURE 3 TO APPENDIX D

Natural Phenomena Monitors

METEOROLOGICAL MONITORING INSTRUMENTATION

1. Wind Speed Instrument
   a. Elevation 10 meters and 60 meters.
2. Wind Direction Instrument
   a. Elevation 10 meters and 60 meters.
3. Air Temperature Difference Instrument
   a. Elevation 10/60 meters.
4. Ambient Temperature Gauge Instrument
   a. Elevation 10 meters.
5. Dew Point Gauge Instrument
   a. Elevation 10 meters.
6. Rainfall Gauge Instrument
   a. Ground level.

SEISMIC MONITORING INSTRUMENTATION

INSTRUMENTS AND SENSOR LOCATIONS

1. Triaxial Accelerometers and Triggers
   a. Reactor Equipment, Unit 1
   b. Reactor Bldg. Floor (RHR), Unit 1
   c. ESSW Pumphouse Floor [(a)]
   d. Containment Foundation, Unit 1 [(a)]
   e. Containment Structure, Unit 1
   f. Containment Foundation, Unit 2 [(a)]

2 Response-Spectrum Analyzer/Recorders

(a) The Unit 1 Containment Foundation, Unit 2 Containment Foundation and ESSW Pumphouse Floor Accelerometer Channels have associated triggers. These triggers provide control room indication and annunciation.

Enclosure 4 to Appendix D

RADIOLOGICAL MONITORS

Instrument Type	Individual Detectors	Function & Sensitivity
Air Sampling Equipment	Continuous Air Monitors	Particulate, Iodine Equipment & Gas Monitor
	High volume samplers	Particulate, Iodine
	Low volume samplers	Particulate, Iodine
	Breathing zone samplers	Particulate, Iodine
Personnel Dosimetry	Electronic Dosimetry TLD's	0 - 100,000 mrem
Portable Survey Instruments	GM survey instruments Ion chamber survey instruments Ion chamber survey instruments Telescoping GM survey instruments GM count rate meters Meter with alpha scintillation probe Neutron detector Portal monitors	0 - 2 R/hr 0 - 5 Rem/hr 0 - 50 Rem/hr 0 - 1,000 R/hr 0 - 50,000 cpm 10 CPM to 100,000 CPM 0 - 5 Rem/hr
Counting Room	Low background gas	N/A
	proportional counters	
	Liquid scintillation counter	
	scintillation - alpha	
	scintillation - beta	
	High Purity Ge Spectrometer	
	GM End Window Scaler	

Enclosure 4 to Appendix D (Cont'd.)

AREA RADIATION MONITORS (ARMs)

Channel #	Location Building and Area	Elev.	Range (mR/hr)	Local Alarm
1	1R/2R Resid Heat Removal Area	645'	0.1-1000	Yes
2	1R/2R RCIC Pump Turbine Room	645'	0.01-100	Yes
3	1R/2R HPCI Pump Turbine Room	645'	0.01-100	Yes
4	1R/2R Radwaste Sump Area	645'	0.1-1000	Yes
5	1R/2R Control Rod Drive (North)	719'	0.1-1000	Yes
6	1R/2R Control Rod Drive (South)	719'	0.1-1000	Yes
7	1R/2R Offgas By Pass Line	656'	0.1-1000	Yes
8	1R/2R Cleanup Recirc. Pump Access Area	749'	0.01-100	Yes
9	1R/2R CRD Repair Area	719'	0.1-1000	Yes
10	1R/2R Fuel Pool Room	749'	0.1-1000	Yes
11	1R/2R Sample Station Room	749'	0.01-100	Yes
12	1R/2R Recirc. Fan Room	799'	0.01-100	Yes
13	1R/2R New Fuel Storage Vault	817'	0.1-1000	Yes
14	1R/2R Spent Fuel Pool	818'	0.1-1000	Yes
15	1R/2R Refueling Floor Area	818'	0.01-100	Yes
16	1R/2R Access to Remote Shutdown	670'	0.01-100	Yes
17	1T/2T Cond. Pumps Area	656'	0.01-100	Yes
18	1T/2T RFPT Area at Reactor Bldg Access	676'	0.01-100	Yes
19	1T/2T Air Ejector Room	682'	0.1-1000	Yes
20	1T/2T Feedwater Heater Area	699'	0.1-1000	Yes
21	1T/2T Rx Recirc. MG Set Area	729'	0.01-100	Yes
22	1T/2T Generator Bay Area	729'	0.01-100	Yes
23	1T/2T H&V Equip. Room	762'	0.01-100	Yes
24	1T/2T Turbine Front End	729'	0.01-100	Yes
25	1R/2R Resid. Heat Removal Area	645'	0.1-1000	Yes
26	1R/2R TIP Drive Area	719'	0.1-1000	Yes
27	S&A Bldg. Entrance to Turbine Floor	729'	0.01-100	Yes
28	S&A Bldg. 2nd Floor Corridor	691'	0.01-100	Yes
29	RW Corr. Pers. Access Area	646'	0.1-1000	Yes
30	RW Opt. Surveil. Contr. Area	646'	0.1-1000	Yes
3l	RW Corr. to Collection Tank	646'	0.1-1000	Yes
32	RW Controlled Zone Shop	676'	0.1-1000	Yes
33	RW Control Room	676'	0.1-1000	Yes
34	RW Storage and Equip. Area	676'	0.1-1000	Yes
35	RB Sampling Cask Storage Area	818'	0.01-100	Yes
36	RB Railroad Access Area	670'	0.01-100	Yes

Enclosure 4 to Appendix D (Cont'd)

AREA RADIATION MONITORS (ARMs)

Channel #	Location Building and Area	Elev.	Range (mR/hr)	Local Alarm
37	Standby Gas Treatment Room	806'	0.01-100	Yes
38	Control Structure Rad Chem Lab.	676'	0.01-100	Yes
39	Control Structure Control Room	729'	0.01-100	Yes
40	S&A Access to Unit 1 Turbine Bldg.	676'	0.01-100	Yes
41	RB Tip Chamber Shield Area	719'	100-1,000,000	Yes
42	RB Refueling Floor Area	818'	.01-100	Yes
46 (43 U-2)	RB New Fuel Storage Vault	817'	0.1-1000	Yes
47 (44 U-2)	RB Spent Fuel Pool Area	818'	0.1-1000	Yes
48	1R/2R HPCI Pump & Turbine Room	645'	100-1,000,000	No
49	1R/2R Refueling Floor Area	818'	100-1,000,000	No
50	1R/2R Control Rod Drive North	719'	100-1,000,000	No
51	1R/2R Control Rod Drive South	719'	100-1,000,000	No
52	1R/2R RWCU Recirc. Pump Access Area	749'	100-1,000,000	No
53	1R/2R Access to Remote Shutdown Panel	670'	100-1,000,000	No
54	1R/2R Fuel Pool Pump Room	749'	100-1,000,000	No
55	1R/2R RHR Room - Loop A	645'	100-1,000,000	No
56	1R/2R RHR Room - Loop B	645'	100-1,000,000	No
57	1R/2R RCIC Pump Turbine Room	645'	100-1,000,000	No

Enclosure 4 to Appendix D (Cont'd.) PROCESS MONITORS			
System	**Det. Types**	**Range**	**Location**
Main Steam Line	ION Chambers (IC)	$1\text{-}10^6$ mR/hr	Near main steamlines between primary and secondary containment walls, just downstream of MSIVs
Refueling Floor Wall Exhaust Duct	GMs	0.0l-l00 mR/hr	Exhaust ducting upstream of inboard isolation damper, prior to discharge through reactor building vent
Refueling Floor High Exhaust Duct.	GMs	0.0l-l00 mR/hr	Exterior to fuel pool ventilation exhaust duct
Railroad Access Exhaust Duct	GMs	0.0l-l00 mR/hr	Exhaust duct prior to Rx building vent
Emergency Outside Air Intake	GMs	0.0l-l00 mR/hr	In the outside intake air plenum
Offgas Pretreatment (SJAE)	ICs	$1\text{-}10^6$mR/hr	Discharge of the delay pipe after SJAE
Liquid Radwaste Effluent	Scintillation (SCIN)	$10 – 10^7$ cpm	Off-line on liquid waste effluent discharge
Service Water (FPC)	SCIN	$l0^{-1}$ - $l0^6$ cps	Downstream of fuel pool HX prior to discharge to cooling towers
RHR Service Water	SCIN	$l0^{-1}$ - $l0^6$ cps	On the downstream piping of each RHR HX
RX Building Closed	SCIN	$l0^{-1}$ - $l0^6$ cpm	Suction piping of the Water RBCCW pumps
Standby Gas Treatment SGTS Vent Exhaust	GM	0.0l-l00 mR/hr	Inside exhaust ductwork
Containment Monitor	IC	$1\text{-}10^8$R/hr	Drywell

Enclosure 4 to Appendix D (Cont'd.) VENT MONITORS		
Type	**Minimum**	**Location**
SCIN	10^{-6} micro Ci/cc gas.	Five locations in turbine building, reactor building, and SGTS vents
Iodine Sampling Cartridge	NA*	
Particulate Filter	NA*	

VERMS use Solid State detectors.

* Sensitivity dependent on sample size and count time. Sensitivities equal to or better than 10E-11 micro Ci/cc are achievable.

Enclosure 5 to Appendix D

ENVIRONMENTAL MONITORING SYSTEMS

1. Environmental Monitoring Systems

Instrument System	Individual Detectors	Purpose
A. Radiological Environmental Monitoring Program (REMP) System	off-site fixed air sampling stations	sample particulates sample iodine
	direct radiation monitor stations (dosimeters)	measure gamma dose
B. Analytical Facilities	near-site radiation chemistry laboratory*	radiochemical analysis of environmental and bioassay samples
	off-site environmental contractor**	analysis as above, and also very low-level activity analysis

* Near-Site Radiation Chemistry Laboratory; used for effluent, reactor coolant and primary containment sample analysis

Capabilities:

(1) Gamma Spectrum Analysis: 25-50 samples per 24 hour day; samples may be in the form of water, air (filters/charcoal cartridges and gas marinelli beakers) and other free-flowing liquids.

(2) Liquid Scintillation Analysis: 25 samples per 24 hour day; samples in liquid form.

Equipment:

(1) Intrinsic germanium detector with associated electronics and computer system.

(2) Liquid scintillation detectors.

** Off-site Environmental Contractor (Teledyne Brown Engineering, Inc.); used for post-accident environmental samples

Location: Knoxville, TN.

Capabilities:

(1) Gamma Spectrum Analysis: 50 samples per 24 hour day; samples may be in the form of food, milk, water, air filters and charcoal cartridges.

(2) Gross Alpha/Beta Analysis: 50 samples per 24 hour day; samples may be in the form of air filters and water.

Equipment:

(1) Intrinsic germanium detector with associated electronics and computer system.

(2) Liquid scintillation detectors.

(3) Gas proportional detector.

Response Time:

(1) During normal hours staff existing at facility.

(2) During off normal hours two hours following notification.

Enclosure 5 to Appendix D (Cont'd.)
ENVIRONMENTAL MONITORING SYSTEMS

2. Typical Radiological Monitoring Team Equipment

Emergency Planning and Grid Coordinate Maps
Stopwatch, tweezers, masking tape
Gamma Survey Meter with current calibration
Low Volume Air Sampler and Head
Potassium Iodide Tablets
Radioactive Material Stickers
Particulate Filters, box
Silver Zeolite Cartridges
Disposable Plastic Gloves
Plastic sample bags and labels
Flashlight
Spare Batteries
Portable Frisker with Probe

3. Typical Emergency Environmental Sample Kit Contents

Assortment of Sampling Bags
Flashlight
Grid Coordinate Map
Electronic Dosimeters
Pliers
Plastic Gloves
Sample Containers
Sample Labels
Scale
Scissors
Spare Batteries

ENCLOSURE 6 TO APPENDIX D

Typical Radiation Protection Van Radiation Emergency Monitoring Equipment

Survey Meter with current calibration
Portable Frisker with probe
Low Volume Air Sampler with head (AC powered)
Low Volume Air Sampler with DC power plug
DC to AC Inverter
VHF mobile radio
Respirators
Iodine Canister
Potassium Iodide Tablets
Sets of Anti-contamination Clothing
Disposable gloves
Calculator
Frisker Check source
Silver Zeolite cartridges
Particulate Filters
Tweezers
Stopwatch
Masking Tape
Microfiber Wipes
Smear Papers
Plastic bags for samples
Extension cord
Work light
Flashlight
First Aid Kit
Spare batteries
Safety Vests
Gamma Survey Meter Check Source

ENCLOSURE 7 TO APPENDIX D

Emergency Classification Dependent Instrumentation

Vent Stack Monitors
Meteorological Tower Indication
Airborne Sampling System
Liquid Radwaste Sampling
Liquid Discharge Radiation Monitors
RHRSW Radiation Monitors
SW Radiation Monitors
Spent Fuel Pool Level Indication
Area Radiation Monitors
Refuel Floor Exhaust Radiation Monitors
Primary Containment Isolation Valve Position Indication
Reactor Coolant System Sampling
Reactor Pressure Vessel Level Indication (Fuel Zone, Shutdown Range, Extended Wide Range)
Main Steam Isolation Valve Position Indication
Main Steam Line Flow Indication
Main Steam Line Tunnel Temperature Indication
Drywell Sump Level Indication
Reactor Building Temperature Indication
Containment Pressure Indication
Containment Hydrogen / Oxygen Analyzers
Containment High Range Radiation Monitor
AC Power – 13.8KV (Downstream Loads / Breaker Position)
AC Power – 4KV (Downstream Loads / Breaker Position)
125 VDC Power (Downstream Loads / Breaker Position)
Nuclear Instrumentation (APRM, SRM)
Suppression Pool Temperature Indication
Suppression Pool Level Indication
Reactor Pressure Vessel Pressure Indication
Drywell Equipment Drain Tank Level Indication
Offgas Pretreatment Radiation Monitor
Seismic Monitor Instrumentation
Station Flooding Instrumentation
Simplex Fire Detection
Reactor Coolant System Temperature Indication
Reactor Building Sump Level Indication
Reactor Protection System Trip Indication
LRW Collection Tank Level Indication
Main Condenser Hotwell Level Indication

ENCLOSURE 8 TO APPENDIX D

Typical Emergency Equipment for Initial Incident Response

Portable frisker with probe
Low volume Air Sample with Head
Gamma Survey Meter
Particulate paper filters
Silver Zeolite Cartridges
Spare Batteries
Portable Worklight
Self Reading Dosimetry
Potassium Iodine Tablets
Anti-contamination Clothing
Full face Respirator
Iodine Filter Canisters
SCBA Equipment
Emergency Plan
Emergency Plan Position Specific Instructions
Emergency Planning Map with offsite sampling locations
Onsite Monitoring Locations Map
Food and potable water adequate to support 10 people for 5 days.

Typical Technical Support Center Equipment

Plant Technical Specifications
Operating Procedures Manual
Emergency Operating Procedure Manual
Final Safety Analysis Report
EP and EP-PSs
Safety Procedure Manual
Offsite Dose Calculation Manual
Plant as built drawings
Emergency Phone Directory
Copy Machine and Telecopier

ENCLOSURE 9 TO APPENDIX D

Typical Emergency Operations Facility Equipment

Plant Technical Specifications
Operating Procedures Manual
Emergency Operating Procedures Manual
Final Safety Analysis Report
Emergency Plan
Emergency Plan Position Specific Instructions
Current Emergency Plans for PEMA, LCEMA, CCEMA
Rad Health Handbook
Offsite Dose Calculation Manual
Emergency Phone Directory
Emergency Planning Map with Offsite Monitoring Locations
Calculators
Flashlight
First Aid Kit

APPENDIX E

Susquehanna Nuclear, LLC Policy Statement:

SUSQUEHANNA SES EMERGENCY MANAGEMENT

Brad Berryman
Sr. Vice President & Chief Nuclear Officer

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TALEN ENERGY

October 29, 2018

SUSQUEHANNA NUCLEAR LLC POLICY STATEMENT:

SUSQUEHANNA STEAM ELECTRIC STATION EMERGENCY MANAGEMENT

Immediate response, assessment, and the implementation of protective and corrective measures pertaining to an emergency condition at the Susquehanna Steam Electric Station shall be the responsibility of the SSES Emergency Director until relieved of this function by the Recovery Manager. The individuals who shall act in the capacity of SSES Emergency Managers are determined as follows:

> Immediately upon the occurrence of an emergency, the Shift Manager on duty at the station shall assume the role of SSES Emergency Director, as described in the SSES Emergency Plan, until relieved of that responsibility by the Emergency Director or his designated alternate.
>
> If the emergency requires activation of the Emergency Operations Facility (EOF), the SSES Recovery Manager shall assume responsibility for overall management of the emergency and off-site Protective Action Recommendations. The SSES Emergency Director retains responsibility for on-site operations.

The SSES Emergency Managers shall implement applicable portions of the SSES Emergency Plan to prevent or mitigate the consequences of emergencies at the Susquehanna Steam Electric Station. They shall have the authority to act on behalf of Susquehanna Nuclear, LLC, in all matters concerning an emergency, at least until such time as the scope, severity, and potential radiological consequences have been assessed, and the appropriate protective and corrective actions have been implemented. Following that critical period, but still with complete regard for health and safety, major decisions and Corporate commitments are the responsibility of Susquehanna Nuclear, LLC, Management.

Throughout the course of an emergency condition, all expertise and support available within the Susquehanna Nuclear, LLC organization shall be provided at the request of the SSES Emergency Managers.

Brad Berryman

APPENDIX F

DEVIATIONS TO NEI 99-01 REV. 6

Susquehanna Deviations to NEI 99-01 Rev 6
INITIATING CONDITIONS and Emergency Actions Levels

As documented in SSES letter to the NRC dated October 15, 2015 Susquehanna Steam Electric Station Proposed Additional Changes to the SSES Emergency Plan Basis Document Since Submittal of Response to NRC Request for Additional Information - PLA-7399 Enclosure 2, SSES took no deviations from the generic NEI 99-01 Revision 6 guidance. That enclosure provides a list of the SSES differences from the NRC endorsed guidance given in NEI 99-01 Revision 6.

APPENDIX G

SSES EVACUATION TIME ESTIMATES

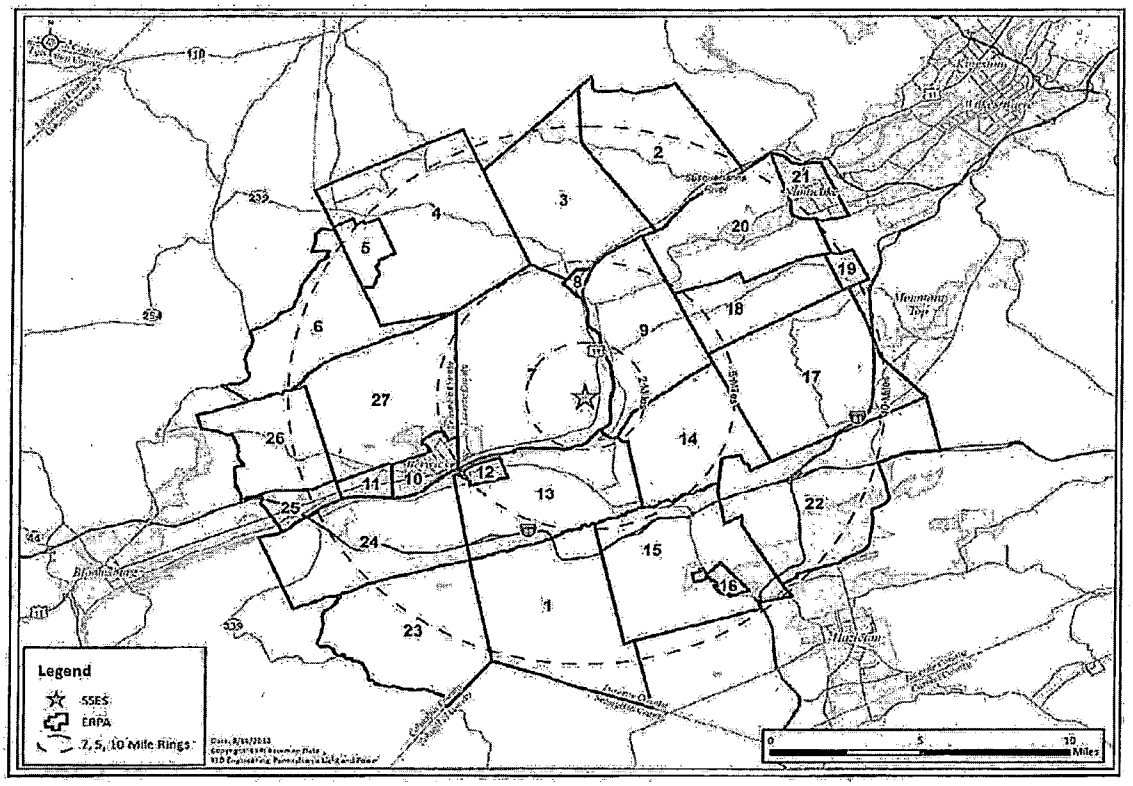
ORIGINAL DOCUMENT ISSUED 11/2012

NOTE: The information contained in Appendix G is a copy of the executive summary of the November 2012 Evacuation Time Estimate. The entire Evacuation Time Estimate can be found in the Susquehanna Information Management System which also stores the annual reviews.

KLD ENGINEERING, P.C.

Susquehanna Steam Electric Station

Development of Evacuation Time Estimates



Work performed for PPL Susquehanna, LLC, by:

KLD Engineering, P.C.
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Hauppauge, NY 11788
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November, 2012 **Final Report, Rev. 0** **KLD TR – 527**

EXECUTIVE SUMMARY

This report describes the analyses undertaken and the results obtained by a study to develop Evacuation Time Estimates (ETE) for the Susquehanna Steam Electric Station (SSES) located in Luzerne County, Pennsylvania. ETE are part of the required planning basis and provide PPL Susquehanna, LLC (PPL) and state and local governments with site-specific information needed for Protective Action decision-making.

In the performance of this effort, guidance is provided by documents published by Federal Governmental agencies. Most important of these are:

- Criteria for Development of Evacuation Time Estimate Studies, NUREG/CR-7002, November 2011.
- Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, NUREG-0654/FEMA-REP-1, Rev. 1, November 1980.
- Development of Evacuation Time Estimates for Nuclear Power Plants, NUREG/CR-6863, January 2005.
- 10CFR50, Appendix E – "Emergency Planning and Preparedness for Production and Utilization Facilities"

Overview of Project Activities

This project began in March, 2012 and extended over a period of 6 months. The major activities performed are briefly described in chronological sequence:

- Attended "kick-off" meetings with PPL personnel.
- Accessed U.S. Census Bureau data files for the year 2010. Studied Geographical Information Systems (GIS) maps of the area in the vicinity of the SSES, then conducted a detailed field survey of the highway network.
- Synthesized this information to create an analysis network representing the highway system topology and capacities within the Emergency Planning Zone (EPZ), plus a Shadow Region covering the region between the EPZ boundary and approximately 15 miles radially from the plant.
- Designed and sponsored a telephone survey of residents within the EPZ to gather focused data needed for this ETE study that were not contained within the census database. The survey used was carried out in 2008; it is still valid since there has not been a significant change in EPZ demographics. The survey instrument had been reviewed and modified by the licensee and offsite response organization (ORO) personnel prior to conducting the survey.
- Data collection forms (provided to PPL at the kickoff meeting) were returned with data

pertaining to employment, transients, and special facilities in each county.

- The traffic demand and trip-generation rates of evacuating vehicles were estimated from the gathered data. The trip generation rates reflected the estimated mobilization time (i.e., the time required by evacuees to prepare for the evacuation trip) computed using the results of the telephone survey of EPZ residents.
- Following federal guidelines, the EPZ is subdivided into 27 ERPA. These ERPA are then grouped within circular areas or "keyhole" configurations (circles plus radial sectors) that define a total of 30 Evacuation Regions.
- The time-varying external circumstances are represented as Evacuation Scenarios, each described in terms of the following factors: (1) Season (Summer, Winter); (2) Day of Week (Midweek, Weekend); (3) Time of Day (Midday, Evening); and (4) Weather (Good, Rain, Snow). One special event scenario - refueling at the plant - was considered. One roadway impact scenario was considered wherein a single lane was closed on Interstate 80 westbound for the duration of the evacuation.
- Staged evacuation was considered for those regions wherein the 2 mile radius and sectors downwind to 5 miles were evacuated.
- As per NUREG/CR-7002, the planning basis for the calculation of ETE is:
  - A rapidly escalating accident at the SSES that quickly assumes the status of General Emergency such that the Advisory to Evacuate is virtually coincident with the siren alert, and no early protective actions have been implemented.
  - While an unlikely accident scenario, this planning basis will yield ETE, measured as the elapsed time from the Advisory to Evacuate until the stated percentage of the population exits the impacted Region, that represent "upper bound" estimates. This conservative Planning Basis is applicable for all initiating events.
- If the emergency occurs while schools are in session, the ETE study assumes that the children will be evacuated by bus directly to reception centers or host schools located outside the EPZ. Parents, relatives, and neighbors are advised to not pick up their children at school prior to the arrival of the buses dispatched for that purpose. The ETE for schoolchildren are calculated separately.
- Evacuees who do not have access to a private vehicle will either ride-share with relatives, friends or neighbors, or be evacuated by buses provided as specified in the county evacuation plans. Those in special facilities will likewise be evacuated with public transit, as needed: bus, van, or ambulance, as required. Separate ETE are calculated for the transit-dependent evacuees, for homebound special needs population, and for those evacuated from special facilities.

Computation of ETE

A total of 420 ETE were computed for the evacuation of the general public. Each ETE quantifies the aggregate evacuation time estimated for the population within one of the 30 Evacuation

Regions to evacuate from that Region, under the circumstances defined for one of the 14 Evacuation Scenarios (30 x 14 = 420). Separate ETE are calculated for transit-dependent evacuees, including school children for applicable scenarios.

Except for Region R03, which is the evacuation of the entire EPZ, only a portion of the people within the EPZ would be advised to evacuate. That is, the Advisory to Evacuate applies only to those people occupying the specified impacted region. It is assumed that 100 percent of the people within the impacted region will evacuate in response to this Advisory. The people occupying the remainder of the EPZ outside the impacted region may be advised to take shelter.

The computation of ETE assumes that 20% of the population within the EPZ but outside the impacted region, will elect to "voluntarily" evacuate. In addition, 20% of the population in the Shadow Region will also elect to evacuate. These voluntary evacuees could impede those who are evacuating from within the impacted region. The impedance that could be caused by voluntary evacuees is considered in the computation of ETE for the impacted region.

Staged evacuation is considered wherein those people within the 2-mile region evacuate immediately, while those beyond 2 miles, but within the EPZ, shelter-in-place. Once 90% of the 2-mile region is evacuated, those people beyond 2 miles begin to evacuate. As per federal guidance, 20% of people beyond 2 miles will evacuate (non-compliance) even though they are advised to shelter-in-place.

The computational procedure is outlined as follows:

- A link-node representation of the highway network is coded. Each link represents a unidirectional length of highway; each node usually represents an intersection or merge point. The capacity of each link is estimated based on the field survey observations and on established traffic engineering procedures.
- The evacuation trips are generated at locations called "zonal centroids" located within the EPZ and Shadow Region. The trip generation rates vary over time reflecting the mobilization process, and from one location (centroid) to another depending on population density and on whether a centroid is within, or outside, the impacted area.
- The evacuation model computes the routing patterns for evacuating vehicles that are compliant with federal guidelines (outbound relative to the location of the plant), then simulate the traffic flow movements over space and time. This simulation process estimates the rate that traffic flow exits the impacted region.

The ETE statistics provide the elapsed times for 90 percent and 100 percent, respectively, of the population within the impacted region, to evacuate from within the impacted region. These statistics are presented in tabular and graphical formats. The 90th percentile ETE have been identified as the values that should be considered when making protective action decisions because the 100th percentile ETE are prolonged by those relatively few people who take longer to mobilize. This is referred to as the "evacuation tail" in Section 4.0 of NUREG/CR-7002.

The use of a public outreach (information) program to emphasize the need for evacuees to

minimize the time needed to prepare to evacuate (secure the home, assemble needed clothes, medicines, etc.) should also be considered.

Traffic Management

This study references the comprehensive traffic management plans provided in the Luzerne and Columbia County Radiological Emergency Response Plans. Due to the detailed plans already in place and the limited traffic congestion within the EPZ, no additional traffic or access control measures have been identified as a result of this study.

Selected Results

A compilation of selected information is presented on the following pages in the form of figures and tables extracted from the body of the report; these are described below.

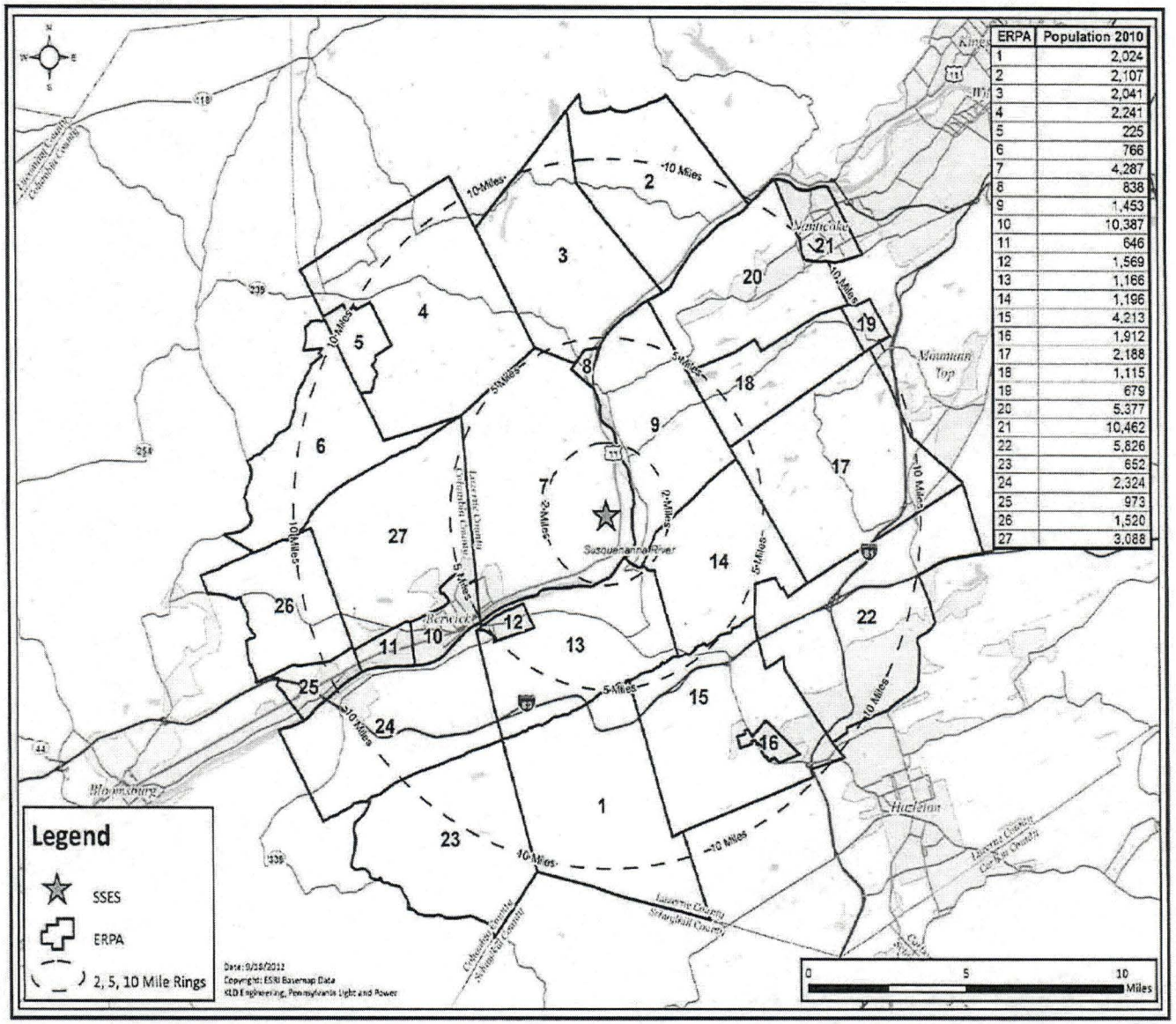
- Figure 6-1 displays a map of the SSES EPZ showing the layout of the 27 ERPA that comprise, in aggregate, the EPZ.
- Table 3-1 presents the estimates of permanent resident population in each ERPA based on the 2010 Census data.
- Table 6-1 defines each of the 30 Evacuation Regions in terms of their respective groups of ERPA.
- Table 6-2 lists the Evacuation Scenarios.
- Tables 7-1 and 7-2 are compilations of ETE. These data are the times needed to clear the indicated regions of 90 and 100 percent of the population occupying these regions, respectively. These computed ETE include consideration of mobilization time and of estimated voluntary evacuations from other regions within the EPZ and from the Shadow Region.
- Tables 7-3 and 7-4 presents ETE for the 2-mile region for un-staged and staged evacuations for the 90th and 100th percentiles, respectively.
- Table 8-7 presents ETE for the schoolchildren in good weather.
- Table 8-11 presents ETE for the transit-dependent population in good weather.
- Figure H-8 presents an example of an Evacuation Region (Region R08) to be evacuated under the circumstances defined in Table 6-1. Maps of all regions are provided in Appendix H.

Conclusions

- General population ETE were computed for 420 unique cases – a combination of 30 unique Evacuation Regions and 14 unique Evacuation Scenarios. Table 7-1 and Table 7-2 document these ETE for the 90th and 100th percentiles. These ETE range from 1:40 (hr:min) to 3:35 at the 90th percentile.
- Inspection of Table 7-1 and Table 7-2 indicates that the ETE for the 100th percentile are significantly longer than those for the 90th percentile. This is the result of the relatively long mobilization time of a small proportion of the resident population and congestion within the EPZ. When the system becomes congested, traffic exits the EPZ at rates somewhat below capacity until some evacuation routes have cleared. As more routes

clear, the aggregate rate of egress slows since many vehicles have already left the EPZ. Towards the end of the process, relatively few evacuees (those with the longest mobilization times) travel freely out of the EPZ. See Figures 7-8 through 7-21.

- Inspection of Table 7-3 and Table 7-4 indicates that a staged evacuation provides no benefits to evacuees from within the 2 mile region and unnecessarily delays the evacuation of those beyond 2 miles (compare Regions R25 through R30 and Regions R04 through R08 and R02, respectively, in Tables 7-1 and 7-2). See Section 7.6 for additional discussion.
- Comparison of Scenarios 6 and 13 in Table 7-1 indicates that the Special Event – refueling outage at the plant – does not have a significant impact on the ETE for the 90th percentile. See Section 7.5 for additional discussion.
- Comparison of Scenarios 1 and 14 in Table 7-1 indicates that the roadway closure – one lane westbound on I-80 from the interchange with SC 339 to the EPZ boundary – does not change the ETE, indicating that there is excess capacity on the highway. See Section 7.5.
- Nanticoke City and Briar Creek Borough and Township are the most congested areas during an evacuation. The last roadway in the EPZ to exhibit traffic congestion is SC 93. All links within the EPZ are at LOS A (free-flowing traffic conditions) at 3 hours and 20 minutes after the Advisory to Evacuate. See Section 7.3 and Figures 7-3 through 7-7.
- Separate ETE were computed for schools, medical facilities, transit-dependent persons, homebound special needs persons and correctional facilities. The average single-wave ETE for these sources are within a similar range as the general population ETE at the 90th percentile. See Section 8.
- Table 8-5 indicates that there are enough buses and wheelchair vans available to evacuate the transit-dependent population within the EPZ in a single wave; however, aid agreements with other counties will need to be activated in order to provide enough ambulances to evacuate the bedridden population in a single wave. See Sections 8.4 and 8.5.
- The general population ETE at the 90th percentile is insensitive to reductions in the base trip generation time of 4 hours since the mobilization time of the bulk of evacuees is unchanged by the truncation. See Table M-1.
- The general population ETE is relatively insensitive to the voluntary evacuation of vehicles in the Shadow Region (tripling the shadow evacuation percentage only increases 90th percentile ETE by 5 minutes). See Table M-2.
- Population changes between +30% or -46% are needed to result in ETE changes which meet the criteria for updating ETE between decennial Censuses. See Section M.3.



ERPA	Population 2010
1	2,024
2	2,107
3	2,041
4	2,241
5	225
6	766
7	4,287
8	838
9	1,453
10	10,387
11	646
12	1,569
13	1,166
14	1,196
15	4,213
16	1,912
17	2,188
18	1,115
19	679
20	5,377
21	10,462
22	5,826
23	652
24	2,324
25	973
26	1,520
27	3,088

Figure 6-1. SSES EPZ ERPA

Table 3-1. EPZ Permanent Resident Population

ERPA	2000 Population	2010 Population
1	2,132	2,024
2	2,227	2,107
3	2,100	2,041
4	2,117	2,241
5	203	225
6	703	766
7	4,270	4,287
8	959	838
9	1,385	1,453
10	10,552	10,387
11	645	646
12	1,532	1,569
13	1,092	1,166
14	1,247	1,196
15	3,613	4,213
16	1,956	1,912
17	2,105	2,188
18	1,112	1,115
19	671	679
20	5,021	5,377
21	10,930	10,462
22	4,614	5,826
23	609	652
24	2,251	2,324
25	910	973
26	1,501	1,520
27	3,288	3,088
TOTAL	69,745	71,275
EPZ Population Growth:		2.19%

Table 6-1. Description of Evacuation Regions

Region	Description	ERPA																										
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
R01	2-Mile Ring							X		X																		
R02	5-Mile Ring							X	X	X	X		X	X	X													
R03	Full EPZ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Evacuate 2-Mile Radius and Downwind to 5 Miles																												
Region	Wind Direction To:	ERPA																										
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
R04	NNW, N, NNE							X	X	X																		
	NE, W, WNW, NW	Refer to R01																										
R05	ENE, E, ESE							X		X					X													
R06	SE, SSE							X		X				X	X													
R07	S							X		X				X														
R08	SSW, SW, WSW							X		X			X	X														
Evacuate 5-Mile Radius and Downwind to the EPZ Boundary																												
Region	Wind Direction To:	ERPA																										
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
R09	N		X	X	X			X	X	X	X		X	X	X						X							
R10	NNE		X	X				X	X	X	X		X	X	X				X		X	X						
R11	NE		X					X	X	X	X		X	X	X			X	X	X	X	X						
R12	ENE							X	X	X	X		X	X	X			X	X	X	X	X	X					
R13	E							X	X	X	X		X	X	X			X	X	X			X					
R14	ESE							X	X	X	X		X	X	X	X	X	X					X					
R15	SE							X	X	X	X		X	X	X	X	X						X					
R16	SSE	X						X	X	X	X		X	X	X	X	X						X					
R17	S	X						X	X	X	X		X	X	X	X	X							X				

Region	Description	ERPA																										
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
R18	SSW	X						X	X	X	X		X	X	X									X	X			
R19	SW	X						X	X	X	X	X	X	X	X									X	X	X	X	X
R20	WSW						X	X	X	X	X	X	X	X	X									X	X	X	X	X
R21	W				X	X	X	X	X	X	X	X	X	X	X										X	X	X	X
R22	WNW				X	X	X	X	X	X	X		X	X	X												X	X
R23	NW			X	X	X	X	X	X	X	X		X	X	X													X
R24	NNW		X	X	X	X		X	X	X	X		X	X	X													

Staged Evacuation - 2-Mile Radius Evacuates, then Evacuate Downwind to 5 Miles

Region	Wind Direction To:	ERPA																										
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
R25	NNW, N, NNE							X	X	X																		
	NE, W, WNW, NW	Refer to R01																										
R26	ENE, E, ESE							X		X					X													
R27	SE, SSE							X		X				X	X													
R28	S							X		X				X														
R29	SSW, SW, WSW							X		X			X	X														
R30	5-Mile Ring							X	X	X	X		X	X	X													

Key

ERPA(s) Shelter-in-Place until 90% ETE for R01, then Evacuate	ERPA(s) Shelter-in-Place	ERPA(s) Evacuate

Table 6-2. Evacuation Scenario Definitions

Scenario	Season[1]	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, Weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Midweek	Midday	Snow	None
9	Winter	Weekend	Midday	Good	None
10	Winter	Weekend	Midday	Rain	None
11	Winter	Weekend	Midday	Snow	None
12	Winter	Midweek, Weekend	Evening	Good	None
13	Winter	Midweek	Midday	Good	Refueling SSES
14	Summer	Midweek	Midday	Good	Roadway Impact – Lane Closure on I-80 WB

[1] Winter assumes that school is in session (also applies to spring and autumn). Summer assumes that school is not in session.

Table 7-1. Time to Clear the Indicated Area of 90 Percent of the Affected Population

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Midweek	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, and EPZ														
R01	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R02	2:00	2:10	1:55	2:00	1:55	2:05	2:10	2:40	1:55	2:00	2:30	1:55	2:05	2:00
R03	2:20	2:30	2:10	2:15	2:15	2:20	2:30	3:00	2:10	2:15	2:50	2:15	2:25	2:20
2-Mile Region and Keyhole to 5 Miles														
R04	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R05	1:55	2:00	1:40	1:40	1:40	1:55	1:55	2:35	1:40	1:40	2:25	1:40	1:50	1:55
R06	2:00	2:00	1:40	1:40	1:40	2:00	2:00	2:40	1:40	1:40	2:25	1:40	1:55	2:00
R07	2:00	2:00	1:40	1:45	1:40	2:00	2:00	2:40	1:40	1:45	2:25	1:40	1:50	2:00
R08	2:00	2:00	1:40	1:40	1:40	2:00	2:00	2:40	1:40	1:40	2:25	1:40	1:55	2:00
5-Mile Region and Keyhole to EPZ Boundary														
R09	2:10	2:15	1:55	2:05	1:55	2:10	2:15	2:55	1:55	2:05	2:35	2:00	2:15	2:10
R10	2:15	2:25	2:05	2:15	2:05	2:15	2:25	3:00	2:10	2:15	2:50	2:10	2:25	2:15
R11	2:10	2:20	2:00	2:10	2:05	2:10	2:20	2:50	2:00	2:10	2:40	2:05	2:15	2:10
R12	2:05	2:10	1:55	2:00	2:00	2:05	2:10	2:45	1:55	2:00	2:30	2:00	2:05	2:05
R13	1:55	2:00	1:50	1:50	1:50	1:55	2:00	2:30	1:50	1:50	2:20	1:50	1:55	1:55
R14	1:55	2:00	1:50	1:50	1:50	1:55	2:00	2:30	1:50	1:50	2:20	1:50	1:55	1:55
R15	1:55	2:00	1:45	1:50	1:50	1:55	2:00	2:30	1:45	1:50	2:20	1:50	1:55	1:55
R16	1:55	2:00	1:50	1:50	1:50	1:55	2:00	2:30	1:45	1:50	2:20	1:50	1:55	1:55
R17	1:55	2:00	1:45	1:50	1:50	1:55	2:00	2:30	1:45	1:50	2:20	1:50	1:55	1:55
R18	2:05	2:10	1:55	2:00	2:00	2:05	2:10	2:40	1:55	2:00	2:30	2:00	2:05	2:05
R19	2:30	2:45	2:20	2:25	2:25	2:30	2:45	3:10	2:20	2:25	3:00	2:25	2:30	2:30
R20	2:35	2:40	2:20	2:30	2:25	2:35	2:50	3:15	2:20	2:30	3:05	2:25	2:30	2:35
R21	2:35	2:45	2:25	2:30	2:30	2:35	2:45	3:15	2:25	2:30	3:05	2:30	2:35	2:35
R22	2:30	2:40	2:20	2:30	2:20	2:30	2:40	3:10	2:20	2:25	3:00	2:20	2:30	2:30
R23	2:25	2:35	2:10	2:25	2:15	2:25	2:40	3:10	2:15	2:20	3:00	2:15	2:25	2:25
R24	2:10	2:15	1:55	2:05	1:55	2:10	2:15	2:45	1:55	2:05	2:35	1:55	2:10	2:10

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Midweek	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
Staged Evacuation - 2-Mile Region and Keyhole to 5 Miles														
R25	2:00	2:00	1:55	1:55	1:55	2:00	2:00	2:35	1:55	1:55	2:30	1:55	1:55	2:00
R26	2:05	2:05	2:00	2:00	2:00	2:00	2:00	2:35	2:00	2:00	2:35	2:00	2:00	2:05
R27	2:05	2:05	2:05	2:05	2:05	2:05	2:05	2:40	2:05	2:05	2:35	2:05	2:05	2:05
R28	2:05	2:05	2:00	2:00	2:00	2:05	2:05	2:40	2:00	2:00	2:35	2:00	2:00	2:05
R29	2:10	2:10	2:05	2:10	2:05	2:10	2:10	2:45	2:05	2:10	2:40	2:05	2:10	2:10
R30	2:50	2:55	2:45	2:50	2:45	2:50	2:55	3:35	2:45	2:50	3:30	2:45	2:50	2:50

Table 7-2. Time to Clear the Indicated Area of *100* Percent of the Affected Population

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Midweek	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, and EPZ														
R01	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
R02	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05
R03	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
2-Mile Region and Keyhole to 5 Miles														
R04	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05
R05	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05
R06	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05
R07	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05
R08	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05
5-Mile Region and Keyhole to EPZ Boundary														
R09	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R10	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R11	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R12	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R13	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R14	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R15	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R16	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R17	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R18	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R19	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R20	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R21	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R22	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R23	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10
R24	4:10	4:10	4:10	4:10	4:10	4:10	4:10	4:40	4:10	4:10	4:40	4:10	4:10	4:10

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Midweek	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
Staged Evacuation - 2-Mile Region and Keyhole to 5 Miles														
R25	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05
R26	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05
R27	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05
R28	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05
R29	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05
R30	4:05	4:05	4:05	4:05	4:05	4:05	4:05	4:35	4:05	4:05	4:35	4:05	4:05	4:05

Table 7-3. Time to Clear 90 Percent of the 2-Mile Region

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Midweek	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, and EPZ														
R01	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R02	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
2-Mile Region and Keyhole to 5 Miles														
R04	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R05	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R06	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R07	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R08	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
Staged Evacuation - 2-Mile Region and Keyhole to 5 Miles														
R25	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R26	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R27	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R28	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R29	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55
R30	1:55	1:55	1:40	1:45	1:40	1:55	1:55	2:35	1:40	1:45	2:25	1:40	1:50	1:55

Table 7-4. Time to Clear 100 Percent of the 2-Mile Region

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Midweek	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Region	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Snow	Good Weather	Rain	Snow	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, and EPZ														
R01	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
R02	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
2-Mile Region and Keyhole to 5 Miles														
R04	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
R05	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
R06	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
R07	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
R08	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
Staged Evacuation - 2-Mile Region and Keyhole to 5 Miles														
R25	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
R26	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
R27	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
R28	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
R29	4:00	4:00	4:00	4:00	4:00	4:00	4:00	4:35	4:00	4:00	4:30	4:00	4:00	4:00
R30	4:00	4:05	4:00	4:00	4:00	4:00	4:05	4:35	4:00	4:00	4:30	4:00	4:00	4:00

Table 8-7. School Evacuation Time Estimates – Good Weather

School	Driver Mobilization Time (min)	Loading Time (min)	Dist. To EPZ Bdry (mi)	Average Speed (mph)	Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bdry to H.S. (mi.)	Travel Time from EPZ Bdry to H.S. (min)	ETE to H.S. (hr:min)
COLUMBIA COUNTY SCHOOLS									
Beaver Main Elementary School	90	15	0.6	41.4	1	1:50	9.1	14	2:00
Berwick Middle School	90	15	7.7	13.2	36	2:25	16.2	25	2:50
Berwick Senior High School	90	15	7.7	13.2	36	2:25	15.0	23	2:45
Columbia Day Care Program	90	15	7.7	13.2	36	2:25	19.0	29	2:50
Fourteenth Street Elementary	90	15	7.3	12.3	36	2:25	14.7	23	2:45
Holy Family Consolidated School	90	15	6.2	8.3	45	2:30	19.0	29	3:00
New Story Elementary	90	15	6.7	12.3	33	2:20	15.4	24	2:45
Nescopeck Elementary School	90	15	8.2	33.2	15	2:00	15.4	24	2:25
Orange St Elementary School	90	15	6.1	15.1	25	2:10	16.2	25	2:35
Salem Elementary School	90	15	7.7	13.2	36	2:25	19.0	29	2:50
LUZERNE COUNTY SCHOOLS									
Drums Elementary/Middle School	90	15	1.8	44.3	3	1:50	8.1	13	2:05
GNA Educational Center	90	15	0.5	6.5	5	1:50	2.1	4	1:55
GNA Elementary School	90	15	0.5	6.5	5	1:50	2.1	4	1:55
Greater Nanticoke High School	90	15	0.5	6.5	5	1:50	2.1	4	1:55
Hunlock Creek Elementary School	90	15	4.7	9.5	30	2:15	17.9	27	2:45
Huntington Mills Elementary School	90	15	5.7	17.4	20	2:05	15.2	23	2:30
JFK Elementary School	90	15	0.5	6.5	5	1:50	2.1	4	1:55
K.M. Smith Elementary School	90	15	2.4	5.1	29	2:15	2.1	4	2:20
Keystone Job Corp High School	90	15	1.7	44.3	3	1:50	8.1	13	2:05
Muhlenberg Christian Academy	90	15	2.3	9.7	15	2:00	15.2	23	2:25
Northwest Area High School	90	15	5.7	42.1	9	1:55	19.7	30	2:25
Penn State Hazelton	90	15	0.8	32.4	2	1:50	24.1	37	2:25
Pope John Paul II Catholic School	90	15	1.4	4.7	19	2:05	2.1	4	2:10
Rice Elementary	90	15	Located outside of the EPZ				5.7	9	1:55
The Learning Station School	90	15	2.0	5.1	25	2:10	2.1	4	2:15
Valley Elementary/Middle School	90	15	2.7	37.2	5	1:50	8.0	12	2:05
					Maximum for EPZ:	2:30		Maximum:	3:00
					Average for EPZ:	2:05		Average:	2:25

Table 8-11. Transit-Dependent Evacuation Time Estimates – Good Weather

			One-Wave								Two-Wave			
Route Number	Bus Number	Mobilization (min)	Route Length (miles)	Route Speed (mph)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)	Distance to Rec. Ctr. (miles)	Travel Time to Rec. Ctr. (min)	Unload (min)	Driver Rest (min)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)
1	1	90	4.4	43.1	6	30	2:10	20.7	31	5	10	44	30	4:10
2	1,2	80	7.4	10.9	41	30	2:35	45.4	68	5	10	91	30	6:00
	3,4	90	7.4	11.2	40	30	2:40	45.4	68	5	10	91	30	6:05
	5,6	100	7.4	12.6	35	30	2:50	45.4	68	5	10	91	30	6:15
	7,8	110	7.4	12.9	34	30	2:55	45.4	68	5	10	91	30	6:20
	9,10,11	120	7.4	13.2	34	30	3:05	45.4	68	5	10	91	30	6:30
3	1	90	7.4	40.9	11	30	2:15	14.8	22	5	10	44	30	4:10
	2	120	7.4	41.5	11	30	2:45	14.8	22	5	10	43	30	4:40
4	1	90	4.2	26.7	9	30	2:10	43.2	65	5	10	76	30	5:20
5	1	90	10.1	13.0	46	30	2:50	30.2	45	5	10	76	30	5:40
	2	105	10.1	15.2	40	30	2:55	30.2	45	5	10	76	30	5:45
	3	120	10.1	16.5	37	30	3:10	30.2	45	5	10	76	30	6:00
6	1,2	90	4.6	42.3	7	30	2:10	16.1	24	5	10	37	30	4:00
	3,4	105	4.6	42.1	7	30	2:25	16.1	24	5	10	37	30	4:15
	5,6	120	4.6	42.1	7	30	2:40	16.1	24	5	10	37	30	4:30
7	1	90	2.5	32.8	4	30	2:05	14.8	22	5	10	30	30	3:45
	2	120	2.5	34.4	4	30	2:35	14.8	22	5	10	30	30	4:15
8	1	90	10.3	42.7	15	30	2:15	29.7	45	5	10	74	30	5:00
9	1	90	4.7	37.7	7	30	2:10	29.7	45	5	10	59	30	4:40
	2	120	4.7	37.7	7	30	2:40	29.7	45	5	10	59	30	5:10
10	1	90	4.2	40.5	6	30	2:10	34.3	51	5	10	64	30	4:55
11	1	90	17.0	36.5	28	30	2:30	17.0	26	5	10	73	30	4:55
12	1	90	4.3	13.0	20	30	2:20	28.1	42	5	10	54	30	4:45
	2	120	4.3	16.0	16	30	2:50	28.1	42	5	10	54	30	5:15
13	1	90	4.0	44.1	5	30	2:10	34.2	51	5	10	63	30	4:50
	2	120	4.0	44.2	5	30	2:40	34.2	51	5	10	63	30	5:20

		One-Wave						Two-Wave						
Route Number	Bus Number	Mobilization (min)	Route Length (miles)	Route Speed (mph)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)	Distance to Rec. Ctr. (miles)	Travel Time to Rec. Ctr. (min)	Unload (min)	Driver Rest (min)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)
14	1	90	5.5	43.5	8	30	2:10	34.4	52	5	10	66	30	4:55
	2	120	5.5	46.9	7	30	2:40	34.4	52	5	10	66	30	5:25
15	1,2	80	0.9	6.0	9	30	2:00	28.9	43	5	10	46	30	4:15
	3,4	90	0.9	6.6	8	30	2:10	28.9	43	5	10	46	30	4:25
	5,6	100	0.9	6.7	8	30	2:20	28.9	43	5	10	46	30	4:35
	7,8	110	0.9	7.3	7	30	2:30	28.9	43	5	10	46	30	4:45
	9,10,11	120	0.9	7.2	8	30	2:40	28.9	43	5	10	46	30	4:55
16	1	90	8.1	29.7	16	30	2:20	34.4	52	5	10	73	30	5:15
	2	120	8.1	34.8	14	30	2:45	34.4	52	5	10	73	30	5:40
17	1,2	90	4.4	17.2	15	30	2:20	28.4	43	5	10	56	30	4:45
	3,4	105	4.4	19.7	13	30	2:30	28.4	43	5	10	56	30	4:55
	5	120	4.4	25.0	11	30	2:45	28.4	43	5	10	56	30	5:10
18	1	90	1.1	55.0	1	30	2:05	28.4	43	5	10	45	30	4:20
19	1	90	1.0	35.2	2	30	2:05	30.3	45	5	10	49	30	4:25
20	1	90	8.0	11.7	41	30	2:45	34.4	52	5	10	76	30	5:40
	2	120	8.0	13.8	35	30	3:05	34.4	52	5	10	76	30	6:00
21	1	90	7.1	14.4	30	30	2:30	34.4	52	5	10	72	30	5:20
22	1	90	6.1	42.3	9	30	2:10	30.1	45	5	10	63	30	4:45
23	1	90	2.3	55.0	3	30	2:05	34.4	52	5	10	58	30	4:40
24	1,2	90	6.0	41.7	9	30	2:10	13.3	20	5	10	38	30	3:55
	3,4	120	6.0	43.3	8	30	2:40	13.3	20	5	10	37	30	4:25
25	1,2	90	7.0	18.9	22	30	2:25	29.7	44	5	10	64	30	5:00
	3,4	120	7.0	23.8	18	30	2:50	29.7	44	5	10	64	30	5:25
						Maximum ETE:	3:10						Maximum ETE:	6:30
						Average ETE:	2:30						Average ETE:	5:00

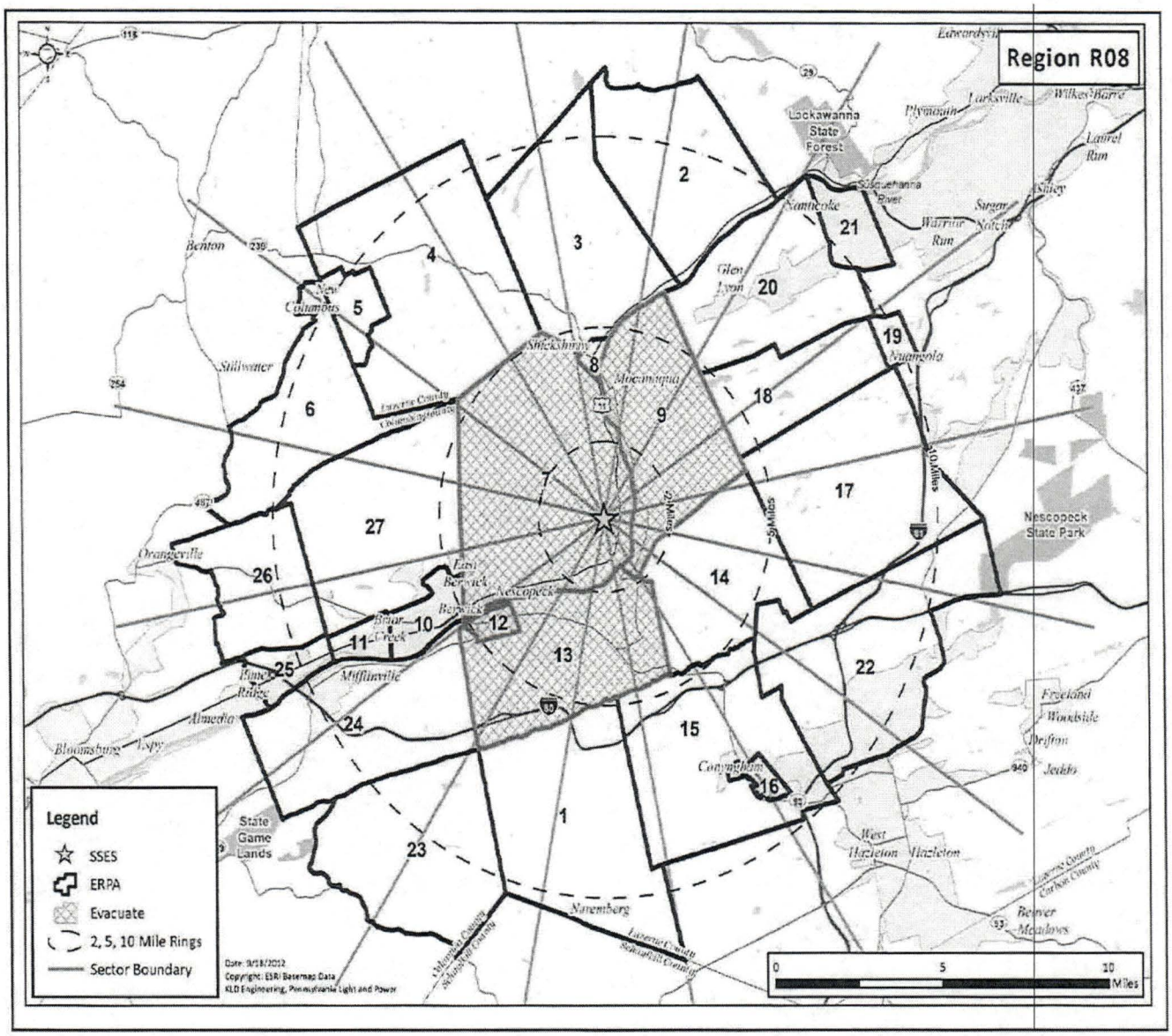


Figure H-8. Region R08

APPENDIX H

DOWNSTREAM SUSQUEHANNA RIVER WATER USAGE

APPENDIX H

User's Name	Location-River Miles	Use	Class	Quantity (Mgd)	Comment
1. Keystone Water Co.	Berwick - 8.0	M	Sb	None	For emergency use only. Not used for 8 years. Pump removed. Serves about 20-25 thousand people.
2. Bloomsburg Water Co.	Bloomsburg - 19.4	M	Sb	0	
3. Campbell Soup Co.	Bloomsburg - 19.4	I	None	None	No use of river water.
4. Danville Borough	Danville - 27.4	M	Pr	1.8	Will expand use. Serves about 8,000 people.
5. Merck & Co.	Danville - 27.4	I	Pr	7-9	Serves about 500 people. Large quantity for cooling, small for process.
6. Danville State Hospital	Danville - 27.4	Pu	Pr	NA	Serves about 4,000 people. Receives water from Danville Borough. Only in emergencies.
8. Celotex Corp.	Sunbury - 38.5	I	None	None	Receives water from Sunbury Municipal Authority.
9. Sunbury (SES) - WPS	Sunbury - 38.5	I	Pr	245	
10. Shamokin Dam Municipal	Shamokin Dam - 44.4	M	Pr	NA	Serves about 2,000 people
11. Millersburg Water Co.	Millersburg - 69.4	M	Sb	NA	
12. Harrisburg Mun. Auth.	Harrisburg - 91.0	M	Sb	NA	
13. Bethlehem Steel Co.	Harrisburg - 91.0	I	NA	NA	
14. Borough of Steelton Water Co.	Steelton - 93.4	M	Pr	1.7	Allocated 5.0 Mgd
15. Metropolitan Edison (SES)	Middletown -100.2	I	Pr	245	
16. Metropolitan Edison (HES)	York Haven - 105.2	I	Pr	11,782	
17. Talen (SES)	Brunner Island - 108.0	I	Pr	745	
18. Wrightsville Water Co.	Wrightsville - 119.0	M	Pr	NA	
19. Columbia Water Co.	Columbia - 119.0	M	Pr	1.8	
20. Lancaster Water Auth.	Lancaster - *	M	Pr	8.0	Based on old data, allocated 24.0 Mgd.
21. York Water Co.	York - *	M	Sb	NA	
22. Safe Harbor Water	Safe Harbor - 129.7	M	Pr	79,527	
23. Talen (HES)	Holtwood - 137.9	I	Pr	21,337	
24. Phila. Electric (PS)	Muddy Run - 140.4	I	Pr	12,931	
25. Phila. Electric (NS)	Peach Bottom - 143.0	I	NA	0.03	

APPENDIX H					
User's Name	**Location-River Miles**	**Use**	**Class**	**Quantity (Mgd)**	**Comment**
26. Phila. Electric & Susquehanna Power Co. (HES)	Conowingo - 154.3	I	Pr	53,018	
27. Chester Water Auth.	Chester - *	M	Sb	NA	
28. Baltimore Water Authority	Baltimore, MD - *	M	Sb	NA	
29. Havre-de-Grace Municipal Auth.	Havre-de-Grace, Md - *	M	Pr	1.4	
NOTE: River miles are from Susquehanna SES Site * Not on River					

LEGEND	
NA	Not Available
(SES)	Steam Electric Station
(HES)	Hydroelectric Station
(PS)	Pumping Station
(NS)	Nuclear Station
I	Industrial
M	Municipal
Pu	Public
Pr	Primary
Sb	Standby
Mgd	Million gallons per day

APPENDIX I

POPULATION UPDATE FOR SSES EMERGENCY PLANNING ZONE

REFER TO THE EVACATION TIME ESTIMATE IN APPENDIX G FOR THE CURRENT POPULATION INFORMATION

APPENDIX J

NUREG-0654 PLANNING STANDARDS AND EVALUATION CRITERIA CROSS REFERENCE TO SSES EMERGENCY PLAN

NUREG-0654 PLANNING STANDARDS AND EVALUATION CRITERIA CROSS REFERENCE TO SSES EMERGENCY PLAN	
APPLICABLE NUREG-0654 SECTION	**SSES EMERGENCY PLAN**
A. Assignment of Responsibility	
1.a.	Chapter 6, Section 6.0, Table 6.2, Appendix A
1.b.	Chapter 4 Table 5.2 Chapter 6
1.c.	Chapter 6, Figures 6.2, 6.3, 6.6, 6.7 FSAR Figure 13.1-3
1.d.	Chapter 6, Sections 6.2.1, 6.3.1.1
1.e.	Chapter 6, Sections 6.0, 6.1, 6.2, 6.2.3, 6.2.4, 6.2.5, 6.3, 6.3.1.2, 6.3.1.4, 6.3.1.5, 8.3.1, 8.3.2
3.	Appendix A
4.	Chapter 6, Sections 6.2.7, 6.3.1.3
B. Onsite Emergency Organization	
1.	Chapter 6, Sections 6.0 Phase I, II, III, 6.1, Tables 6.1, Figure 6.2, Figure 6.3
2.	Chapter 6, Sections 6.0, 6.1 Appendix E
3.	Chapter 6, Section 6.2.1
4.	Chapter 6, Section 6.2.1
5.	Chapter 6, Tables 6.1
6.	Chapter 6, Figure 6.7
7.a.	Chapter 6, Section 6.2.6
7.b.	Chapter 6, Section 6.2.5, 6.5
7.c.	Chapter 6, Section 6.2.1
7.d.	Chapter 6, Section 6.3.2.1
8.	Chapter 6, Table 6.2 Appendix A
9.	Chapter 6, Table 6.2 Appendix A

NUREG-0654 PLANNING STANDARDS AND EVALUATION CRITERIA CROSS REFERENCE TO SSES EMERGENCY PLAN	
APPLICABLE NUREG-0654 SECTION	**SSES EMERGENCY PLAN**
C. Emergency Response Support Resources	
1.a.	Chapter 6, Sections 6.2.1, 6.3.1.1, 6.4.3
1.b.	Chapter 6, Section 6.4.3
1.c.	Chapter 6, Section 6.4.3
2.b.	Chapter 6, Sections 6.2.1, 6.3.1.1
3.	Appendix D, Enclosure 5
4.	Appendix A, Table 6.2
D. Emergency Classifications	
1.	Chapter 5, Sections 5.1, 5.2, Appendix D, Appendix F, Tables F, R, S, E, H, C.
2.	Chapter 5, Table F, R, S, E, H, C.
E. Notification, Methods and Procedures	
1.	Chapter 6, Figure 6.7 Appendix C, Position Specific Instructions for: • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • EOF Communicator • Radiation Protection Coordinator • Technical Support Coordinator • Recovery Manager • Dose Assessment Supervisor
2.	Appendix C, Position Specific Instructions for: • Emergency Director • Control Room NRC Communicator • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • Security Coordinator
3.	Appendix C, Position Specific Instructions for: • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • EOF Communicator
4.a., b., c., k., n.	Appendix C, Position Specific Instructions for: • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • EOF Communicator

NUREG-0654 PLANNING STANDARDS AND EVALUATION CRITERIA CROSS REFERENCE TO SSES EMERGENCY PLAN	
APPLICABLE NUREG-0654 SECTION	**SSES EMERGENCY PLAN**
4.d., e., f., g., h., i., j., l.	Appendix C, Position Specific Instructions for: • Radiation Protection Coordinator • Dose Assessment Supervisor
4.m.	Appendix C, Instructions for: • TSC Security Coordinator • Offsite Organization Response to Plant Events
6.	Chapter 6, Sections 6.2.1, 6.3.1.1 Chapter 7, Sections 7.1.1, 7.3.2 Chapter 8, Section 8.5.4
7.	Chapter 6, Sections 6.2, 6.2.1, 6.2.3, 6.3.1.1, 6.3.1.5 Chapter 7, Section 7.3.2, Table 7.3
F. Emergency Communications	
1.	Chapter 6, Figure 6.7 Chapter 8, Sections 8.1.3.5, 8.2.2.4
1.a.	Chapter 6, Sections Phase Ic), 6.2.3, 6.2.4e), 6.2.5g), 6.3.1.1i), 6.3.1.4e), 6.3.1.5, 6.4 Appendix C, Position Specific Instruction for: • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • EOF Communicator • Radiation Protection Coordinator • Tech Support Coordinator • Recovery Manager • Dose Assessment Supervisor
1.b.	Chapter 8, Sections 8.3.1, 8.3.2
1.c.	Chapter 6, Sections Phase Ic), 6.2.3, 6.2.4, 6.3.1.5 Chapter 8, Sections 8.1.3.5, 8.2.2.4, 8.2.2.4.1, 8.2.2.4.2 Appendix C, Position Specific Instructions for: • Control Room Emergency Plan Communicator • Control Room NRC Communicator • TSC Emergency Plan Communicator • TSC NRC Communicator • EOF Communicator
1.d.	Chapter 6, Sections 6.2.1j), 6.2.3c), 6.2.4d), 6.2.5g) Chapter 8, Sections 8.1.3.5, 8.1.3.5.1, 8.1.3.5.2, 8.2.2.4, 8.2.2.4.1, 8.2.2.4.2

NUREG-0654 PLANNING STANDARDS AND EVALUATION CRITERIA CROSS REFERENCE TO SSES EMERGENCY PLAN	
APPLICABLE NUREG-0654 SECTION	**SSES EMERGENCY PLAN**
1.e.	Chapter 6, Sections Phase I, Phase II, Phase III, 6.2, 6.3
1.f.	Chapter 8, Sections 6.2.1d, 6.3.1.1c, 6.3.1.1j, Figure 6.7
2.	Chapter 7, Sections 7.4.2, 7.4.3 Chapter 8, Sections 8.1.3.5.1, 8.2.2.4 Appendix C, Instruction for: • Security Coordinator • Offsite Organization Response to Plant Events
3.	Chapter 9, Sections 9.1.2, 9.3
G. Public Education and Information	
1.a., b., c., d.	Chapter 9, Sections 9.4, 9.4.1, 9.4.2, 9.4.3, 9.4.4
2.	Chapter 9, Sections 9.4, 9.4.1, 9.4.2, 9.4.3, 9.4.4
3.a.	Chapter 6, Section 6.3.2 Chapter 8, Section 8.2.1
3.b.	Chapter 8, Section 8.2.1
4.a.	Chapter 6, Section 6.3.2.1
4.b.	Chapter 6, Sections 6.3.2, 6.3.2.1
4.c.	Chapter 6, Section 6.3.2.1e)
5.	Chapter 9, Section 9.4.2
H. Emergency Facilities and Equipment	
1.	Chapter 8, Sections 8.1.2.1, 8.1.1.2, 8.1.3
2.	Chapter 8, Section 8.1.2.2
4.	Chapter 6, Sections Phase I, Phase II, Phase III
5.	Appendix D, Enclosures 3, 4, 5, 7
5.a.	Appendix D, Enclosure 3
5.b.	Appendix D, Enclosure 4
5.c.	Appendix D, Enclosures 4, 7
5.d.	Appendix D, Enclosure 7
6.a., b.	Chapter 7, Section 7.1, 7.1.1

NUREG-0654 PLANNING STANDARDS AND EVALUATION CRITERIA CROSS REFERENCE TO SSES EMERGENCY PLAN	
APPLICABLE NUREG-0654 SECTION	**SSES EMERGENCY PLAN**
6.c.	Appendix C, Position Specific Instructions for: • Chemistry Coordinator • Field Team Director Table 6.2
7.	Appendix D, Enclosures 4, 5
8.	Chapter 7, Section 7.1.1.1, Appendix D, Enclosure 3
9.	Chapter 8, Section 8.1.2
10.	Chapter 9, Section 9.3
11.	Appendix D
12.	Chapter 6, Sections 6.2.4f), 6.3.1.4f)
I. Accident Assessment	
1.	Chapter 5, Table F, R, S, E, H, C Appendix F
2.	Chapter 7, Section 7.1
3.a., b.	Chapter 7, Section 7.1, 7.1.1.3
4.	Chapter 7, Section 7.1, 7.1.1, 7.1.1.3
5.	Chapter 7, Section 7.1.1.1
6.	Chapter 7, Sections 7.1.1.3, 7.1.1.4
7.	Chapter 7, Section 7.1, 7.1.1
8.	Chapter 7, Section 7.1, 7.1.1.3
9.	Chapter 7, Section 7.1.1.3 Appendix D, Enclosures 4, 5, 6
10.	Chapter 7, Section 7.1.1, Table 7.3, 7.1.1.3

NUREG-0654 PLANNING STANDARDS AND EVALUATION CRITERIA CROSS REFERENCE TO SSES EMERGENCY PLAN	
APPLICABLE NUREG-0654 SECTION	**SSES EMERGENCY PLAN**
J. Protective Response	
1.a., b., c., d.	Chapter 7, Section 7.3, 7.3.1, 7.3.2 Appendix C, Position Specific Instruction for: • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • Radiation Protection Coordinator • Security Coordinator • Control Room Emergency Director • TSC Emergency Director
2.	Chapter 7, Section 7.3.1.4
3.	Chapter 7, Section 7.3.1.4
4.	Chapter 7, Sections 7.3.1.3, 7.3.1.4
5.	Chapter 7, Sections 7.3.1, 7.3.1.3, 7.3.1.4 Appendix C, Position Specific Instructions for: • Emergency Director • Security Controller
6.a.	Chapter 7, Section 7.3.1
6.b.	Chapter 7, Section 7.3.1
6.c.	Chapter 6, Section 6.2.1k, 6.2.4l Chapter 7, Table 7.2
7.	Chapter 6, Sections, 6.0, 6.2.1, 6.3.1.1 Chapter 7, Tables 7.1, 7.3 Appendix C, Position Specific Instructions for: • Emergency Director • Radiation Protection Coordinator • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • Recovery Manager • Dose Assessment Supervisor • Liaison Support Supervisor • EOF Communicator
8.	Appendix G

NUREG-0654 PLANNING STANDARDS AND EVALUATION CRITERIA CROSS REFERENCE TO SSES EMERGENCY PLAN	
APPLICABLE NUREG-0654 SECTION	**SSES EMERGENCY PLAN**
10.a.	Appendix C, Position Specific Instructions for: • RP Tech I (OSCAR) • Field Team Director • Monitoring Team • Environmental Sampling Team Appendix G Appendix H Chapter 7, Section 7.3.1.4 & Figure 8.1
10.b.	Appendix G Appendix I
10.c.	Chapter 7, Section 7.3.2 Chapter 8, Section 8.5.4
10.m.	Chapter 7, Sections 7.3.2, Appendix G
K. Radiological Exposure Control	
1.a., b., c., d., e., f., g.	Chapter 7, Section 7.4.3, Table 7.2 Appendix C, Position Specific Instructions for: • Security Coordinator • Radiation Protection Coordinator • RP Specialist
2.	Chapter 6, Section 6.2.11, 6.2.1k, 6.2.4l Chapter 7, Section 7.2, Table 7.2 Appendix C, Position Specific Instructions for: • Radiation Protection Coordinator
3.a.	Chapter 7, Section 7.3 Appendix C, Position Specific Instructions for: • Radiation Protection Specialist • Radiation Protection Coordinator Appendix D, Enclosures 5,6,8
3.b.	Appendix C, Position Specific Instructions for: • Radiation Protection Specialist • Radiation Protection Coordinator • Field Team Director • Monitoring Team • Environmental Sampling Team
5.a., b.	Chapter 7, Section 7.3.1, 7.4.2
6.a., b., c.	Chapter 7, Section 7.3.1, 7.4.2

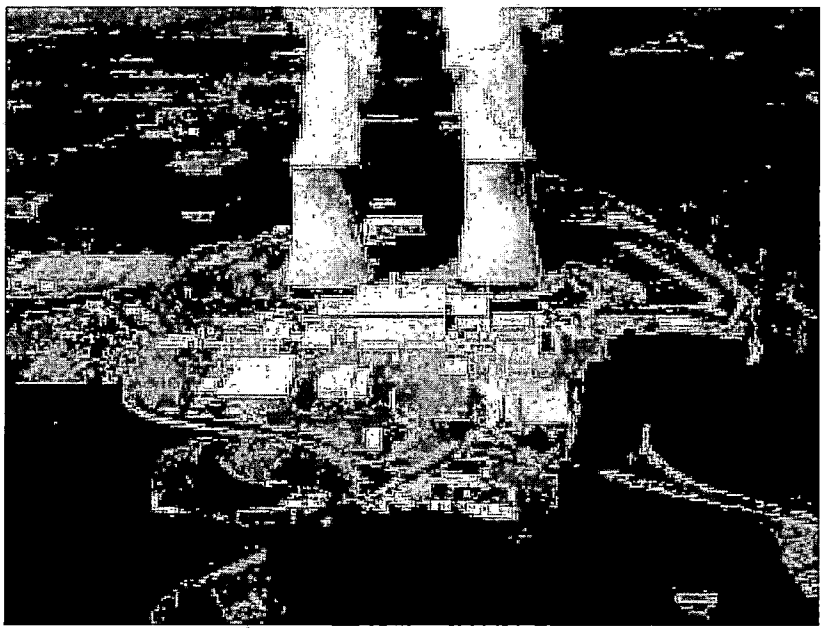
NUREG-0654 PLANNING STANDARDS AND EVALUATION CRITERIA CROSS REFERENCE TO SSES EMERGENCY PLAN	
APPLICABLE NUREG-0654 SECTION	**SSES EMERGENCY PLAN**
7.	Chapter 7, Section 7.3.1.4, 7.4.2
L. Medical and Public Health Support	
1.	Appendix A
2.	Table 6.1
4.	Chapter 7, Section 7.4.3 Appendix A Appendix C, Position Specific Instructions for: • Security Coordinator
M. Recovery and Reentry Planning and Postaccident Operations	
1.	Chapter 6, Sections Phase IV, 6.5 Appendix C, Position Specific Instructions for: • Emergency Director • Recovery Manager
2.	Chapter 6, Section 6.5, Figure 6.6 Appendix C, Position Specific Instructions for: • Emergency Director • Recovery Manager
3.	Chapter 6, Section 6.5
4.	Section 6.2.4, 6.3.1.4 Appendix C, Position Specific Instructions for: • Radiation Protection Coordinator • Dose Assessment Supervisor
N. Exercises and Drills	
1.a., b.	Chapter 9, Section 9.1.2
2.a., b., c., d., e.	Chapter 9, Section 9.1.2
3.a., b., c., d., e., f.	Chapter 9, Section 9.1.2
4.	Chapter 9, Section 9.1.2
5.	Chapter 9, Section 9.1.2
O. Radiological Emergency Response Training	
1.a.	Chapter 9, Section 9.1.1, Table 9.1
1.b.	Chapter 9, Sections 9.1.1, 9.1.2
2.	Chapter 9, Section 9.1.2, Table 9.1

NUREG-0654 PLANNING STANDARDS AND EVALUATION CRITERIA CROSS REFERENCE TO SSES EMERGENCY PLAN	
APPLICABLE NUREG-0654 SECTION	**SSES EMERGENCY PLAN**
3.	Chapter 9, Section 9.1
4.a., b., c., d., e., f.	Chapter 9, Table 9.1
4.g.	Chapter 9, Section 9.1.1
4.h., i., j.	Chapter 9, Table 9.1
5.	Chapter 9, Table 9.1
P. Responsibility for the Planning Effort : Development, Periodic Review and Distribution of Emergency Plans	
1.	Chapter 9, Section 9.1.1, Table 9.1
2.	Chapter 9, Section 9.1.3
3.	Chapter 9, Section 9.1.3
4.	Chapter 9, Section 9.2.1
5.	Chapter 9, Section 9.2.1
6.	Chapter 3, Appendix A
7.	Appendix C
8.	Table of Contents
9.	Chapter 9, Section 9.2
10.	Chapter 9, Section 9.3
Appendix 1	Table F, R, S, E, H, C, Appendix F
Appendix 2	Appendix B
Appendix 3	Section 6 – Phase I Section 6.2.3, 6.3.1.5, 6.4.2, 7.3.2

APPENDIX K

On-Shift Staffing Analysis

Susquehanna Steam Electric Station



On-Shift Staffing Analysis Report

Revision 0

December 14, 2012

On-Shift Staffing Analysis

Table of Contents

Title	Page Number
Introduction	1
Executive Summary	1
Conclusion	2
Table 1, Susquehanna On-Shift Staffing	2
Table 2, Susquehanna DBA/ISG Analyzed Events	3
Appendix A, Phase II Analysis Results	4
Phase II Preliminary Conclusions	5
Phase II Recommendations	6
Appendix B, Phase II Event Analysis Tables	7
Phase II Event Analysis Table Index	8
On-Shift Personnel Assignments Used During Phase II Analysis	9
Appendix C, Phase III Results	86
Phase III Time Motion Study Results	95

On-Shift Staffing Analysis

Introduction

10 CFR 50 Appendix E, effective on December 23, 2011 directed that a detailed study be performed by December 24, 2012, to ensure on-shift staffing was adequate to perform critical functions until relieved by the augmented Emergency Response Organization (ERO). The NRC in the published staff guidance (Reference 2) endorsed NEI 10-05 as an acceptable means of performing the required staffing analysis. This report documents the result of that analysis for Susquehanna Steam Electric Station (SSES).

References

1. 10 CFR 50 Appendix E
2. NSIR/DPR-ISG-01, Interim Staff Guidance, Emergency Planning for Nuclear Power Plants
3. NEI 10-05, Revision 0, Assessment of On-Shift Emergency Response Organization Staffing and Capabilities
4. SSES Emergency Plan, Revision 53, Table 6.1, Station Emergency Plan Minimum Staffing Requirements
5. SSES FSAR, Chapter 15

Executive Summary

A detailed staffing analysis performed in accordance with NEI 10-05 was conducted to document the adequacy of shift staffing as required by 10 CFR 50 Appendix E.

The minimum staff described in Table 6.1 of the SSES Emergency Plan, Revision 53, was used to perform the on-shift staffing analysis. Table 1 of this report lists the on-shift staffing as described in Revision 53 of the SSES Emergency Plan.

NRC staff guidance directs the scenarios that must be used to demonstrate the adequacy of on-shift staffing to perform required functions for event mitigation, radiation protection response, firefighting, chemistry and Emergency Plan functions. Those scenarios include specific design basis events as described in the FSAR as well as specific scenarios defined in the staff guidance document. Table 2 identifies the scenarios that were examined.

The next phase required of NEI 10-05 requires a dedicated team using tabletop techniques examine the scenarios for conflicts between the functional areas that must be resolved by detailed procedural analysis. For those scenarios where no conflicts are identified in the specified areas no further actions are required. Table 2 also identifies the scenarios that required detailed analysis due to conflicts in response functions. Appendix A to this report documents the results of the procedural analysis. Appendix B includes the completed event scenario analysis tables.

The final phase of NEI 10-05, Time Motion Study (TMS), identifies any staffing conflicts with the minimum shift that must be resolved. The TMS for Susquehanna Steam Electric Station determined that staffing conflicts do not exist. Appendix C of this report summarizes the results of the TMS.

On-Shift Staffing Analysis

Conclusion

The minimum staff identified in Table 6.1 of the Susquehanna Steam Electric Station Emergency Plan, Revision 53, was adequate to respond to the scenarios identified in the regulations until relieved by the augmented ERO.

Table 1
Susquehanna Steam Electric Station On-Shift Staffing

SSES Emergency Plan, Rev 53 Table 6.1, Station Emergency Plan Minimum Staffing Requirements	
Position	On-Shift
Shift Manager (SM) [7]	1
Unit Supervisor (SRO) [7]	1
NRC Communicator (SRO) [1, 7]	1
Plant Control Operators [7]	3
E Plan Communicator [2, 7]	1
Shift Technical Advisor (STA) [1, 7]	1
Nuclear Plant Operator	4
RP Technician [3]	2
Chemistry Technician [4]	1
Total:	15
Fire Brigade [5]	TRM
Rescue Operations/First Aid [6]	2
Security	Sec plan

[1] One Unit Supervisor assigned to each unit. The unaffected Unit Supervisor or STA assumes the role of NRC Communicator.

[2] Two (2) Control Room Operators per unit. This number includes two (2) OATC Reactor Operators and two (2) BOP Reactor Operators. The unaffected unit BOP assumes the role of E Plan Communicator.

[3] Two (2) RP Technicians on shift. One (1) RP Technician provides support as Dose Calculator (Offsite Dose Assessment). One (1) RP Technician provides support by providing In-plant surveys, job coverage, and personnel monitoring.

[4] One (1) Chemistry Technician provides chemistry sampling support.

[5] Fire Brigade is a collateral duty of Maintenance Site Support Services Management requiring 5 personnel without safe shutdown responsibilities. The Fire Brigade consists of 1 Fire Brigade Leader (Field Unit Supervisor) and 4 Fire Brigade Members. Reference NDAP-QA-0445.

[6] Rescue Operations/First Aid is a collateral duty of Fire Brigade and Security personnel.

[7] Licensed Operators are trained and qualified as E Plan and NRC Communicators.

On-Shift Staffing Analysis

Table 2
Susquehanna Steam Electric Station DBA/ISG Analyzed Events

TMS Required	DBA/ISG Event #	Summary Description of Event or Accident
YES	1	Land and/or waterborne HOSTILE ACTION directed against the Protected Area by a HOSTILE FORCE. Adversary characteristics defined by the Design Basis Threat (DBT).
NO	2	Recirc Pump Shaft Seizure (No Classification – Phase II Analysis not required per NEI 10-05 guidance)
NO	3	Recirc Pump Shaft Break [1]
NO	4	Control Rod Drop
NO	5	Instrument Line Break [2]
NO	6	Steam System Piping Break Outside Containment (MSLB)
NO	7	Loss of Coolant Accident inside Containment (with release exceeding PAGs and resulting PARs) [3]
NO	8	Feedwater Line Break Outside Containment [2]
NO	9	Fuel and Equipment Handling Accident [4]
NO	10	ATWS
NO	11	Response actions for an "aircraft probable threat" in accordance with 10 CFR 50.54(hh)(1) and as discussed in RG 1.214
YES	12	Control room fire leading to evacuation and remote shutdown, as referenced in IN 95-48.
YES	13	Station Blackout (Current Licensing Basis)
NO	14	Appendix R Fire Response [5]
NO	15	SAMG

[1] The SSES FSAR states that the Recirc Pump Shaft Break event is bounded by Event 2, Recirc Pump Shaft Seizure. Therefore, no Phase II Analysis is required.

[2] The SSES FSAR states that the Steam System Piping Break Outside Containment is more limiting than the Feedwater Line Break Outside Containment and the Instrument Line Break. Therefore, Event 6, Steam System Piping Break (MSLB), bounds these events and no Phase II Analysis is required.

[3] DBA event designated as proceeding non-mechanistically to GE with release exceeding Protective Action Guides.

[4] Fuel and Equipment Handling accident is not analyzed with the existing on-shift staff. The SSES FSAR states that this event involves fuel that is conditioned at least 24 hours after shutdown; therefore it is applicable to refueling conditions. Refueling operations are staffed for the evolution with additional operations, RP and support personnel.

[5] Per SSES personnel, the Control Room fire with evacuation and remote shutdown is the bounding Appendix R fire scenario; therefore, no further analysis of this event is required.

Appendix A
Phase II Analysis Results

On-Shift Staffing Analysis

A multi-disciplined team of subject matter experts from Susquehanna Steam Electric Station was assembled September 10-12, 2012 to provide input into the shift staffing analysis of events identified by NSIR/DPR-ISG-01, Interim Staff Guidance, Emergency Planning for Nuclear Power Plants. This team consisted of: a Shift Technical Advisor (SRO Certified); Chemistry Foreman; an RP Supervisor; a Fire Protection Engineer; a Security Coordinator; and Emergency Planning staff (station and consultants). The team provided analysis support during the Phase II analysis as follows:

On-Shift Staffing Analysis Team	
Team Member	Subject Matter Expertise
Shift Technical Advisor	Emergency Operating Procedure (EOP) actions for SROs, NPOs, and PCOs
	Off-Normal Operating Procedure (ONOP) actions for SROs, NPOs, and PCOs
	Operating Procedure actions
	Site Emergency Director (E Plan) Actions
	Fire response actions
	Control Room Communicator (NRC Communications) actions
Fire Protection Engineer	Fire Brigade Response actions
Chemistry Foreman	Chemistry Technician response actions
RP Supervisor	RP Technician response actions
Security Coordinator	Security Response actions
	Accountability Response actions
Emergency Planning	Emergency Plan response actions
	Site Emergency Director (E Plan) Actions

The Phase II Analysis was conducted in three steps: identification of events for analysis; minimum shift staffing complement determination; and, a table top analysis of the on-shift staffing resources required for response to the identified events. The team reviewed a total of nine (9) events. The results and recommendations of the Phase II Shift Staffing Analysis are documented in this report.

Phase II Preliminary Conclusions

1. Operations Conflicts – Time Motion Study (TMS) is required for the STA position due to competing ON/EOP procedure actions and assigned Emergency Plan functions/tasks. The TMS will determine if these functions can be performed by the STA during an event.

Phase II Recommendations:

1. Determine the most effective methodology to perform remaining scenarios requiring detailed time motion studies (Simulator based Drill, timed in-plant response, combinations, other).

2. Schedule and conduct Phase III analysis for the following events:
   a. Design Basis Threat
   b. Control Room Fire with Evacuation and Remote Shutdown
   c. Station Blackout

Appendix B
Phase II Event Analysis Tables

On-Shift Staffing Analysis

Phase II Event Analysis Table Index

Analysis (Scenario Number)	FSAR DBA/ ISG Event # (Appendix A)	Title	Source	Page Number
1	1	Design Basis Threat	ISG	11
2	4	Control Rod Drop	FSAR Limiting Fault Event	20
3	6	Steam System Piping Break Outside Containment (MSLB)	FSAR Condition IV Event	29
4	7	Loss of Coolant Accident inside Containment (with release exceeding PAGs and resulting in PARs)	ISG/FSAR Limiting Fault Event	38
5	10	ATWS	ISG/FSAR Limiting Fault Event	46
6	11	Response actions for an "aircraft probable threat" in accordance with 10 CFR 50.54(hh)(1) and as discussed in RG 1.214	ISG	54
7	12	Control room fire leading to evacuation and remote shutdown, as referenced in IN 95-48.	ISG	62
8	13	Station Blackout (Current Licensing Basis)	ISG	71
9	15	SAMG	ISG	80

On-Shift Staffing Analysis

On-Shift Personnel Assignments Used During Phase II Analysis

Position	Designation	Assignment
Shift Manager	Shift Manager	Shift Manager/Emergency Director
Unit Supervisor	SRO #1	Unit 1 Shift Supervisor
Unit Supervisor	SRO #2	Unit 2 Shift Supervisor
Field Unit Supervisor	FBL	Fire Brigade Leader
Shift Technical Advisor	STA	Shift Technical Advisor
Plant Control Operator	PCO #1	Unit 1 Operator At Controls (OATC)
Plant Control Operator	PCO #2	Unit 1 Balance of Plant (BOP - Communicator)
Plant Control Operator	PCO #3	Unit 2 Operator At The Controls (OATC)
Plant Control Operator	PCO #4	Unit 2 Balance of Plant (BOP - Communicator)
Nuclear Plant Operator	NPO #1	Unit 1 Reactor Building NPO
Nuclear Plant Operator	NPO #2	Unit 2 Reactor Building NPO
Nuclear Plant Operator	NPO #3	Unit 1 Turbine Building NPO
Nuclear Plant Operator	NPO #4	Unit 2 Turbine Building NPO

Other On-Shift Assignments Used During Analysis

Position	Designation	Assignment
RP Technician	RP #1	Offsite Dose Assessment
RP Technician	RP #2	RP Support
Chemistry Technician	Chem #1	Chemistry Sampling
Maintenance Site Support Services Handyman #1	FBM #1	Fire Brigade Member/Maintenance Site Support Services
Maintenance Site Support Services Handyman #2	FBM #2	Fire Brigade Member/Maintenance Site Support Services
Maintenance Site Support Services Handyman #3	FBM #3	Fire Brigade Member/Maintenance Site Support Services
Maintenance Site Support Services Handyman #4	FBM #4	Fire Brigade Member/Maintenance Site Support Services

On-Shift Staffing Analysis

Event Timelines and Assumptions

Event #1 Design Basis Threat

Initial Conditions:

Time: Sunday @0230

Unit @ 100% Power

RCS @ normal operating temperature and pressure

Sequence of Events:

0235 Adversary force assaults SSES and attempts to breach the protected area fence

Security engages adversaries and notifies Shift Manager

0236 CR personnel initiate Security Event response AOP

Rx manually tripped

On-site protective actions initiated

Emergency Plan entered

0240 Security informs Shift Manager that PA has been breached

0245 Security informs Shift Manager that adversaries have been neutralized

No injuries to site personnel
No fires or collateral damage to plant equipment
No adverse consequences to plant safety

On-Shift Staffing Analysis

Appendix B

Analysis #1: DBA/ISG Event #1 - Design Basis Threat **ECL: Site Area Emergency**

TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	SSES E Plan Table 6.1	N/A	T2/L1 T5/L1 T5/L3 T5/L8	NO	NO
2.	Unit Supervisor (SRO #1) [1]	SSES E Plan Table 6.1	N/A	T2/L2	NO	NO
3.	Unit Supervisor (SRO #2) [1]	SSES E Plan Table 6.1	N/A	T2/L3	NO	NO
4.	Shift Technical Advisor (STA)	SSES E Plan Table 6.1	N/A	T2/L4 T5/L6 T5/L7 T5/L10 T5/L11 T5/L13	NO	**YES**
5.	Plant Control Operator (PCO #1)	SSES E Plan Table 6.1	N/A	T2/L5	NO	NO
6.	Plant Control Operator (PCO #2) [2]	SSES E Plan Table 6.1	N/A	T2/L6 T5/L5 T5/L9[3]	NO	NO
7.	Plant Control Operator (PCO #3)	SSES E Plan Table 6.1	N/A	T2/L7	NO	NO

On-Shift Staffing Analysis

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
8.	Plant Control Operator (PCO #4) [2]	SSES E Plan Table 6.1	N/A	T2/L8	NO	NO
9.	Nuclear Plant Operator (NPO #1)	SSES E Plan Table 6.1	N/A	T2/L9	NO	NO
10.	SAS Operator	SSES E Plan Table 6.1	N/A	T5/L14	NO	NO

Notes: [1] Unaffected Unit Supervisor functions as the NRC Communicator
[2] Unaffected Unit Plant Control Operator functions as E Plan Communicator
[3] Refer to Table 2A – PCO available to perform Emergency Plan actions after ON/EOP actions

On-Shift Staffing Analysis

TABLE 2 - Plant Operations & Safe Shutdown Analysis # 1

Two Units - One Control Room (Shared) Applicable to unit 1 & 2
Minimum Operations Crew Necessary to Implement ONs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Shift Supervisor	Unit Supervisor (SRO #1)	Operator Training
3.	Shift Supervisor	Unit Supervisor (SRO #2)	Operator Training
4.	Shift Technical Advisor	Shift Technical Advisor (STA)	Operator Training
5.	Reactor Operator #1	Plant Control Operator (PCO #1)	Operator Training
6.	Reactor Operator #2	Plant Control Operator (PCO #2)	Operator Training
7.	Reactor Operator #3	Plant Control Operator (PCO #3)	Operator Training
8.	Reactor Operator #4	Plant Control Operator (PCO #4)	Operator Training
9.	Auxiliary Operator #1	Nuclear Plant Operator (NPO #1)	Operator Training

Notes: See Table 2A for ON/EOP actions

On-Shift Staffing Analysis

Analysis #1, Table 2A – ON/EOP Actions

Design Basis Threat

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
ON-000-101 Attach C	Intruder Flow Cart	SRO 1	X											
Step 3.9	PA Announcement	PCO2	X											
Step 3.7	Notify NRC	STA		X										
Step 3.11	Rx Scram	PCO1 PCO3	X											
Attach C	Staff RS/DP	SRO2 PCO4							X					
EO-100-102 EO-200-102	RPV Control	SRO1							X					
Step RC2	Verify Control Rods In	PCO 1 PCO 3	X											
RC/L-1	Isolations ECCS Initiations DGs Start	PCO 2 PCO 4	X											
RC/L-8	Reset Main Gen Lockouts	PCO 2 PCO 4	X											
RC/L-4	Control Rx Water Level	PCO 1 PCO 3	X											
RC/P-7	Cool down/Lower Pressure Using BPV	PCO 1 PCO 3							X					
ON-100-101 ON-200-101	Scram Imminent Actions	PCO1,2,3,4	X											
	Perform Scram Actions until transition to SD	PCO 1 PCO 3							X					

On-Shift Staffing Analysis

Design Basis Threat

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
ON-000-010 Attach C	Max CRD	PCO 1 PCO 3		X										
ON-000-010 Attach C	Isolate RWCU	PCO 1 PCO 3		X										
	Eval EPlan Entry	SM and STA		X										
Attach G Mitigation List	Start ESW and DGs	PCO 2		X										
	Start SCC DG	NPO 1				X								
	Start Supp Pool Cooling	PCO 2				X								

On-Shift Staffing Analysis

TABLE 3 – Firefighting **Analysis # 1**

Line	Performed By	Task Analysis Controlling Method
1.	N/A	N/A
2.	N/A	N/A
3.	N/A	N/A
4.	N/A	N/A
5.	N/A	N/A

Notes: No Fire Brigade response required for this event

On-Shift Staffing Analysis

TABLE 4 – Radiation Protection & Chemistry **Analysis # 1**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey (OSC) On-Shift Position: RP																		
2.	In-Plant Survey (TSC) On-Shift Position: RP																		
3.	Personnel Monitoring On-Shift Position:																		
4.	Job Coverage On-Shift Position:																		
5.	Offsite Radiological Assessment On-Shift Position: RP #1																		
6.	Other Site-Specific RP – Describe: On-Shift Position:																		
7.	Chemistry function/task #1 – Describe: Support Field Monitoring Team On-Shift Position: Chem #1																		
8.	Chemistry function/task #2 – Describe: On-Shift Position: Chem #1																		

Notes: No RP/Chemistry actions due to "Duck and Cover " mode

On-Shift Staffing Analysis

TABLE 5 – Emergency Plan Implementation **Analysis # 1**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1.	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2.	Approve Offsite Protective Action Recommendations	N/A	N/A
3.	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4.	Approve extension to allowable dose limits	N.A	N.A
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	PCO #2	EP/Ops Training and EP Drill Program
6.	ERO notification	STA	EP/Ops Training and EP Drill Program
7.	Abbreviated NRC notification for DBT event	STA	EP/Ops Training and EP Drill Program
8.	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9.	Perform State/local notifications	PCO #2	EP Training and EP Drill Program
10.	Complete NRC event notification form	STA	EP/Ops Training and EP Drill Program
11.	Activate ERDS	STA	EP/Ops Training and EP Drill Program
12.	Offsite radiological assessment	N/A	N/A
13.	Perform NRC notifications	STA	EP/Ops Training and EP Drill Program
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	SAS[1]	EP/Security Training and EP Drill Program
15.	Personnel accountability	N/A	N/A

Notes: Site Area Emergency EAL OS2
EP-PS-100 Emergency Director, Control Room

[1]Security notifies LLEA/FBI

On-Shift Staffing Analysis

Event Timelines and Assumptions

Event #4 Control Rod Drop

Initial Conditions:

Time: Tuesday @ 0430

Unit 2 Hot Standby, NOP & NOT

Sequence of Events:

0430 Mechanical failure causes central Control Rod to drop
Valid off-gas pre-treatment High/High RAD Alarm received in Control Room
ARM 50 & 51 (CRD North & South) High Alarms received
ARM 48 (HPCI Turbine Room) in Alarm
ARM 57 (RCIC Room) in Alarm
Upgrade to Alert based on ARM 48 & 57 Alarms

On-Shift Staffing Analysis

Appendix B

Analysis #2: DBA/ISG Event #4 - Control Rod Drop **ECL: Unusual Event → Alert**

TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	SSES E Plan Table 6.1	N/A	T2/L1 T5/L1 T5/L3 T5/L8	NO	NO
2.	Unit Supervisor (SRO #1) [1]	SSES E Plan Table 6.1	N/A	T5/L6 T5/L10 T5/L11 T5/L13	NO	NO
3.	Unit Supervisor (SRO #2) [1]	SSES E Plan Table 6.1	N/A	T2/L2	NO	NO
4.	Shift Technical Advisor (STA)	SSES E Plan Table 6.1	N/A	T2/L3	NO	NO
5.	Plant Control Operator (PCO #2) [2]	SSES E Plan Table 6.1	N/A	T5/L5 T5/L9	NO	NO
6.	Plant Control Operator (PCO #3)	SSES E Plan Table 6.1	N/A	T2/L4	NO	NO
7.	Plant Control Operator (PCO #4) [2]	SSES E Plan Table 6.1	N/A	T2/L5	NO	NO
8.	Nuclear Plant Operator (NPO #2)	SSES E Plan Table 6.1	N/A	T2/L6	NO	NO
9.	Nuclear Plant Operator (NPO #4)	SSES E Plan Table 6.1	N/A	T2/L7	NO	NO
10.	RP Technician (RP #1)	SSES E Plan Table 6.1	60	T4/L5	NO	NO
11.	RP Technician (RP #2)	SSES E Plan Table 6.1	60	T4/L2	NO	NO
12.	Chemistry Technician (Chem #1)	SSES E Plan Table 6.1	60	T4/L7	NO	NO

Notes: [1] Unaffected Unit Supervisor functions as the NRC Communicator
[2] Unaffected Unit Plant Control Operator functions as E Plan Communicator

On-Shift Staffing Analysis

TABLE 2 - Plant Operations & Safe Shutdown **Analysis # 2**

Two Units - One Control Room (Shared) **Applicable to unit 2**

Minimum Operations Crew Necessary to Implement ONs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Shift Supervisor	Unit Supervisor (SRO #2)	Operator Training
3.	Shift Technical Advisor	Shift Technical Advisor (STA)	Operator Training
4.	Reactor Operator #3	Plant Control Operator (PCO #3)	Operator Training
5.	Reactor Operator #4	Plant Control Operator (PCO #4)	Operator Training
6.	Auxiliary Operator #2	Nuclear Plant Operator (NPO #2)	Operator Training
7.	Auxiliary Operator #4	Nuclear Plant Operator (NPO #4)	Operator Training

Notes: See Table 2A for ON/EOP actions

On-Shift Staffing Analysis

Analysis #2, Table 2A – ON/EOP Actions

Control Rod Drop (Unit #2)

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
ON-200-102	Place Mode Switch in S/D	PCO 3	X											
EO-200-102, 103 and 104 GO-200-004	RPV Control	SRO 2							X					
Step RC2	Verify Control Rods In	PCO 3	X											
RC/L-1	Isolations ECCS Initiations DGs Start	PCO 4	X											
RC/L-8	Reset Main Gen Lockouts	PCO 3	X											
ON-279-001	Close MSIV and MSL Drains	PCO 4	X											
ON-279-001	Remove SJAE from service	PCO 4	X											
RC/L-4	Control Rx Water Level with HPIC RCIC	PCO 4	X											
RC/P-6	Maintain Pressure with SRVs	PCO 4							X					
RC/P-7	Lower pressure using SRVs	PCO 4						X						
RC/L-4	Restore Condensate injection and control RPV water level	PCO3									X			
EO-200-103	Place RHR in supp pool cooling	PCO 3		X										
ON-200-101	Perform Scram Actions until transition to SD	PCO 3 PCO 4							X					
ON-159-002	Verify Isolations	PCO 3	X											
GO-200-004	Performing SD actions	NPO 2 NPO 4 PCO 3										X		

On-Shift Staffing Analysis

Control Rod Drop (Unit #2)

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
		PCO 4												
EO-200-104	Monitoring Rx Bldg RAD levels and Temp	SRO 2 PCO 3	X											
	Start ESW and All coolers with cooling sources	PCO 3				X								
	Announce Evac of U2 Rx Bldg	PCO 2	X											

On-Shift Staffing Analysis

TABLE 3 – Firefighting **Analysis # 2**

Line	Performed By	Task Analysis Controlling Method
1.	N/A	N/A
2.	N/A	N/A
3.	N/A	N/A
4.	N/A	N/A
5.	N/A	N/A

Notes: No Fire Brigade response required for this event.

On-Shift Staffing Analysis

TABLE 4 – Radiation Protection & Chemistry **Analysis # 2**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey On-Shift Position: RP																		
2.	Out of Plant Survey On-Shift Position: RP #2		X	X	X	X	X	X	X	X	X	X	X						
3.	Personnel Monitoring On-Shift Position:																		
4.	Job Coverage On-Shift Position:																		
5.	Offsite Radiological Assessment On-Shift Position: RP #1		X	X	X	X	X	X	X	X	X	X	X						
6.	Other Site-Specific RP – Describe: On-Shift Position: RP																		
7.	Chemistry function/task #1 – Describe: Sample and analyze RCS On-Shift Position: Chem #1	X	X	X	X	X	X	X	X	X	X	X	X						
8.	Chemistry function/task #2 – Describe: On-Shift Position: Chem #1																		

Notes: Chemistry self monitors during sampling. No RP support required.
Chemistry sampling of RCS is from PASS due to isolation of normal sample point.
RP #2 relocates Sample Van outside protected area and prepares for monitoring/sampling. Note that RP#2 may be asked to provide radiological monitoring /survey by Shift Manager depending upon actual emergency conditions. This is acceptable since On-site (out-of-plant) RP Tech is not required until 60 minutes IAW Emergency Plan Table 6.1.
CH-ON-007, Chemistry Sampling Team
EP-PS-108, RP Tech 1 (OSCAR)
EP-PS-130, RP II Dose Calculator

On-Shift Staffing Analysis

TABLE 5 – Emergency Plan Implementation **Analysis # 2**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1.	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2.	Approve Offsite Protective Action Recommendations	N/A	N/A
3.	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4.	Approve extension to allowable dose limits	N/A	N/A
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	PCO #2	EP/Ops Training and EP Drill Program
6.	ERO notification	SRO #1	EP/Ops Training and EP Drill Program
7.	Abbreviated NRC notification for DBT event	N/A	N/A
8.	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9.	Perform State/local notifications	PCO #2	EP Training and EP Drill Program
10.	Complete NRC event notification form	SRO #1	EP/Ops Training and EP Drill Program
11.	Activate ERDS	SRO #1	EP/Ops Training and EP Drill Program
12.	Offsite radiological assessment	N/A	N/A
13.	Perform NRC notifications	SRO #1	EP/Ops Training and EP Drill Program
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	N/A	N/A
15.	Personnel accountability	N/A	N/A

Notes: Unusual Event EAL MU7 → Alert EAL RA2 or FA1
EP-PS-100 Emergency Director, Control Room

On-Shift Staffing Analysis

Event Timelines and Assumptions

Event #6 MSL Break outside containment isolation

Initial Conditions:

Time: Tuesday @ 0430

Unit 2 100% Power, NOP, NOT, NOL

Sequence of Events:

0430 Double-ended guillotine MSLB occurs outside secondary containment on A MS Line

Break is downstream of the MSL Isolation Valves

Rx Scram occurs
MSIVs closed in 5.5 seconds

0432 SRVs open on high vessel pressure

SRVs Cycle to maintain pressure at ≈ 1200 psig

0435:30 Rx water level above core begins to drop slowly

Pressure ≈ 1200 psig

0505 RxV Level at -161" – ADS initiated

0508 Low pressure ECCS systems initiated

On-Shift Staffing Analysis

Appendix B

Analysis #3: DBA/ISG Event #6 – Steam System Piping Break (MSLB) **ECL: Alert → Site Area Emergency**

TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	SSES E Plan Table 6.1	N/A	T2/L1 T5/L1 T5/L3 T5/L8	NO	NO
2.	Unit Supervisor (SRO #1) [1]	SSES E Plan Table 6.1	N/A	T5/L6 T5/L9 T5/L10 T5/L11 T5/L13	NO	NO
3.	Unit Supervisor (SRO #2) [1]	SSES E Plan Table 6.1	N/A	T2/L2	NO	NO
4.	Shift Technical Advisor (STA)	SSES E Plan Table 6.1	N/A	T2/L3	NO	NO
5.	Plant Control Operator (PCO #2) [2]	SSES E Plan Table 6.1	N/A	T2/L4	NO	NO
6.	Plant Control Operator (PCO #3)	SSES E Plan Table 6.1	N/A	T2/L5	NO	NO
7.	Plant Control Operator (PCO #4) [2]	SSES E Plan Table 6.1	N/A	T2/L6	NO	NO
8.	Nuclear Plant Operator (NPO #2)	SSES E Plan Table 6.1	N/A	T2/L7	NO	NO
9.	Nuclear Plant Operator (NPO #3)	SSES E Plan Table 6.1	N/A	T2/L8	NO	NO
10.	Nuclear Plant Operator (NPO #4)	SSES E Plan Table 6.1	N/A	T2/L9	NO	NO
11.	RP Technician (RP #1)	SSES E Plan Table 6.1	60	T4/L5	NO	NO
12.	RP Technician (RP #2)	SSES E Plan Table 6.1	60	T4/L2	NO	NO
13.	Security Officer #1	SSES E Plan Table 6.1	N/A	T2/L10	NO	NO
14.	Security Officer #2	SSES E Plan Table 6.1	N/A	T5/L15	NO	NO

Notes: [1] Unaffected Unit Supervisor functions as the NRC Communicator
[2] Unaffected Unit Plant Control Operator functions as E Plan Communicator

On-Shift Staffing Analysis

TABLE 2 - Plant Operations & Safe Shutdown **Analysis # 3**

Two Units - One Control Room (Shared) **Applicable to unit 2**
Minimum Operations Crew Necessary to Implement ONs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Shift Supervisor	Unit Supervisor (SRO #2)	Operator Training
3.	Shift Technical Advisor	Shift Technical Advisor (STA)	Operator Training
4.	Reactor Operator #2	Plant Control Operator (PCO #2)	Operator Training
5.	Reactor Operator #3	Plant Control Operator (PCO #3)	Operator Training
6.	Reactor Operator #4	Plant Control Operator (PCO #4)	Operator Training
7.	Auxiliary Operator #2	Nuclear Plant Operator (NPO #2)	Operator Training
8.	Auxiliary Operator #3	Nuclear Plant Operator (NPO #3)	Operator Training
9.	Auxiliary Operator #4	Nuclear Plant Operator (NPO #4)	Operator Training

Notes: See Table 2A for ON/EOP actions

Other (non-Operations) Personnel Necessary to Implement ONs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
10.	Security Officer	Security Officer #1	Security Training

Notes: Validate steam release from RX building using cameras

On-Shift Staffing Analysis

Analysis #3, Table 2A – ON/EOP Actions

Steam System Piping Break Outside Containment – MSLB (Unit #2)

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
ON-200-102	Place Mode Switch in S/D	PCO 3	X											
EO-200-102, 103 and 104 GO-200-004	RPV Control	SRO 2							X					
Step RC2	Verify Control Rods In	PCO 3	X											
RC/L-1	Isolations ECCS Initiations DGs Start	PCO 4	X											
RC/L-4	Control Rx Water Level with HPIC RCIC	PCO 4	X											
RC/P-6	Maintain Pressure with SRVs	PCO 4							X					
RC/P-7	Lower pressure using SRVs	PCO 4		X										
RC/L-4	Use Condensate injection and restore RPV water level	PCO3		X										
EO-200-102 RC/L-5 RC/L-11 RC/L-10	Attempt to feed using table 5 subsystems	PCO 3 PCO 4			X									
	Line up Low pressure ECCS Systems	PCO 4			X									
EO-200-103 SP/T-2	Place RHR in supp pool cooling	PCO 2		X										
	Restore supp pool cooling	PCO 4								X				

On-Shift Staffing Analysis

Steam System Piping Break Outside Containment – MSLB (Unit #2)

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
EO-200-112	Minus 161 enter EO-200-112	SRO 2							X					
	Prevent uncontrolled condensate ejection	PCO 3							X					
	Verify supp pool level	PCO 4							X					
	Open all ADS valves	PCO 4							X					
	Recover level with low pressure ECCS	PCO 3 PCO 4 .								X				
ON-200-101	Perform Scram Actions until transition to SD	PCO 3 PCO 4							X					
ON-159-002	Verify Isolations	PCO 3	X											
GO-200-004	Performing SD actions	NPO 2 NPO 4 PCO 3 PCO 4										X		
EO-200-104	Monitoring Rx Bldg and Turbine Bldg RAD levels and Temp	SRO 2 PCO 3							X					
	Start ESW and All coolers with cooling sources	PCO 3				X								
	Announce Evac of U2 Rx Bldg	PCO 2	X											
EO-200-105	Notify RP to Perform Offsite Dose Calcs	SM		X										
	Perform post start checks on DG	NPO 3						X						

On-Shift Staffing Analysis

TABLE 3 – Firefighting **Analysis # 3**

Line	Performed By	Task Analysis Controlling Method
1.	N/A	N/A
2.	N/A	N/A
3.	N/A	N/A
4.	N/A	N/A
5.	N/A	N/A

Notes: No Fire Brigade response required for this event.

On-Shift Staffing Analysis

TABLE 4 – Radiation Protection & Chemistry **Analysis # 3**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey On-Shift Position: RP																		
2.	Out of Plant Survey Relocation Field Monitoring Team Sample Van outside protected area On-Shift Position: RP #2	X	X	X	X	X	X	X	X	X	X	X	X						
3.	Personnel Monitoring On-Shift Position:																		
4.	Job Coverage On-Shift Position:																		
5.	Offsite Radiological Assessment On-Shift Position: RP #1	X	X	X	X	X	X	X	X	X	X	X	X						
6.	Other Site-Specific RP – Describe: On-Shift Position:																		
7.	Chemistry function/task #1 – Describe: Support Field Monitoring Team On-Shift Position: Chem #1																		
8.	Chemistry function/task #2 – Describe: On-Shift Position: Chem #1																		

Notes: Chemistry post trip sampling after ERO augmentation
EP-PS-108, RP Tech 1 (OSCAR)
EP-PS-130, RP II Dose Calculator
Note that RP#2 may be asked to provide radiological monitoring /survey by Shift Manager depending upon actual emergency conditions. This is acceptable since On-site (out-of-plant) RP Tech is not required until 60 minutes IAW Emergency Plan Table 6.1.

On-Shift Staffing Analysis

TABLE 5 – Emergency Plan Implementation **Analysis # 3**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1.	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2.	Approve Offsite Protective Action Recommendations	N/A	N/A
3.	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4.	Approve extension to allowable dose limits	N/A	N/A
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	PCO #2	EP/Ops Training and EP Drill Program
6.	ERO notification	SRO #1	EP/Ops Training and EP Drill Program
7.	Abbreviated NRC notification for DBT event	N/A	N/A
8.	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9.	Perform State/local notifications	SRO #1	EP Training and EP Drill Program
10.	Complete NRC event notification form	SRO #1	EP/Ops Training and EP Drill Program
11.	Activate ERDS	SRO #1	EP/Ops Training and EP Drill Program
12.	Offsite radiological assessment	N/A	N/A
13.	Perform NRC notifications	SRO #1	EP/Ops Training and EP Drill Program
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	N/A	N/A
15.	Personnel accountability	Security Officer #2	EP/Security Training and EP Drill Program

Notes: Alert EAL FA1 → Site Area Emergency EAL FS1
EP-PS-100 Emergency Director, Control Room

On-Shift Staffing Analysis

Event Timelines and Assumptions

Event #7 Large break LOCA with release exceeding PAGs and resulting in PARs

Initial Conditions:

Time: Tuesday @ 0430

Unit 2 100% Power, NOP & NOT

Sequence of Events:

0430 Large Break LOCA occurs – Recirc Line Break
Loss of Normal AC power occurs coincident with break

0435 Reactor Level -205 inches. Drywell pressure 18.5psig

0500 Dose Projection indicates 1.1 R/hr at Emergency Plan Boundary (EPB)

On-Shift Staffing Analysis

Appendix B

Analysis #4: DBA/ISG Event #7 - Large Break LOCA with release and PARs ECL: Site Area Emergency → General Emergency

TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	SSES E Plan Table 6.1	N/A	T2/L1 T5/L1 T5/L2 T5/L3 T5/L4 T5/L8	NO	NO
2.	Unit Supervisor (SRO #1) [1]	SSES E Plan Table 6.1	N/A	T5/L5 T5/L6 T5/L9 T5/L10 T5/L11 T5/L13	NO	NO
3.	Unit Supervisor (SRO #2) [1]	SSES E Plan Table 6.1	N/A	T2/L2	NO	NO
4.	Shift Technical Advisor (STA)	SSES E Plan Table 6.1	N/A	T2/L3	NO	NO
5.	Plant Control Operator (PCO #2) [2]	SSES E Plan Table 6.1	N/A	T2/L4 T5/L9[3]	NO	NO
6.	Plant Control Operator (PCO #3)	SSES E Plan Table 6.1	N/A	T2/L5	NO	NO
7.	Plant Control Operator (PCO #4) [2]	SSES E Plan Table 6.1	N/A	T2/L6	NO	NO
8.	Nuclear Plant Operator (NPO #4)	SSES E Plan Table 6.1	N/A	T2/L7	NO	NO
9.	RP Technician (RP #1)	SSES E Plan Table 6.1	60	T4/L6	NO	NO
10.	RP Technician (RP #2)	SSES E Plan Table 6.1	60	T4/L2 T4/L3	NO	NO
11.	CAS Operator	SSES E Plan Table 6.1	N/A	T5/L15	NO	NO

Notes: [1] Unaffected Unit Supervisor functions as the NRC Communicator
[2] Unaffected Unit Plant Control Operator functions as E Plan Communicator
[3] PCO is available to make offsite communications at GE (See Table 2A)

On-Shift Staffing Analysis

TABLE 2 - Plant Operations & Safe Shutdown **Analysis # 4**

Two Units - One Control Room (Shared) **Applicable to unit 2**
Minimum Operations Crew Necessary to Implement ONs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Shift Supervisor	Unit Supervisor (SRO #2)	Operator Training
3.	Shift Technical Advisor	Shift Technical Advisor (STA)	Operator Training
4.	Reactor Operator #2	Plant Control Operator (PCO #2)	Operator Training
5.	Reactor Operator #3	Plant Control Operator (PCO #3)	Operator Training
6.	Reactor Operator #4	Plant Control Operator (PCO #4)	Operator Training
7.	Auxiliary Operator #4	Nuclear Plant Operator (NPO #4)	Operator Training

Notes: See Table 2A for ON/EOP actions

On-Shift Staffing Analysis

Analysis #4, Table 2A – ON/EOP Actions

Loss of Coolant Accident Inside Containment (Unit #2)

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
ON-200-102	Place Mode Switch in S/D	PCO 3	X											
EO-200-102, 103	RPV Control	SRO 2							X					
Step RC2	Verify Control Rods In	PCO 3	X											
RC/L-1	Isolations ECCS Initiations DGs Start	PCO 4	X											
EO-200-112	Minus 161 enter EO-200-112	SRO 2	X											
	Prevent uncontrolled condensate injection	PCO 3	X											
	Verify supp pool level	PCO 4	X											
	Verify that all ADS valves are open	PCO 4	X											
	Recover level with low pressure ECCS	PCO 3 PCO 4	X											
	Start standby Liquid control and maximize CRD	PCO 3	X											
EO-200-103	Commence Dry Well Sprays	PCO 3			X									
	Commence Supp Pool cooling	PCO 2			X									
	Start H2 Analyzers	PCO 3					X							
EO-200-102	Line up RHR service water to RHR heat exchangers	PCO 2 PCO 3		X										
	DG post start checks	NPO 4	X											

On-Shift Staffing Analysis

TABLE 3 – Firefighting **Analysis # 4**

Line	Performed By	Task Analysis Controlling Method
1.	N/A	N/A
2.	N/A	N/A
3.	N/A	N/A
4.	N/A	N/A
5.	N/A	N/A

Notes: No Fire Brigade response required for this event.

On-Shift Staffing Analysis

TABLE 4 – Radiation Protection & Chemistry **Analysis # 4**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey On-Shift Position: RP																		
2.	Out of Plant Survey Move Field Monitoring Team Van outside PA On-Shift Position: RP #2	X	X	X	X	X	X												
3.	Out of Plant Survey Perform surveys (Near Site) On-Shift Position: RP #2							X	X	X	X								
4.	Personnel Monitoring On-Shift Position:																		
5.	Job Coverage On-Shift Position:																		
6.	Offsite Radiological Assessment On-Shift Position: RP #1	X	X	X	X	X	X	X	X	X	X								
7.	Other Site-Specific RP – Describe: On-Shift Position:																		
8.	Chemistry function/task #1 – Describe: Support Field Monitoring Team On-Shift Position: Chem #1																		
9.	Chemistry function/task #2 – Describe: On-Shift Position: Chem #1																		

Notes: EP-PS-108, RP Tech I (OSCAR)
EP-PS-130, RP II Dose Calculator
Note that RP#2 may be asked to provide radiological monitoring /survey by Shift Manager depending upon actual emergency conditions. This is acceptable since On-site (out-of-plant) RP Tech is not required until 60 minutes IAW Emergency Plan Table 6.1.

On-Shift Staffing Analysis

TABLE 5 – Emergency Plan Implementation **Analysis # 4**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1.	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2.	Approve Offsite Protective Action Recommendations	Shift Manager	EP/Ops Training and EP Drill Program
3.	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4.	Approve extension to allowable dose limits	Shift Manager	EP/Ops Training and EP Drill Program
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	SRO #1	EP/Ops Training and EP Drill Program
6.	ERO notification	SRO #1	EP/Ops Training and EP Drill Program
7.	Abbreviated NRC notification for DBT event	N/A	N/A
8.	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9.	Perform State/local notifications	SRO #1 @ SAE PCO #2 @ GE	EP Training and EP Drill Program
10.	Complete NRC event notification form	SRO #1	EP/Ops Training and EP Drill Program
11.	Activate ERDS	SRO #1	EP/Ops Training and EP Drill Program
12.	Offsite radiological assessment	N/A	N/A
13.	Perform NRC notifications	SRO #1	EP/Ops Training and EP Drill Program
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	N/A[1]	N/A
15.	Personnel accountability	CAS Operator	EP/Security Training and EP Drill Program

Notes: Site Area Emergency EAL FS1 → General Emergency EAL RG1
EP-PS-100 Emergency Director, Control Room
[1] Shift Manager notifies Senior State Official of PARs. Completion of notification within approximately 1 minute.

On-Shift Staffing Analysis

Event Timelines and Assumptions

Event #10 ATWS

Initial Conditions:

Time: Tuesday @ 0430

Unit 1 100% Power, NOP & NOT

Sequence of Events:

0430 MSIVs close. Reactor does not trip.

Supplemental and/or manual trip actions are successful.

On-Shift Staffing Analysis

Appendix B

Analysis #5: DBA/ISG Event #10 - ATWS **ECL: Alert**
TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	SSES E Plan Table 6.1	N/A	T2/L1 T5/L1 T5/L3 T5/L8	NO	NO
2.	Unit Supervisor (SRO #1) [1]	SSES E Plan Table 6.1	N/A	T2/L2 T5/L5	NO	NO
3.	Unit Supervisor (SRO #2) [1]	SSES E Plan Table 6.1	N/A	T5/L6 T5/L10 T5/L11 T5/L13	NO	NO
4.	Shift Technical Advisor (STA)	SSES E Plan Table 6.1	N/A	T2/L3	NO	NO
5.	Plant Control Operator (PCO #1)	SSES E Plan Table 6.1	N/A	T2/L4	NO	NO
6.	Plant Control Operator (PCO #2) [2]	SSES E Plan Table 6.1	N/A	T2/L5	NO	NO
7.	Plant Control Operator (PCO #4) [2]	SSES E Plan Table 6.1	N/A	T5/L9	NO	NO
8.	Nuclear Plant Operator (NPO #1)	SSES E Plan Table 6.1	N/A	T2/L6	NO	NO
9.	Nuclear Plant Operator (NPO #3)	SSES E Plan Table 6.1	N/A	T2/L7	NO	NO

Notes: [1] Unaffected Unit Supervisor functions as the NRC Communicator
[2] Unaffected Unit Plant Control Operator functions as E Plan Communicator

On-Shift Staffing Analysis

TABLE 2 - Plant Operations & Safe Shutdown **Analysis # 5**

Two Units - One Control Room (Shared) **Applicable to unit 1**
Minimum Operations Crew Necessary to Implement ONs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Shift Supervisor	Unit Supervisor (SRO #1)	Operator Training
3.	Shift Technical Advisor	Shift Technical Advisor (STA)	Operator Training
4.	Reactor Operator #1	Plant Control Operator (PCO #1)	Operator Training
5.	Reactor Operator #2	Plant Control Operator (PCO #2)	Operator Training
6.	Auxiliary Operator #1	Nuclear Plant Operator (NPO #1)	Operator Training
7.	Auxiliary Operator #3	Nuclear Plant Operator (NPO #3)	Operator Training

Notes: See Table 2A for ON/EOP actions

On-Shift Staffing Analysis

Analysis #5, Table 2A – ON/EOP Actions

ATWS

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
EO-100-113	Place Mode Switch in S/D	PCO1	X											
	Verify all rods IN	PCO1	X											
	Transition to EO-100-102	SRO1	X											
EO-100-102	RPV Control	SRO1	X											
Step RC2	Verify Control Rods In	PCO 1	X											
RC/L-1	Isolations ECCS Initiations DGs Start	PCO 2	X											
RC/L-8	Reset Main Gen Lockouts	PCO 2	X											
RC/L-4	Control Rx Water Level with HPIC RCIC	PCO 2				X								
RC/P-6	Maintain Pressure with SRVs	PCO 2			X									
RC/P-6	Maintain Pressure with HPIC	PCO 2									X			
RC/P-7	Cool down using HPCI	PCO 2										X		
RC/L-4	Restore Condensate injection and control RPV water level	PCO1										X		
EO-100-103	Place RHR in supp pool cooling	PCO 1				X								

On-Shift Staffing Analysis

ATWS

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
ON-100-101	Perform Scram Actions until transition to SD	PCO 1 PCO 2							X					
ON-159-002	Recover from Isolations	PCO 1 NPO1										X		
GO-100-004	Performing SD actions	NPO 1 NPO3										X		

On-Shift Staffing Analysis

TABLE 3 – Firefighting **Analysis # 5**

Line	Performed By	Task Analysis Controlling Method
1.	N/A	N/A
2.	N/A	N/A
3.	N/A	N/A
4.	N/A	N/A
5.	N/A	N/A

Notes: No Fire Brigade response required for this event.

On-Shift Staffing Analysis

TABLE 4 – Radiation Protection & Chemistry

Analysis # 5

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey On-Shift Position: RP																		
2.	Out of Plant Survey On-Shift Position: RP #2																		
3.	Personnel Monitoring On-Shift Position:																		
4.	Job Coverage On-Shift Position:																		
5.	Offsite Radiological Assessment On-Shift Position: RP #1																		
6.	Other Site-Specific RP – Describe: On-Shift Position:																		
7.	Chemistry function/task #1 – Describe: Support Field Monitoring Team On-Shift Position: Chem #1																		
8.	Chemistry function/task #2 – Describe: On-Shift Position: Chem #1																		

Notes: RP & Chemistry report to Control Room for direction from Shift Manager
Chemistry Post Trip Sampling after ERO augmentation (required within 12 hours of shutdown)

On-Shift Staffing Analysis

TABLE 5 – Emergency Plan Implementation **Analysis # 5**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1.	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2.	Approve Offsite Protective Action Recommendations	N/A	N/A
3.	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4.	Approve extension to allowable dose limits	N/A	N/A
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	SRO #1	EP/Ops Training and EP Drill Program
6.	ERO notification	SRO #2	EP/Ops Training and EP Drill Program
7.	Abbreviated NRC notification for DBT event	N/A	N/A
8.	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9.	Perform State/local notifications	PCO #4	EP Training and EP Drill Program
10.	Complete NRC event notification form	SRO #2	EP/Ops Training and EP Drill Program
11.	Activate ERDS	SRO #2	EP/Ops Training and EP Drill Program
12.	Offsite radiological assessment	N/A	N/A
13.	Perform NRC notifications	SRO #2	EP/Ops Training and EP Drill Program
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	N/A	N/A
15.	Personnel accountability	N/A	N/A

Notes: Alert EAL MA
EP-PS-100 Emergency Director, Control Room

On-Shift Staffing Analysis

Event Timelines and Assumptions

Event #11 Response actions for an "aircraft probable threat" in accordance with 10CFR50.54(hh)(1)

Initial Conditions:

Time: Monday @ 2100

Unit 1&2 100% Power, NOP & NOT

Sequence of Events:

2100 Aircraft probable threat call received from NRC Headquarters.

Call is verified.

Aircraft is ≈ 25 minutes from site

On-Shift Staffing Analysis

Appendix B

Analysis #6: DBA/ISG Event #11 - Aircraft Probable Threat **ECL: Alert**

TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	SSES E Plan Table 6.1	N/A	T2/L1 T5/L1 T5/L3 T5/L8	NO	NO
2.	Unit Supervisor (SRO #1) [1]	SSES E Plan Table 6.1	N/A	T2/L2	NO	NO
3.	Unit Supervisor (SRO #2) [1]	SSES E Plan Table 6.1	N/A	T5/L6 T5/L10 T5/L11 T5/L13	NO	NO
4.	Shift Technical Advisor (STA)	SSES E Plan Table 6.1	N/A	T2/L3	NO	NO
5.	Plant Control Operator (PCO #1)	SSES E Plan Table 6.1	N/A	T2/L4	NO	NO
6.	Plant Control Operator (PCO #2) [2]	SSES E Plan Table 6.1	N/A	T2/L5 T5/L5	NO	NO
7.	Plant Control Operator (PCO #3)	SSES E Plan Table 6.1	N/A	T2/L6	NO	NO
8.	Plant Control Operator (PCO #4) [2]	SSES E Plan Table 6.1	N/A	T2/L7 T5/L9[3]	NO	NO
9.	Nuclear Plant Operator (NPO #1)	SSES E Plan Table 6.1	N/A	T2/L8	NO	NO
10.	Security Officer #1	SSES E Plan Table 6.1	N/A	T2/L9	NO	NO
11.	Security Officer #2	SSES E Plan Table 6.1	N/A	T5/L14	NO	NO

Notes: [1] Unaffected Unit Supervisor functions as the NRC Communicator
[2] Unaffected Unit Plant Control Operator functions as E Plan Communicator
[3] Refer to Table 2A – PCO available to perform Emergency Plan actions after ON/EOP actions.

On-Shift Staffing Analysis

TABLE 2 - Plant Operations & Safe Shutdown **Analysis # 6**

Two Units - One Control Room (Shared) **Applicable to unit 1 & 2**
Minimum Operations Crew Necessary to Implement ONs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Shift Supervisor	Unit Supervisor (SRO #1)	Operator Training
3.	Shift Technical Advisor	Shift Technical Advisor (STA)	Operator Training
4.	Reactor Operator #1	Plant Control Operator (PCO #1)	Operator Training
5.	Reactor Operator #2	Plant Control Operator (PCO #2)	Operator Training
6.	Reactor Operator #3	Plant Control Operator (PCO #3)	Operator Training
7.	Reactor Operator #4	Plant Control Operator (PCO #4)	Operator Training
8.	Auxiliary Operator #1	Nuclear Plant Operator (NPO #1)	Operator Training

Notes: See Table 2A for ON/EOP actions

Other (non-Operations) Personnel Necessary to Implement ONs and EOPs, or SAMGs if applicable

Line	**Generic Title/Role**	**On-Shift Position**	**Task Performance Validation**
9.	Security Officer	Security Officer #1	Security Training

Notes: Extinguish interior (PA) plant lighting and preps to extinguish exterior plant lighting

On-Shift Staffing Analysis

Analysis #6, Table 2A – ON/EOP Actions

Aircraft Threat

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
ON-000-010 Step 3.9	PA Announcement	PCO 2	X											
ON-000-010	Direct ON-000-010 actions	SRO 1							X					
ON-000-010 Attach D	Establish Communications with NRC	STA	X											
	Isolate RWCU (both Units)	PCO 1 PCO 3	X											
	Perform Scram Imminent Actions	PCO 1-4	X											
	Maximize CRD	PCO 2 PCO 4	X											
	Place CREOASS in Recirc	PCO 2	X											
	Eval E Plan Entry	SM and STA		X										
	Extinguish Interior (PA) Lights and Prep to Extinguish Exterior Lights	SAS	X											
ON-000-010 Attach G	Start ESW and DG	PCO 2	X											
	Start SCC DG	NPO1		X										
	Supp Pool Cooling in Service	PCO 2 PCO 4		X										

On-Shift Staffing Analysis

TABLE 3 – Firefighting **Analysis # 6**

Line	Performed By	Task Analysis Controlling Method
1.	N/A	N/A
2.	N/A	N/A
3.	N/A	N/A
4.	N/A	N/A
5.	N/A	N/A

Notes:	No Fire Brigade response required for this event. Personnel evacuate target buildings. Initiate "Duck and Cover"

On-Shift Staffing Analysis

TABLE 4 – Radiation Protection & Chemistry **Analysis # 6**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey On-Shift Position: RP																		
2.	Out of Plant Survey On-Shift Position: RP #2																		
3.	Personnel Monitoring On-Shift Position:																		
4.	Job Coverage On-Shift Position:																		
5.	Offsite Radiological Assessment On-Shift Position: RP #1																		
6.	Other Site-Specific RP – Describe: On-Shift Position:																		
7.	Chemistry function/task #1 – Describe: Support Field Monitoring Team On-Shift Position: Chem #1																		
8.	Chemistry function/task #2 – Describe: On-Shift Position: Chem #1																		

Notes: RP/Chemistry are in "Duck and Cover" Mode.

On-Shift Staffing Analysis

TABLE 5 – Emergency Plan Implementation **Analysis # 6**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1.	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2.	Approve Offsite Protective Action Recommendations	N/A	N/A
3.	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4.	Approve extension to allowable dose limits	N/A	N/A
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	PCO #2	EP/Ops Training and EP Drill Program
6.	ERO notification	SRO #2	EP/Ops Training and EP Drill Program
7.	Abbreviated NRC notification for DBT event	N/A	N/A
8.	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9.	Perform State/local notifications	PCO #4	EP Training and EP Drill Program
10.	Complete NRC event notification form	SRO #2	EP/Ops Training and EP Drill Program
11.	Activate ERDS	SRO #2	EP/Ops Training and EP Drill Program
12.	Offsite radiological assessment	N/A	N/A
13.	Perform NRC notifications	SRO #2	EP/Ops Training and EP Drill Program
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	Security Officer #2	EP/Security Training and EP Drill Program
15.	Personnel accountability	N/A	N/A

Notes: Alert EAL OA2
EP-PS-100 Emergency Director, Control Room

On-Shift Staffing Analysis

Event Timelines and Assumptions

Event #12 Control room fire leading to evacuation and remote shutdown

Initial Conditions:

Time: Monday @ 0330

Unit 1&2 100% Power, NOP & NOT

Sequence of Events:

0330 Smoke, sparks and flames observed coming from back of control board

Fire Brigade activated

0332 Fire Operations attempt to extinguish flames without success – fire and smoke affects operation of both units 1&2

0340 Decision to evacuate Control Room 1&2

On-Shift Staffing Analysis

Appendix B

Analysis #7: DBA/ISG Event #12 - Control Room Fire w/Evacuation & Remote Shutdown **ECL: Alert**

TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	SSES E Plan Table 6.1	N/A	T2/L1 T5/L1 T5/L3 T5/L8	NO	NO
2.	Unit Supervisor (SRO #1) [1]	SSES E Plan Table 6.1	N/A	T2/L2 T5/L5	NO	NO
3.	Unit Supervisor (SRO #2) [1]	SSES E Plan Table 6.1	N/A	T2/L3	NO	NO
4.	Shift Technical Advisor (STA)	SSES E Plan Table 6.1	N/A	T2/L4 T5/L6 T5/L9 T5/L10 T5/L13	NO	YES
5.	Field Unit Supervisor (FBL) [2]	SSES E Plan Table 6.1	N/A	T3/L1	NO	NO
6.	Plant Control Operator (PCO #1)	SSES E Plan Table 6.1	N/A	T2/L5	NO	NO
7.	Plant Control Operator (PCO #2) [3]	SSES E Plan Table 6.1	N/A	T2/L6	NO	NO
8.	Plant Control Operator (PCO #3)	SSES E Plan Table 6.1	N/A	T2/L7	NO	NO
9.	Plant Control Operator (PCO #4) [3]	SSES E Plan Table 6.1	N/A	T2/L8	NO	NO
10.	Nuclear Plant Operator (NPO #1)	SSES E Plan Table 6.1	N/A	T2/L9	NO	NO
11.	Nuclear Plant Operator (NPO #2)	SSES E Plan Table 6.1	N/A	T2/L10	NO	NO
12.	Nuclear Plant Operator (NPO #3)	SSES E Plan Table 6.1	N/A	T2/L11	NO	NO

On-Shift Staffing Analysis

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
13.	Nuclear Plant Operator (NPO #4)	SSES E Plan Table 6.1	N/A	T2/L12	NO	NO
14.	Maintenance Site Support Services Handyman #1 (FBM #1)	SSES E Plan Table 6.1	N/A	T3/L2	NO	NO
15.	Maintenance Site Support Services Handyman #2 (FBM #2)	SSES E Plan Table 6.1	N/A	T3/L3	NO	NO
16.	Maintenance Site Support Services Handyman #3 (FBM #3)	SSES E Plan Table 6.1	N/A	T3/L4	NO	NO
17.	Maintenance Site Support Services Handyman #4 (FBM #4)	SSES E Plan Table 6.1	N/A	T3/L5	NO	NO

Notes: [1] Unaffected Unit Supervisor functions as the NRC Communicator
[2] Functions as Fire Brigade Leader during fire related response events
[3] Unaffected Unit Plant Control Operator functions as E Plan Communicator

On-Shift Staffing Analysis

TABLE 2 - Plant Operations & Safe Shutdown **Analysis # 7**

Two Units - One Control Room (Shared) **Applicable to unit 1 & 2**
Minimum Operations Crew Necessary to Implement ONs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Shift Supervisor	Unit Supervisor (SRO #1)	Operator Training
3.	Shift Supervisor	Unit Supervisor (SRO #2)	Operator Training
4.	Shift Technical Advisor	Shift Technical Advisor (STA)	Operator Training
5.	Reactor Operator #1	Plant Control Operator (PCO #1)	Operator Training
6.	Reactor Operator #2	Plant Control Operator (PCO #2)	Operator Training
7.	Reactor Operator #3	Plant Control Operator (PCO #3)	Operator Training
8.	Reactor Operator #4	Plant Control Operator (PCO #4)	Operator Training
9.	Auxiliary Operator #1	Nuclear Plant Operator (NPO #1)	Operator Training
10.	Auxiliary Operator #2	Nuclear Plant Operator (NPO #2)	Operator Training
11.	Auxiliary Operator #3	Nuclear Plant Operator (NPO #3)	Operator Training
12.	Auxiliary Operator #4	Nuclear Plant Operator (NPO #4)	Operator Training

Notes: See Table 2A for ON/EOP actions

On-Shift Staffing Analysis

Analysis #7, Table 2A – ON/EOP Actions

Control Room Fire with Evacuation

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
ON-1(2)00-009 Step 3.2	Notify Security and PA announcement	SRO 1			x									
	Activate ERO or Alt ERO	STA			x									
	Insert Scram and verify Control Rods SRM and IRMs Inserted	PCO 1 PCO 3			x									
	Close MSIVs	PCO 2 PCO 4			x									
	Placing FW in startup level control	PCO 1 PCO 3			x									
	Isolate RWCU	PCO 1 PCO 3			x									
	Startup HPCI and RCIC	PCO 2 PCO 4			x									
	Obtain keys and take EOP boards currently in use	SRO 1 SRO 2			x									
ON-1(2)00-009 Step 3.3	Evac CR	All			x									
Step 4.3.1	Start Laptop	PCO 1 PCO 3				x								
Step 4.3.2	Transfer Switch Lineup	PCO 2 PCO 4				x								
4.3.3	Notify SM when transferred	SRO 1 SRO 2				x								
N/A	SM and STA report to OCC	SM / STA				x								
4.3.4	Isolate A – D ESS bus feeder breakers from CR	NPO 1 NPO 2						x						
4.3.5	Isolate RSR Service water flow thru appropriate RHR heat exchangers	NPO 3 NPO 4								x				

On-Shift Staffing Analysis

Control Room Fire with Evacuation

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
4.3.6 – 4.3.7	Verify MSIV and MSL drains are closed	PCO 1 PCO 3						x						
	Monitor Plant Parameters	PCO 1 PCO 3	x											
4.5.1	Disable CR HMIS interfaces	NPO 1								x				
4.5.2	Verify Control Structure HVAC operating	NPO 2								x				
4.6	Control Rx Press from Remote SDP	PCO 1 PCO 3								x				
	Verify Instrument gas in service	NPO 3 NPO 4						x						
	Verify all Turbines tripped	NPO 3 NPO 4											x	
EO-1(2)00-102 OP-1(2)50-001 Step 2.15	Maintain Rx Water Level with RCIC	PCO 1 PCO 3								x				
EO-1(2)00-102 ON-1(2)00-101	Take Scram Actions	PCO 1-4								x				

On-Shift Staffing Analysis

TABLE 3 – Firefighting **Analysis # 7**

Line	Performed By	Task Analysis Controlling Method
1.	Field Unit Supervisor (FBL)	Fire Brigade Training
2.	Maintenance Site Support Services Handyman #1 (FBM #1)	Fire Brigade Training
3.	Maintenance Site Support Services Handyman #2 (FBM #2)	Fire Brigade Training
4.	Maintenance Site Support Services Handyman #3 (FBM #3)	Fire Brigade Training
5.	Maintenance Site Support Services Handyman #4 (FBM #4)	Fire Brigade Training

Notes:

On-Shift Staffing Analysis

TABLE 4 – Radiation Protection & Chemistry **Analysis # 7**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey On-Shift Position: RP																		
2.	Out of Plant Survey On-Shift Position: RP #2																		
3.	Personnel Monitoring On-Shift Position:																		
4.	Job Coverage On-Shift Position:																		
5.	Offsite Radiological Assessment On-Shift Position: RP #1																		
6.	Other Site-Specific RP – Describe: On-Shift Position:																		
7.	Chemistry function/task #1 – Describe: Support Field Monitoring Team On-Shift Position: Chem #1																		
8.	Chemistry function/task #2 – Describe: On-Shift Position: Chem #1																		

Notes: RP Technicians report to OSC for this event and take direction from Shift Manager.
Chemistry Technician reports to OSC for this event and takes direction from Shift Manager.
Chemistry Post Trip Sampling after ERO augmentation (required within 12 hours of shutdown)

On-Shift Staffing Analysis

TABLE 5 – Emergency Plan Implementation **Analysis # 7**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1.	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2.	Approve Offsite Protective Action Recommendations	N/A	N/A
3.	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4.	Approve extension to allowable dose limits	N/A	N/A
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	SRO #1	EP/Ops Training and EP Drill Program
6.	ERO notification	STA	EP/Ops Training and EP Drill Program
7.	Abbreviated NRC notification for DBT event	N/A	N/A
8.	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9.	Perform State/local notifications	STA	EP Training and EP Drill Program
10.	Complete NRC event notification form	STA	EP/Ops Training and EP Drill Program
11.	Activate ERDS	**Will occur in the EOF after augmentation***	EP Training and EP Drill Program
12.	Offsite radiological assessment	N/A	N/A
13.	Perform NRC notifications	STA	EP/Ops Training and EP Drill Program
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	N/A	N/A
15.	Personnel accountability	N/A	N/A

Notes: Alert EAL OA4/OA6
EP-PS-100 Emergency Director, Control Room
* At the time of the Phase II On-shift Staffing Analysis, ERDS activation would occur in the EOF. As of DEC 2012, ERDS can be started from any nuclear Susquehanna Computer (such as those in the OSC where the SM and STA could evacuate to) IAW EP-PS-135, NRC Communicator. ERDS activation time is ~1 minute

On-Shift Staffing Analysis

Event Timelines and Assumptions

Event #13 Station Blackout

Initial Conditions:

Time: Monday @ 0330

Unit 1 100% Power, NOP & NOT

Unit 2 100% Power, NOP & NOT

Emergency Diesel Generator E was declared inoperable at 0300 and isolated for maintenance due to failure of the Woodward governor.

Sequence of Events:

0330 Total LOOP

Startup Transformers T10 and T20 are unavailable

Emergency Diesel Generator A fails to start

Emergency Diesel Generator B fails to start

Emergency Diesel Generator C fails to start

Emergency Diesel Generator D fails to start

On-Shift Staffing Analysis

Appendix B

Analysis #8: DBA/ISG Event #13 - Station Blackout **ECL: Site Area Emergency**

TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	SSES E Plan Table 6.1	N/A	T2/L1 T5/L1 T5/L3 T5/L8	NO	NO
2.	Unit Supervisor (SRO #1) [1]	SSES E Plan Table 6.1	N/A	T2/L2	NO	NO
3.	Unit Supervisor (SRO #2) [1]	SSES E Plan Table 6.1	N/A	T2/L3	NO	NO
4.	Shift Technical Advisor (STA)	SSES E Plan Table 6.1	N/A	T2/L4 T5/L5 T5/L6 T5/L9 T5/L10 T5/L11 T5/L13	NO	YES
5.	Field Unit Supervisor (FBL) [2]	SSES E Plan Table 6.1	N/A	T2/L5	NO	NO
6.	Plant Control Operator (PCO #1)	SSES E Plan Table 6.1	N/A	T2/L6	NO	NO
7.	Plant Control Operator (PCO #2) [3]	SSES E Plan Table 6.1	N/A	T2/L7	NO	NO
8.	Plant Control Operator (PCO #3)	SSES E Plan Table 6.1	N/A	T2/L8	NO	NO
9.	Plant Control Operator (PCO #4) [3]	SSES E Plan Table 6.1	N/A	T2/L9	NO	NO
10.	Nuclear Plant Operator (NPO #1)	SSES E Plan Table 6.1	N/A	T2/L10	NO	NO
11.	Nuclear Plant Operator (NPO #2)	SSES E Plan Table 6.1	N/A	T2/L11	NO	NO

On-Shift Staffing Analysis

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
12.	Nuclear Plant Operator (NPO #3)	SSES E Plan Table 6.1	N/A	T2/L12	NO	NO
13.	Nuclear Plant Operator (NPO #4)	SSES E Plan Table 6.1	N/A	T2/L13	NO	NO
14.	Security Officer #1	SSES E Plan Table 6.1	N/A	T2/L14	NO	NO
15.	Security Officer #2	SSES E Plan Table 6.1	N/A	T5/L15	NO	NO

Notes: [1] Unaffected Unit Supervisor functions as the NRC Communicator
[2] Functions as Fire Brigade Leader during fire related response events
[3] Unaffected Unit Plant Control Operator functions as E Plan Communicator

On-Shift Staffing Analysis

TABLE 2 - Plant Operations & Safe Shutdown **Analysis # 8**

Two Units - One Control Room (Shared) **Applicable to unit 1 & 2**
Minimum Operations Crew Necessary to Implement ONs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Shift Supervisor	Unit Supervisor (SRO #1)	Operator Training
3.	Shift Supervisor	Unit Supervisor (SRO #2)	Operator Training
4.	Shift Technical Advisor	Shift Technical Advisor (STA)	Operator Training
5.	Shift Supervisor	Field Unit Supervisor (FBL)	Operator Training
6.	Reactor Operator #1	Plant Control Operator (PCO #1)	Operator Training
7.	Reactor Operator #2	Plant Control Operator (PCO #2)	Operator Training
8.	Reactor Operator #3	Plant Control Operator (PCO #3)	Operator Training
9.	Reactor Operator #4	Plant Control Operator (PCO #4)	Operator Training
10.	Auxiliary Operator #1	Nuclear Plant Operator (NPO #1)	Operator Training
11.	Auxiliary Operator #2	Nuclear Plant Operator (NPO #2)	Operator Training
12.	Auxiliary Operator #3	Nuclear Plant Operator (NPO #3)	Operator Training
13.	Auxiliary Operator #4	Nuclear Plant Operator (NPO #4)	Operator Training

Notes: See Table 2A for ON/EOP actions

Other (non-Operations) Personnel Necessary to Implement ONs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
14.	Security Officer	Security Officer #1	Security Training

Notes: Support 'Blue Max' connection activities – officer posted near location

On-Shift Staffing Analysis

Analysis #8, Table 2A – ON/EOP Actions

Station Blackout

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
EO-100-030	Attempts to start DG	NPO 4	X											
	Cycle ESW pump DC power knife switches	NPO 1 NPO 2	X											
	Press local emergency stop for each DG	NPO 4		X										
	Monitor plant parameters on available instrumentation	PCO 1 - 4							X					
	Establish ES priorities	SRO 1 SRO 2							X					
	Operate HPIC and RCIC IAW Attach A	PCO 1 PCO 3							X					
	Use SRVs to maintain pressure	PCO 1 PCO 3			X									
	Operate HPIC to maintain press	PCO 1 PCO 3									X			
	Contact TCC for system status	STA		X										
	Align busses to Attach I	PCO 2 PCO 4				X								
	Vent Hydrogen from main generator	NPO 1 NPO 2		X										
	Connecting Blue Max per ES-002-001	NPO 3							X					
	Secure non-class 250 volt DC loads	NPO 1 NPO 2							X					
	Bypass HPIC High Dry Well Press Initiation	NPO 4 FBL			X									
	Lineup fires system to RHR SW	NPO 2								X				
	Bypass RCIC Low Steam Supply Press Isolation	NPO 4 FBL						X						
	Bypass RCIC High Turbine Exhaust	NPO 4 FBL						X						

On-Shift Staffing Analysis

Station Blackout

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
	Press Trip													
	Bypass HPIC CST Low Water Level Swap	NPO 4 FBL										X		
	Bypass HPIC High Turbine Exhaust Pressure Trip	NPO 4 FBL												X
	Crosstie RWST with CSTs	NPO 1					X							

On-Shift Staffing Analysis

TABLE 3 – Firefighting **Analysis # 8**

Line	Performed By	Task Analysis Controlling Method
1.	N/A	N/A
2.	N/A	N/A
3.	N/A	N/A
4.	N/A	N/A
5.	N/A	N/A

Notes: No fire Brigade response required for this event.

On-Shift Staffing Analysis

TABLE 4 – Radiation Protection & Chemistry **Analysis # 8**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey On-Shift Position: RP																		
2.	Out of Plant Survey On-Shift Position: RP																		
3.	Personnel Monitoring On-Shift Position:																		
4.	Job Coverage On-Shift Position:																		
5.	Offsite Radiological Assessment On-Shift Position: RP #1																		
6.	Other Site-Specific RP – Describe: On-Shift Position:																		
7.	Chemistry function/task #1 – Describe: Support Field Monitoring Team On-Shift Position: Chem #1																		
8.	Chemistry function/task #2 – Describe: On-Shift Position: Chem #1																		

Notes: No RP or Chemistry response required prior to ERO augmentation.

On-Shift Staffing Analysis

TABLE 5 – Emergency Plan Implementation **Analysis # 8**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1.	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2.	Approve Offsite Protective Action Recommendations	N/A	N/A
3.	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4.	Approve extension to allowable dose limits	N/A	N/A
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	STA	EP/Ops Training and EP Drill Program
6.	ERO notification	STA	EP/Ops Training and EP Drill Program
7.	Abbreviated NRC notification for DBT event	N/A	N/A
8.	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9.	Perform State/local notifications	STA	EP Training and EP Drill Program
10.	Complete NRC event notification form	STA	EP/Ops Training and EP Drill Program
11.	Activate ERDS	STA	EP/Ops Training and EP Drill Program
12.	Offsite radiological assessment	N/A	N/A
13.	Perform NRC notifications	STA	EP/Ops Training and EP Drill Program
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	N/A	N/A
15.	Personnel accountability	Security Officer #2	EP/Security Training and EP Drill Program

Notes: Site Area Emergency EAL MS1.
EP-PS-100 Emergency Director, Control Room

On-Shift Staffing Analysis

Event Timelines and Assumptions

Event #15 SAMG Response

Initial Conditions:

Time: Tuesday @ 0500

Unit 2 in accident condition requiring entry into SAMG (refer to Event #7)

Sequence of Events:

0525 SAMG entry conditions met; SAMG entered

On-Shift Staffing Analysis

Appendix B

Analysis #9: DBA/ISG Event # 15 - SAMG **ECL: General Emergency Conditions Exist**

TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	SSES E Plan Table 6.1	N/A	T2/L1	NO	NO
2.	Unit Supervisor (SRO #2) [1]	SSES E Plan Table 6.1	N/A	T2/L2	NO	NO
3.	Shift Technical Advisor (STA)	SSES E Plan Table 6.1	N/A	T2/L3	NO	NO
4.	Field Unit Supervisor (FBL) [2]	SSES E Plan Table 6.1	N/A	T2/L4	NO	NO
5.	Plant Control Operator (PCO #4) [3]	SSES E Plan Table 6.1	N/A	T2/L5	NO	NO
6.	Nuclear Plant Operator (NPO #2)	SSES E Plan Table 6.1	N/A	T2/L6	NO	NO
7.	Nuclear Plant Operator (NPO #3)	SSES E Plan Table 6.1	N/A	T2/L7	NO	NO
8.	RP Technician (RP #1)	SSES E Plan Table 6.1	60	T4/L3	NO	NO
9.	RP Technician (RP #2)	SSES E Plan Table 6.1	60	T4/L6	NO	NO
10.	Maintenance Site Support Services Handyman #1 (FBM #1)	SSES E Plan Table 6.1	N/A	T2/L8	NO	NO
11.	Maintenance Site Support Services Handyman #2 (FBM #2)	SSES E Plan Table 6.1	N/A	T2/L9	NO	NO
12.	Maintenance Site Support Services Handyman #3 (FBM #3)	SSES E Plan Table 6.1	N/A	T2/L10	NO	NO
13.	Maintenance Site Support Services Handyman #4 (FBM #4)	SSES E Plan Table 6.1	N/A	T2/L11	NO	NO

Notes: [1] Unaffected Unit Supervisor functions as the NRC Communicator
[2] Functions as Fire Brigade Leader during fire related response events
[3] Unaffected Unit Plant Control Operator functions as E Plan Communicator

On-Shift Staffing Analysis

TABLE 2 - Plant Operations & Safe Shutdown **Analysis # 9**

Two Units - One Control Room (Shared) **Applicable to unit 2**
Minimum Operations Crew Necessary to Implement SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Shift Supervisor	Unit Supervisor (SRO #2)	Operator Training
3.	Shift Technical Advisor	Shift Technical Advisor (STA)	Operator Training
4.	Shift Supervisor	Field Unit Supervisor (FBL)	Operator Training
5.	Reactor Operator #4	Plant Control Operator (PCO #4)	Operator Training
6.	Auxiliary Operator #2	Nuclear Plant Operator (NPO #2)	Operator Training
7.	Auxiliary Operator #3	Nuclear Plant Operator (NPO #3)	Operator Training

Notes: See Table 2A for SAMG actions

Other (non-Operations) Personnel Necessary to Implement SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
8.	Maintenance Site Support Services Handyman #1	Fire Brigade Member #1	Fire Brigade Training
9.	Maintenance Site Support Services Handyman #2	Fire Brigade Member #2	Fire Brigade Training
10.	Maintenance Site Support Services Handyman #3	Fire Brigade Member #3	Fire Brigade Training
11.	Maintenance Site Support Services Handyman #4	Fire Brigade Member #4	Fire Brigade Training

Notes: See Table 2A for SAMG actions

On-Shift Staffing Analysis

Analysis #9, Table 2A – ON/EOP Actions

SAMG (Unit #2)

Procedure Step/Actions			Performance Time (mins) After Procedure Implementation											
Proc/Step	Task	Assigned Resource	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
EP-DS-003	Using low pressure ECCS to control injections to maintain steam lines flooded	PCO4											X	
EP-DS-002 Steps: RC/F-11 RC/F-23 RC/F-31 RC/F-40 RC/F-47 RC/F-48 RC/F-55 RC/F-56	Maintenance Site Support Services provide portable pump truck	Maintenance Site Support Services Handyman 1, 2, 3, 4											X	

On-Shift Staffing Analysis

TABLE 3 – Firefighting **Analysis # 9**

Line	Performed By	Task Analysis Controlling Method
1.	N/A	N/A
2.	N/A	N/A
3.	N/A	N/A
4.	N/A	N/A
5.	N/A	N/A

Notes: No Fire Brigade response required for this event.

On-Shift Staffing Analysis

TABLE 4 – Radiation Protection & Chemistry **Analysis # 9**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
	In-Plant Survey On-Shift Position: RP																		
	Out of Plant Survey On-Shift Position: RP																		
	Out of Plant Survey Perform surveys (Near Site) On-Shift Position: RP											X	X						
	Personnel Monitoring On-Shift Position:																		
	Job Coverage On-Shift Position:																		
	Offsite Radiological Assessment On-Shift Position: RP #1											X	X						
	Other Site-Specific RP – Describe: On-Shift Position:																		
	Chemistry function/task #1 – Describe: Support Field Monitoring Team On-Shift Position: Chem #1																		
	Chemistry function/task #2 – Describe: On-Shift Position: Chem #1																		

Notes: RP continue performing actions from Event #7
EP-PS-108, RP Tech 1 (OSCAR)
EP-PS-130, RP II Dose Calculator
Note that RP#2 may be asked to provide radiological monitoring /survey by Shift Manager depending upon actual emergency conditions. This is acceptable since On-site (out-of-plant) RP Tech is not required until 60 minutes IAW Emergency Plan Table 6.1.

On-Shift Staffing Analysis

TABLE 5 – Emergency Plan Implementation **Analysis # 9**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1.	Declare the Emergency Classification Level (ECL)	N/A	N/A
2.	Approve Offsite Protective Action Recommendations	N/A	N/A
3.	Approve content of State/local notifications	N/A	N/A
4.	Approve extension to allowable dose limits	N/A	N/A
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	N/A	N/A
6.	ERO notification	N/A	N/A
7.	Abbreviated NRC notification for DBT event	N/A	N/A
8.	Complete State/local notification form	N/A	N/A
9.	Perform State/local notifications	N/A	N/A
10.	Complete NRC event notification form	N/A	N/A
11.	Activate ERDS	N/A	N/A
12.	Offsite radiological assessment	N/A	N/A
13.	Perform NRC notifications	N/A	N/A
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	N/A	N/A
15.	Personnel accountability	N/A	N/A

Notes: Emergency Plan Actions taken during Event #7
EP-PS-100 Emergency Director, Control Room

Appendix C
Phase III Time Motion Study Analysis Results

On-Shift Staffing Analysis

The results of the Phase II On-Shift Staffing Analysis conducted September 10-12, 2012 identified three (3) events with potential conflicts requiring further Phase III Time Motion Study analysis. These events are listed in Table 1 below.

Table 1
Susquehanna – Phase III Time Motion Study Events

Event/Scenario	Functions to be Evaluated	Affected Position	TMS Method
Design Basis Threat	NRC Abbreviated Call	Shift Technical Advisor	Simulator Run
	Evaluate E Plan entry with SM		
	ERO Notification		
	Complete NRC Form		
	NRC Notification		
Control Room Fire with Evacuation and Remote Shutdown	Report to OSC/OCC for E Plan Implementation	Shift Technical Advisor	Simulator Run/ Walkthrough
	ERO Notification		
	Perform State/Local Notifications		
	Completed NRC Form		
	NRC Notification		
Station Blackout	Contact TCC	Shift Technical Advisor	Simulator Run
	ERO Notification		
	Perform State/Local Notifications		
	Complete NRC Form		
	NRC Notifications		

On November 12, 2012, the selected scenarios for Time Motion Study (TMS) were conducted in the Susquehanna Station Operations Training Center on the simulator and using walkthroughs as appropriate. In attendance to conduct the TMS Scenarios were:

Dave Walsh	Operations – Shift Manager
Doug LaMarca	Operations – Unit Supervisor – U1 (SRO #1)
Robert Bingman	Operations – Unit Supervisor – U2 (SRO #2)
David Borger	Operations – Unit Supervisor (STA)
Arnold Avery	Operations – Plant Control Operator – OATC U1 (RO #1)
Gordon Shellenberger	Operations – Plant Control Operator – BOP U1 (RO #2)
Patrick Bone	Operations – Plant Control Operator – BOP U2 (RO #4)
Ian Missien	EP
Rodney Brown	EP Consulting, LLC
Rex Krohn	EP Consulting, LLC
Judi Sanquist	EP Consulting, LLC

The following tables document the results of the TMS for the identified events.

On-Shift Staffing Analysis

APPENDIX D
Function / Responsibility (Task) Analysis Template

Event: Design Bases Threat (Event #1) Position: Shift Technical Advisor Line #: T2/L4, T5/L6, T5/L10, T5/L13

Function	Responsibility (Task)	Action Step		Duration
1. Notifications	1.1 ERO Notifications	1.1.1	STA activates Alt ERO @0948 IAW EP-PS-135	< 1 minute
	1.2. Complete NRC form	1.2.1	STA uses EP-PS-135, Tab 10 for initial NRC notification as a guide to answer questions	N/A
	1.3. Perform NRC Notifications	1.3.1	STA initiates NRC 50.72 Notification [1] @1001	7 minutes
		1.3.2	NRC notification completed - NRC open line maintained @1007	
2. ON/EOP Function [1]	2.1. NRC Abbreviated Call	2.1.1	STA perform immediate notification to NRC - OS2 - Rapid Notification @0943	1 minute
	2.2. Evaluate E Plan entry with Shift Manager	2.2.1	Shift Manager entering E Plan - Directs STA to look at Attachment G and EP-TP-001@0941	4 minutes
		2.2.2	EAL - OS2 SAE declared @0945	

Conflicts for the STA were adequately demonstrated during the Time Motion Study (TMS). The location of the Emergency Notification System (ENS) phone allows the STA to monitor plant data on the Plant Process Computer. This enables the STA to maintain continuous communication while continuing to monitor plant conditions/status (STA function). Note that cordless SpectraLink phones are available to on-shift personnel, if desired.

[1] NRC Form 361 completed and provided to NRC HOO IAW EP-PS-135 and NDAP-QA-0720 within 1 hour of event classification.
[2] ON/EOP Functions are related to Emergency Plan Implementation – not a conflict.

On-Shift Staffing Analysis

Design Basis Threat (Event #1) - Timeline

Time	Task
0938	Crew has "shift"/Unit
0940	Control Room Shift Manager receives phone call from security
	Adversaries attempting to breach PA fence
	Update provided to Control Room Personnel
	Unit 1 Control Room Supervisor and Unit 2 Control Room Supervisor entering ON-000-010
0941	Shift Manager entering E Plan - Directs STA to look at Attachment G
	Inside/Outside isolation zone - attempting to breach inner fence
	SM and STA review EALs
0942	Control Room crew start Plant Shut Down
	Unit 1 & 2 performing SCRAM actions - imminent scram
	RO notifies Generation - units going offline
	OATC calls TCC to report trip
0943	Reactor Trip
	STA perform immediate notification to NRC
	Shift Manager begins to complete State/Local Notification Form
0945	PCOs dispatched to RSDP - Unit 1 and Unit 2
	Site Area Emergency (SAE) declared (EAL OS2)
	Adversaries have breached PA fence - in PA
	STA will have to perform communications - State/NRC
0946	Unit 2 CRS notified Security that 2 PCOs going to Remote Shutdown Panel (RSDP)
0947	Shift Manager provides completed State/Local form (ENR) to STA for peer check
0948	Peer check completed
	STA activates Alt ERO (Alternate ERO activation process) IAW EP-PS-135, NRC Communicator
	Shift Manager reviewing Plant conditions - oversight
0949	Unit 1 using DIV2 for SD cooling - Unit 2 DIV2 - Unit 2 PCO monitoring EDG Start-up
	Shift Manager working thru EOP
0951	STA begins review of ENR form with State/Locals
0953	ENR notification completed w/State/Locals
	Shift Manager updates crew – E-Plan entry - Now Site Emergency Director (SED)
0955	Completes State/Local Notifications
	Security informs Shift Manager that adversaries have been neutralized - immediate threat is clear
	STA validating ERO activation
	Duck and cover still in effect
0956	Unit 2 CRS makes PA announcement - SAE
	STA notifying Generation Plant Dispatch of plant condition status (security event)
	Both units offline
0957	Shift Manager getting update on plant status from Control Room Supervisor
0958	Unit 1 Control Room Supervisor and Shift Manager discussing plant condition

On-Shift Staffing Analysis

Time	Task
0959	Discussion ends
1000	Control Room Supervisor and Shift Technical Advisor discussing prognosis
	STA and SM reviewing current conditions prior to contacting NRC
1001	STA initiates NRC 50.72 Notification - follow up information
	CRS updating SM - no more mitigating actions are being taken at this time
1002	CRS and SM reviewing on-going actions. SM reviewing SPDS/Plant Status Computer
1003	Review completed
1005	SM and CRS reviewing current status on unit
1006	Review completed
1007	NRC notification completed - NRC open line maintained
1009	TMS Terminated

On-Shift Staffing Analysis

APPENDIX D
Function / Responsibility (Task) Analysis Template

Event: Control Room Fire w/evacuation (Event #12) Position: Shift Technical Advisor Line #: T2/L4, T5/L6, T5/L9, T5/L10, T5/L13

Function	Responsibility (Task)	Action Step	Duration
1. Notifications	1.1 ERO Notification	1.1.1 STA activities alternate ERO notification @1051 IAW EP-PS-135	1 minute
		1.1.2 STA calls Security to verify ERO activation @1052	
	1.2 Perform State/Local Notification	1.2.1 STA starts ENR notification to PEMA @1104	3 minutes
		1.2.2 Complete PEMA notification @1107	
		1.2.3 STA starts ENR notification to CCEMA @1107	3 minutes
		1.2.4 Completes CCEMA notification @1110	
		1.2.5 STA starts ENR notification to LCEMA @1110	3 minutes
		1.2.6 Completes LCEMA notification @1113	
		Total time for State/Local notifications	**9 minutes**
		1.2.7 STA starts ENR notification to PIM @1113	4 minutes
		1.2.8 Completes PIM notification @1117	
	1.3 Complete NRC Form	1.3.1 STA uses EP-PS-135, Tab 10 as guide	N/A
	1.4 Perform NRC Notification	1.4.1 STA calls NRC about the Alert classification @1123	<1 minute
		1.4.2 NRC requests an open line for communications	N/A
2. ON/EOP Implementation	2.1 Report to OCC/OSC for E-Plan Implementation	2.1.1 Shift Manager (SM) and STA travel to OCC/OSC @1052	5 minutes
		2.1.2 SM and STA arrive at OCC/OSC @1057	

TMS analysis started in the Simulator Control Room until evacuation by Control Room personnel. Upon evacuation, the Control Room Supervisors and Reactor Operators report to the Remote Shutdown Panels to complete assigned actions. During the TMS these individuals reported to the Remote Shutdown Panels located in the simulator. Upon evacuation, the Shift Manager and STA report to the OCC/OSC to complete assigned actions. A transit time of 5 minutes from the Control Room to the OCC/OSC has been determined by Susquehanna personnel. This time was used during this TMS analysis. To complete the walkthrough activities, the Shift Manager and STA remained in the Simulator Control Room and used only the equipment available in the OCC/OSC to complete notifications (the OCC/OSC has regular phones (i.e., no ringdown phone) and EPIPs available for use as well as computers with access to the plant data system). During this event, the STA primary function is notifications with the Shift Manager maintaining oversight and monitoring plant conditions/status. ERO notification was initiated prior to Control Room evacuation. State/Local Notifications were completed within 9 minutes with the NRC notification being initiated 10 minutes afterwards. Use of the 'Spectra Link' phones in the OCC/OSC enables the STA to maintain continuous communication with the NRC while still monitoring plant conditions/status. All conflicts were resolved during the TMS.

On-Shift Staffing Analysis

Control Room Fire with Evacuation and Remote Shutdown (Event #12) – Timeline

Time	Task
1048	Control Room (CR) crew has the shift
1050	Simplex Fire alarm in CR on control board 1C601 – flames & smoke observed
	CR crew attempts to extinguish fire
1051	PA announcement for CR evacuation, by Unit 1 Control Room Supervisor (CRS)
	STA calls Security to inform that the CR is evacuating the CR and moving to the remote Shutdown Panels – CR crew scrams both units
1051	STA activates alternate ERO IAW EP-PS-135
1052	PA announcement for Unit 1 & Unit 2 Rx scrams
	STA calls Security to verify ERO activation
1052	Shift Manager (SM) and STA travel to OCC/OSC to perform their duties
1057	SM and STA arrive at OCC/OSC, discuss E-Plan classification, and start working through their procedures (SAE if fire control not establish in 15 minutes)
1059	Both Unit 1 & Unit 2 CR crews arrive at remote Shutdown panels
1101	SM declares an Alert (EAL OA4)
1102	SM receives call from remote Shutdown panels that they have control of the plant as of 1100
1102	SM hands STA Emergency Notification Report (ENR) for State/Local notifications
1104	STA starts ENR notification to PEMA
1107	Complete PEMA notification
1107	STA starts ENR notification to CCEMA
1107	SM receives update from both remote Shutdown panels on plant conditions
1108	Both CRS announce to crews about Alert classification
1110	Completes CCEMA notification
1110	STA starts ENR notification to LCEMA
1113	Completes LCEMA notification
1113	STA starts ENR notification to Public Information Manager (PIM)
1117	Completes PIM notification
1117	STA calls TCC about Rx trips and CR Fire
1117	STA calls Generation Power Dispatch about Rx trips and CR Fire
1117	CRS update SM on plant conditions from Shutdown panels
1118	STA progressing through his procedure
1119	STA performs PA announcement for Alert classification
1120	STA reviews SPDS before NRC notification
1121	SM and STA discuss plant conditions
1123	STA calls NRC about the Alert classification and plant conditions
	NRC request that STA maintain an open line of communications – with headset, speaker on mute
1129	SM receives update from both Shutdown panels
1133	TMS terminated

On-Shift Staffing Analysis

APPENDIX D
Function / Responsibility (Task) Analysis Template

Event: Station Blackout (Event #13) Position: Shift Technical Advisor Line #: T2/L4, T5/L6, T5/L9, T5/L10, T5/L13

Function	Responsibility (Task)	Action Step	Duration
1. Notifications	1.1 ERO Notification	1.1.1 SRO #2 activates ERO (Emergency Response Organization) @ 0825 IAW EP-PS-135	1 minute
		1.1.2 ERO Pager activation verified by SRO #2 @ 0826	
	1.2. Perform State/Local Notification	1.2.1 STA initiates State/local Notifications @0823	4 minutes
		1.2.2 STA completes State/Local Notifications @ 0827	
	1.3. Complete NRC Form	1.3.1 No NRC Form completed based on Shift Manager decision to notify NRC and follow-up later with completed ENS form (using EP-PS-135, Tab 10)	N/A
	1.4. Perform NRC Notification	1.4.1 SRO #2 notifies NRC – reviews information contained in EP-PS-135 @ 0840	11 minutes
		1.4.2 SRO #2 directed by NRC to maintain continuous communication @ 0851	
2. ON/EOP Implementation	2.1. Contact TTC	2.1.1 U2 Control Room Supervisor (SRO #2) contacts TCC (Transmission Control Center) @0814	1 minute
Conflicts for the Shift Technical Advisor were resolved by the Shift Manager assigning ERO and NRC notifications to the U2 Control Room Supervisor (SRO #2) once unit was stabilized. STA performed State/Local Notifications within 4 minutes and was available to provide support as directed by the Shift Manager as well as monitoring plant status/conditions.			

On-Shift Staffing Analysis

Station Blackout (Event #13) – Timeline

Time	Task
0809	Control Room Crew has shift
0811	Station Blackout/Rx Trip (both units)
	Rx Trip PA Announcement (RO #2)
	Entering ON/EOP based on low reactor water level and Station Blackout
0812	Shift Manager (SM) directs Shift Technical Advisor (STA) to review E Plan (enter EP-TP-001, ERO Independent Verification Procedure)
0812	U1 Control Room Supervisor (SRO #1) implementing actions from Reactor Water Low flowchart – providing direction to Plant Control Operators (PCO) as needed
0813	Unit 1 PCO (OATC - RO #1) directed to start Emergency Diesel Generators (EDGs)
	RO #1 directs Nuclear Plant Operator (NPO) to manually start all EDGs
	SRO #1 updates SM on ES Flowchart status
0814	U2 Control Room Supervisor (SRO #2) contacts TCC (Transmission Control Center) concerning loss of offsite power and anticipated return to service – call completed in less than 1 minute
0815	STA reviewing plant conditions
	SRO #2 updates SRO #1 on securing EDG emergency start logic – conserve battery
0816	SM determines Emergency Classification, receives concurrence from STA
	SM starts to complete State/Local Notification Form
0819	Site Area Emergency declared (EAL MS1)
0820	SM completes and approves State/Local Notification Form
0821	STA directed to complete Offsite Agency notifications (State/Local/NRC)
0823	STA initiates State/local Notifications
0825	SRO #2 activates ERO (Emergency Response Organization) by pressing applicable button on phone IAW EP-PS-135, NRC Communicator (<1 minute to complete)
0826	ERO Pager activation verified by SRO #2
0827	STA completes State/Local Notifications
0830	SM and STA reviewing current plant status and conditions (oversight)
0833	SM, STA, SRO #2 discuss ERDS capability/activation (in this scenario ERDS would not be available to transmit data due to loss of Process Computer – discussed with crew during debrief)
0836	SM determines need to conduct Site Accountability – directs STA to initiate
0837	SRO #2 announces event classification (PA Announcement)
0838	Site Accountability initiated by STA (alarm) and SRO #2 (PA Announcement)
0840	SRO #1 provides crew update – exiting EOP within ½ minute
0840	SRO #2 notifies NRC – reviews information contained in EP-PS-135, NRC Communicator (no NRC Form completed based on Shift Manager decision to notify NRC and follow-up later with completed form)
0842	Crew Brief initiated
0844	Crew Brief completed
0848	SM and STA review current plant status/conditions
0850	SM updates SRO #2 on current priorities based on NRC request
0851	SRO #2 directed by NRC to maintain continuous communication
0854	TMS Terminated

On-Shift Staffing Analysis

Phase III Time Motion Study Results

1. Design Basis Threat – The identified conflicts for the Shift Technical Advisor were adequately demonstrated during the TMS.

2. Control Room Fire with Evacuation and Remote Shutdown – The identified conflicts for the Shift Technical Advisor were adequately demonstrated during the TMS.

3. Station Blackout – The identified conflicts for the Shift Technical Advisor were adequately demonstrated during the TMS

Enclosure 4 to PLA- 7758

Associated 10 CFR 50.54(q) Screens and Evaluations

SUSQUEHANNA NUCLEAR, LLC

SUSQUEHANNA STEAM ELECTRIC STATION

EMERGENCY PLAN

REVISION ~~61~~62
DATE: ~~September 29, 2017~~TBD

PORC MEETING: ~~17-09-26~~TBD

SUSQUEHANNA NUCLEAR, LLC

SUSQUEHANNA STEAM ELECTRIC STATION

TEAM SUSQUEHANNA™
Generating Excellence

EMERGENCY PLAN

THIS DOCUMENT HAS BEEN UPDATED TO INCLUDE REVISIONS THROUGH 61

DATED: ~~September 29, 2017~~TBD

AFFECTED PAGES

NOTE:	PPL Susquehanna, LLC was reorganized to Susquehanna Nuclear, LLC. Susquehanna is now a part of parent company Talen instead of PPL. Agreements signed in the past as PPL Susquehanna, LLC will be honored and carried forward by Susquehanna Nuclear, LLC.

1. Revision ~~61~~ 62 of the Emergency Plan takes credit for the ~~2017~~ 2018 annual review. ~~Reference the focused self-assessment in DI-2016-00962 for planning standards 1 through 5 and the numerous other actions listed below. Reference AR-2017-00086 and S2017-07-03-01.~~
2. Updated "Manager-Emergency Preparedness" with "Manager-Security/Emeregency Preparedness" throughout the document per AR-2018-04646 (S2018-03-28-01)
3. Replaced Figures 4.1 and 4.2 per AR-2018-13801. (S2018-10-25-01)
4. Replaced "outlines" with "outlined" in second paragraph of section 5.1.4. (S2018-10-25-01)
5. Added "(Alert or higher emergency declaration)" after "classification" in Section 6.0, phase II section. (S2018-10-25-01)
6. Removed section 6.2.7e from the Security Coordinator responsibility to section 6.2.1.p per AR-2017-09053 and AR-2017-20479. (S2018-10-25-01)
7. Combined sections 6.2.5.a with 6.2.5.i in current step 6.2.5.a and renumbered the remaining steps. (S2018-10-25-01)
8. Added steps 6.3.1.1.m and 6.3.1.4.h per AR-2018-13835 (S2018-10-02-01, changes 1.a, 7c and 7.e).
9. Added EOF Techncal Advisor position to Figure 6.4 per AR-2018-13095. (S2018-10-25-01)
10. Corrected typo in section 6.3.1.5 (S2018-10-25-01)
11. Reordered bullets in bulleted list in section 7.1. (S2018-10-25-01)
12. Deleted reference to supplemental meteorological tower from section 7.1.1.1 per AR-2017-17969 (S2018-10-29-01/E2018-10-29-03)
13. Replaced "wind variability" with "wind direction variability" in the first paragraph of section 7.1.1.1. (S2018-10-25-01)
14. Replaced and with when in the seventh paragraph in Section 7.1.1.3. (S2018-10-25-01)
15. Deleted "To the extent reasonable, persons with high lifetime cumulative radiation exposure should not take part in these actions." from Table 7.2 per AR-2018-13465. (S2018-10-24-01/E2018-10-24-01)
16. Replaced "—" with empty spaces in Health Effects Associated with Whole Body Absorbed Doses Received Within a Few Hours Table in Table 7.2. (S2018-10-25-01)
17. Replaced TSC with CR in the second paragraph of section 8.1.2. (S2018-10-25-01)
18. Updated name and sddress for PEMA Headquarters in section 8.3.2 per AR-2018-06092. (S2018-10-25-01)
19. Updated location of the redundant control ANS station in section 8.5.4 per AR-2018-06919. (E2018-04-26-01)
20. Refined description of the plant computer capabilities in the 5th bullet in Section 8.9.1. (S2018-10-25-01)
21. Removed the phrase "For Example: Offsite Emergency Calendars)" from section 9.4.4 per DPA-10-DI-2018-06672. (S2018-10-25-01)
22. Updated MOA for heavy equipment in Appendix A per ACT-02-CR-2018-03742 (E2018-10-29-01)

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23. Updated Fire Department MOA in Appendix A per ACT-02-CR-2018-12173. (E2017-08-25-01)

24. Deleted "EOF Information Coordinator" from Appendix Cper DPA-06-DI-2018-06672 (S2017-10-25-01).

25. Deleted "OSC Clerk" from Appendix C per AR-2017-20382 (S2017-11-21-01)

26. Changed Appendix D Enclosures per AR-2018-04987 (E2018-04-13-01)

27. Updated Corporate Policy letter in Appendix E with current CNO signature. (S2018-10-25-01)

~~1.~~

~~2. Table of Contents updates. Appendix F should be NEI 99-01 Rev 6 not Rev 4. An omission that was not made for Revision 60. Appendix C was shown as starting on the incorrect page. Reference AR-2017-06225, AR-2017-01911 and S2017-07-03-01.~~

~~3. Definition 82, Section 6.1, Section 6.2, Section 6.5, Table 6.1, 7.1.1, 7.1.1.2, 7.3.1, 7.4.2, 8.1.2, 9.1.1.g, Table 9.1 , Appendix C, Appendix D page 2 of 16, Enclosure 6 to Appendix D, Enclosure 8 to Appendix D, Appendix J, and Appendix K. Changed the term "Health Physics" to "Radiation Protection" and "HP" to "RP" to reflect the current name of that work group at SSES. The function and duties of the work group remain the same. Reference S2017-07-03-01.~~

~~4. Definition 90, Acronym 2.71, 7.1.1, Figure 8.2, Enclosure 5 to Appendix D. Removed reference to the Remote Monitoring System / Radiological Environmental Monitoring System since the system will no longer be used at SSES. Enclosure 5 to Appendix D was further modified to designate that the off-site fixed air sampling stations and direct radiation monitor stations (Dosimeters) are associated with REMP. Reference DPA-03-DI-2017-03734, S2017-07-03-01, E2017-07-03-01.~~

~~5. New Acronym added after 2.57 for ORO – Offsite Response Organization since that term is stated on EAL charts S and C. Reference S2017-07-03-01.~~

~~6. Acronym 2.81, page 36 Table R-1 monitor 0C630 and 0C677 removed, 8.1.3.1, Figure 8.2 and Enclosure 4 to Appendix D. Removed reference to System Particulate, Iodine, and Noble Gas Monitor (SPING) since SPINGs are replaced by Vent Effluent Radiation Monitoring System (VERMS). Reference AR-1748182, DPA-01-DI-2016-23363, S2017-07-03-01 and E2013-09-03-01 Rev. 1.~~

~~7. Added a Note after step 5.2.11 and prior to the EAL tables that states "The following Emergency Action Level (EAL) Tables are excerpts from the EAL Basis controlling procedure and contain page number references after each EAL for the corresponding basis section. Those page number references are not applicable within the Emergency Plan". Reference S2017-07-03-01.~~

~~8. EAL Tables. Added Note 6 to Table R and basis to clarify that RA3.2 is applicable if the event that is causing elevated radiation levels occurred in Modes 1 or 2 on page 36. Reference DI-2017-03038. Corrected a typographical error on Primary Containment Barrier Loss column subcategory B. Changed "EO-000-104 Table F-9" to EO-000-104 Table 9" on page 37. Reference AR-2017-11093. Removed "(RCS > 200 °F) from the lower right hand corner of Table F under Hot Conditions. Reference DPA-14-DI-2016-23363. Removed "(RCS > 200 °F) from the lower right hand corner of Table H under Hot Conditions on page 38. Reference DPA-14-DI-2016-23363. Removed "(RCS < 200 °F) from the lower right hand corner of Table C under Cold Conditions on page 41. Reference DPA-14-DI-2016-23363. Reference S2017-07-12-01 for all the EAL table changes.~~

~~9. Section 6.1 and Table 6.1. Revised to provide clarity and alignment of the On-Shift staffing descriptions contained in those places and the staffing study in Appendix K. Although technically correct, the existing information was not easily interpreted. Reference AR-2017-09561, ACT-01-CR-2017-11188 and S2017-07-03-01.~~

~~10. Section 6.2.2, 6.2.11, Table 6.1, Figure 6.2 and Figure 8.2. Removed the position of SAM Coordinator. Added step 6.2.1.f to the Operations Coordinator position to make recommendations to the Shift Manager when SAM procedures are entered. Reference DI-2017-12955, S2017-07-03-01 and E2017-07-27-01.~~

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~~11. Sections 6.2, 6.3, Table 6.1, and Figures 6.2, 6.3 and 6.4 and Section 7.1.1. Revised to provide clarity and alignment of the ERO staffing descriptions contained in those places. References to the applicable Table 6.1 (60 and 90 minute columns) along with the applicable figure(s) and position titles were added to the text descriptions of each position. The descriptions of the Non-Operations Support Personnel shown on Figure 6.3 were expanded and added in the text descriptions to clearly delineate the positions listed in Table 6.1. Although technically correct, the existing information was not easily interpreted. Reference AR-2017-09028 and S2017-07-03-01.~~

~~12. Figures 6.3. Removed the block "Engineering Support" block since the OSC Engineer position was deleted as part of the ERO streamlining project. Reference DPA-01-DI-2016-12918 and S2017-01-24-01.~~

~~13. Section 6.2.3. Revised to remove the responsibility for the TSC NRC Communicator to initiate call in procedures as requested by the ED. Call-in's are performed by the Control Room NRC Communicator and the TSC Administrative Coordinator. Reference AR-2017-09044 and S2017-07-03-01. See NRC Communicator EP-PS-135 section 5.2 and TSC Administrative Coordinator EP-PS-116 section 5.1.9.~~

~~14. Section 6.2.10, Table 6.1, Figure 6.3 and Appendix C. Removed the position of Radio Communicator. Added step 6.2.8.e to the OSC Coordinator position to ensure communications with all in-plant teams is maintained. Changed step a. under the RP Specialist responsibilities to state determine and maintain up-to-date status for radiological conditions in the plant. Added to 6.2.13 – As designated, maintain radio communications with in-plant teams. Revised step 8.1.2 to state that control and dispatch of these teams is the responsibility of the OSC Coordinator. Reference E2017-08-11-01.~~

~~15. Table 6.2. Revised the note that states the Administrative Coordinator maintains the information to contact appropriate vendors in case of an emergency to now state that the information is maintained in the Emergency Telephone Instructions and Directory. Reference AR-2017-09054 and S2017-07-03-01.~~

~~16. Section 8.3.2. Added that the State Emergency Center has 24-hour per day coverage per NUREG-0654 Rev. 1 Section II.A.1.e. Reference AR-2017-09032 and S2017-07-03-01.~~

~~17. Section 8.5.4. Add "(see Figure 8.4)" since that siren location figure is not referenced anywhere in the text of the emergency plan. Reference AR-2017-09057 and S2017-07-03-01.~~

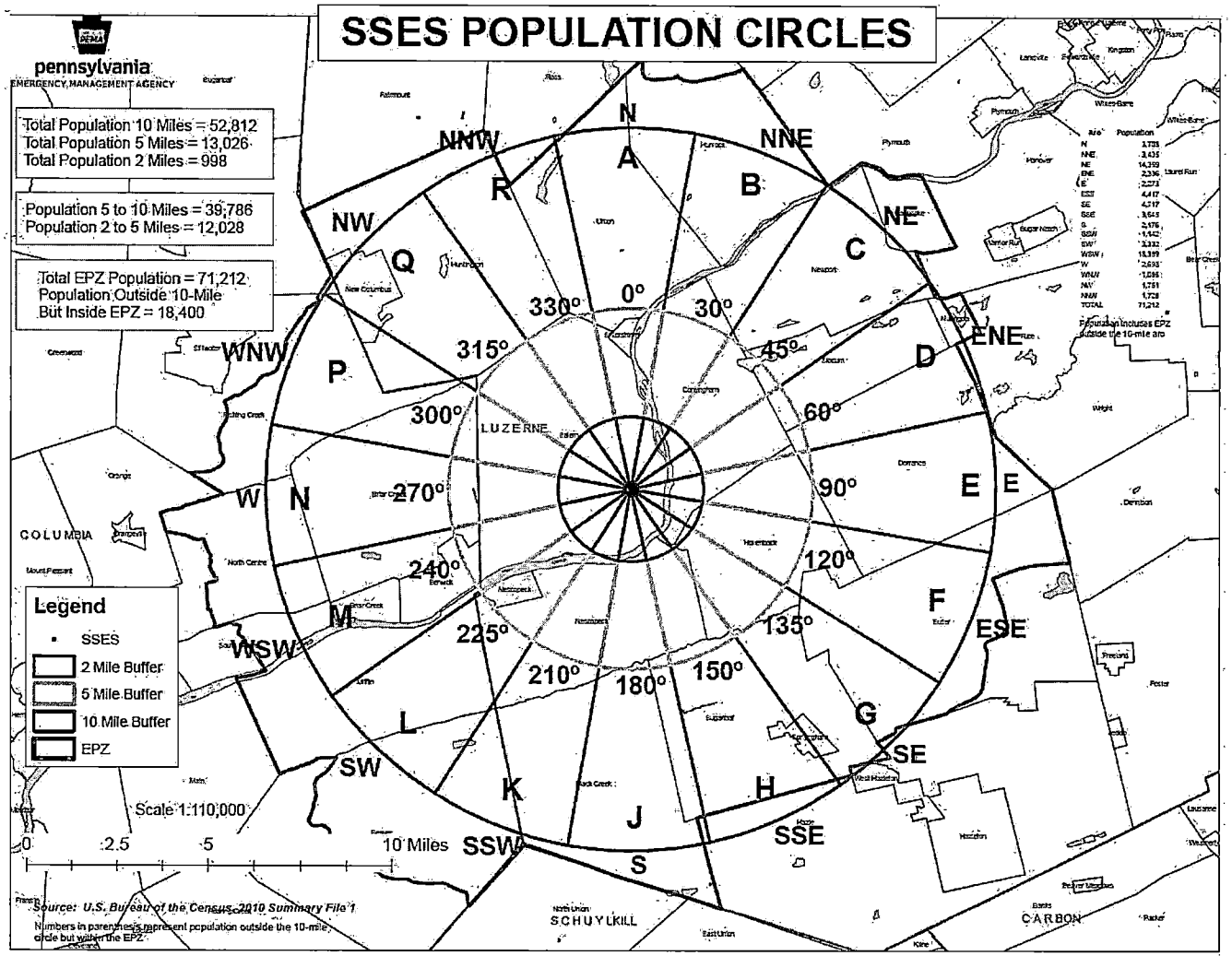
~~18. Table 9.1. Changed Special Office of the President: Information Services Personnel to Joint Information Center Personnel. Revised the note for the table to clarify the type of training and retraining frequencies for the applicable work groups. Reference AR-2016-21848 and S2017-07-03-01.~~

~~19. Appendix A. Added a note to reference a historical basis as to why the Pennsylvania State Police do not need a separate letter of agreement. Reference AR-2017-09031 and S2017-07-03-01. Removed Nescopeck Ambulance and added Nanticoke EMS. Reference CR-2017-14810 and E2017-08-25-01.~~

~~20. Appendix C. Removed reference to the TSC Lead Engineer and the GO Support Engineer. Reference DPA-01-DI-2016-12918 and S2017-02-16-01 and S2016-06-06-01 respectively.~~

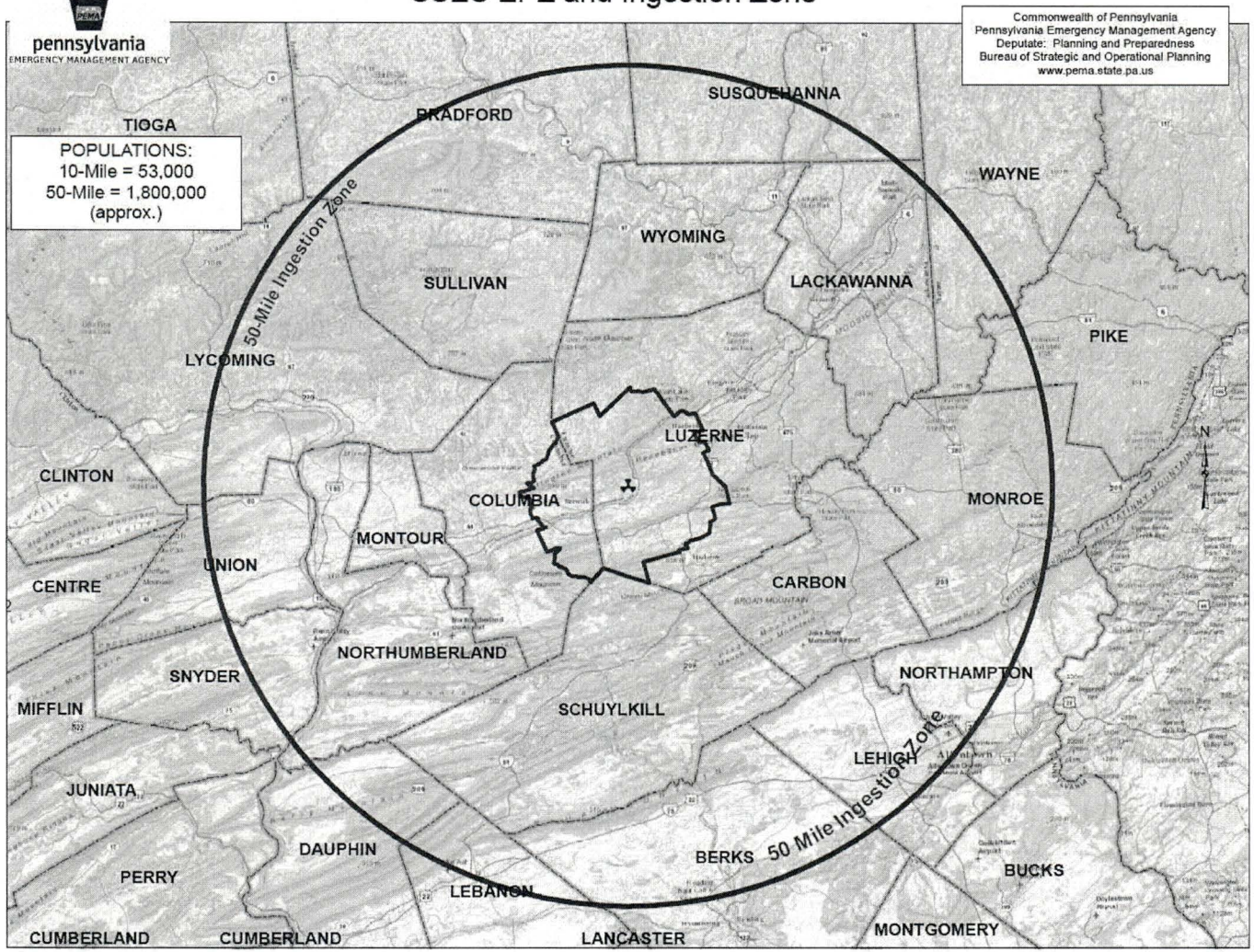
~~21. E-Plan Appendix J page 2 of 10. Revised line item A.1.a to include Appendix A and Table 6.2 which are associated with private sector organizations that are part of the overall response organization. Revised line item A.1.b to include Table 5.2 which is associated with concept of operations for emergency response. Revised line item 1.d to remove 6.2, 6.3 and 6.3.1 since they do not overtly state who is in charge. Revised line item 1.e to add 8.3.1 and 8.3.2 since they describe the 24-hour per day emergency response by the Counties and the State. Revised line item 4 from 6.2.6 to 6.2.7 since the TSC Security Coordinator is the position responsible for assuring continuity of resources. Reference AR-2017-09032 and S2017-07-03-01.~~

~~22. Appendix J line item D.2 changed Tables M and O to S and H respectively. An omission that was not made for Revision 60 is now corrected. Reference AR-2017-04067 and S2017-07-03-01.~~

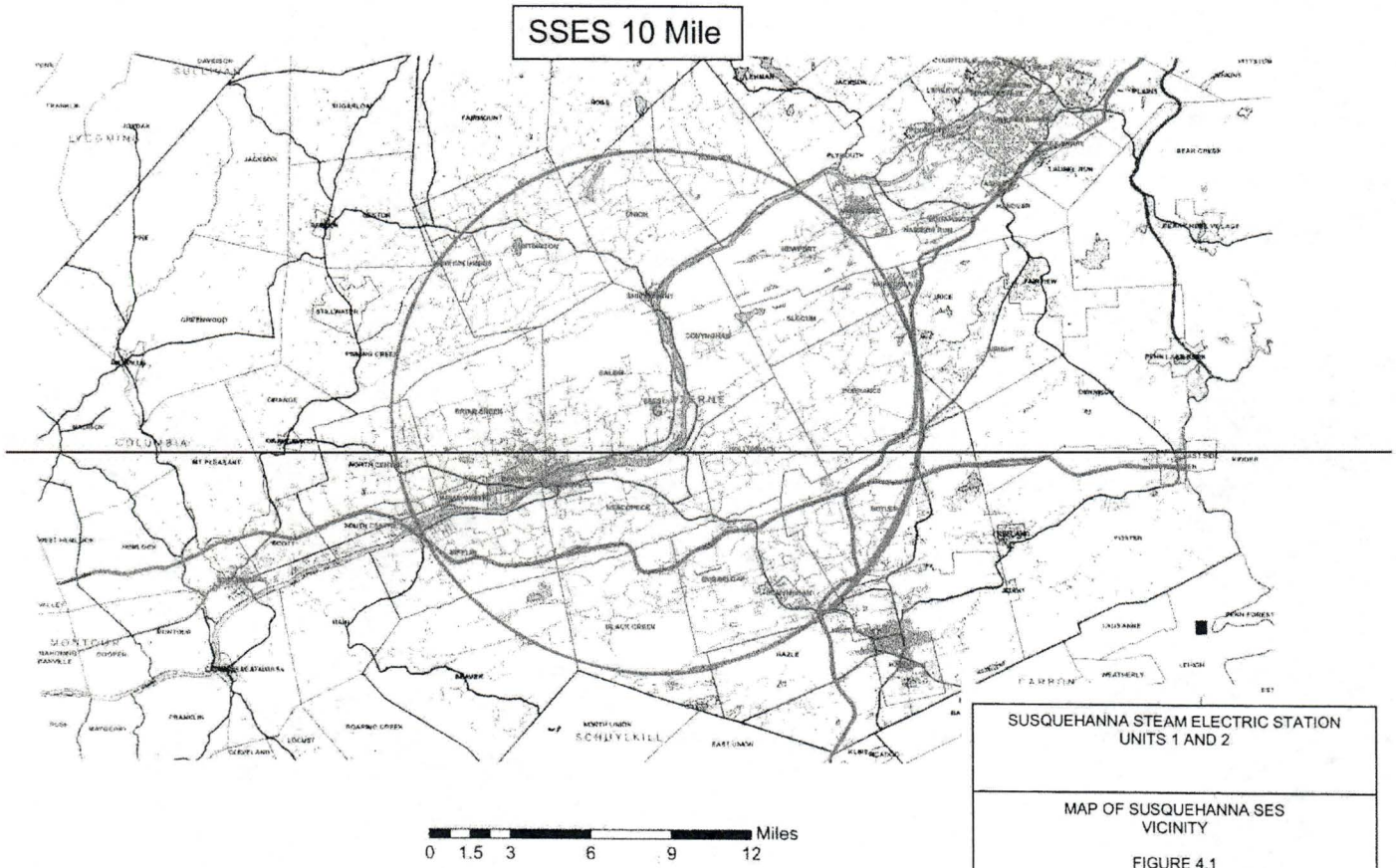


SUSQUEHANNA STEAM ELECTRIC STATION
Units 1 and 2
EMERGENCY PLAN
MAP OF SSES VICINITY
Figure 4.1

SSES EPZ and Ingestion Zone



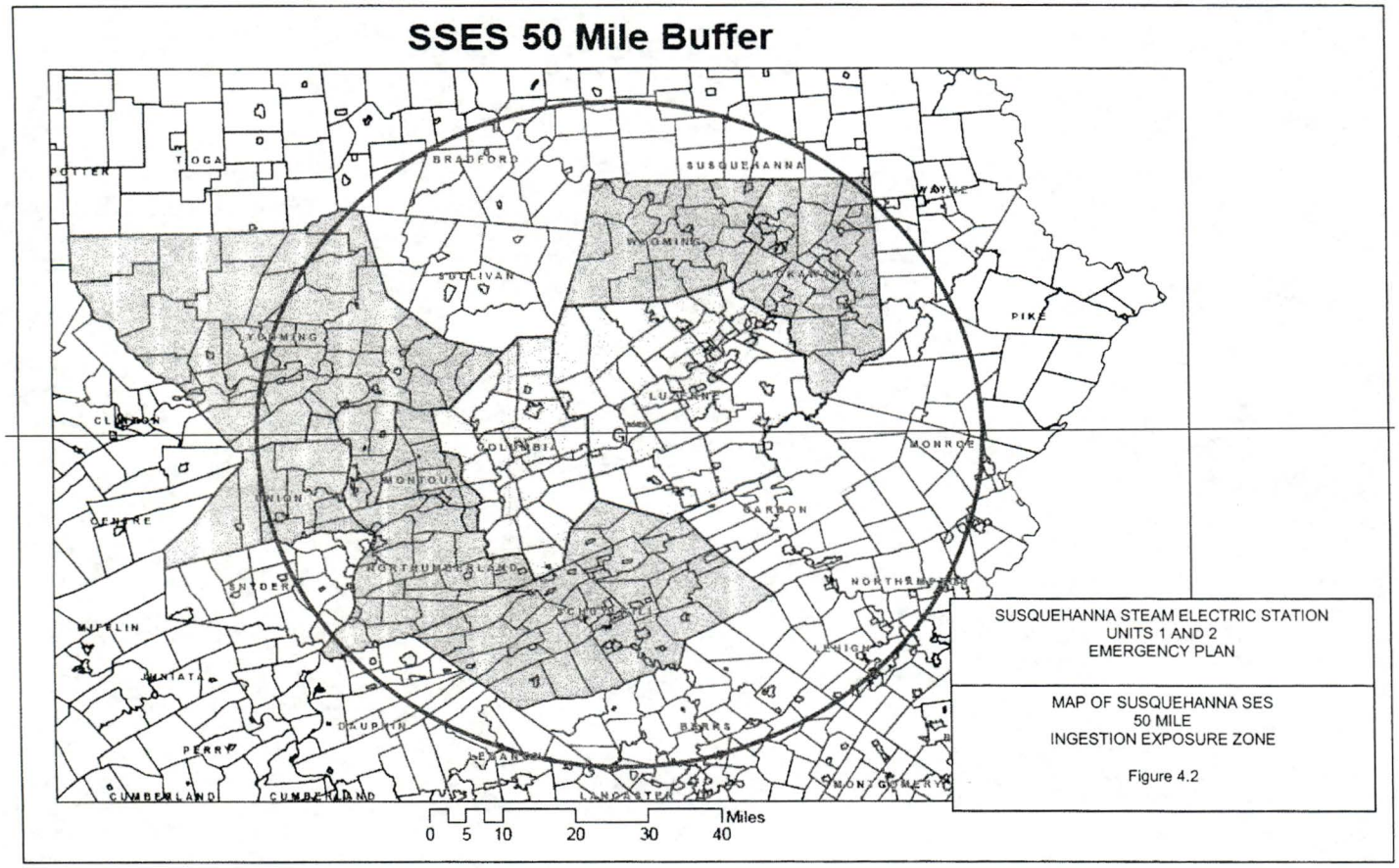
SUSQUEHANNA STEAM ELECTRIC STATION
Units 1 and 2
EMERGENCY PLAN
MAP OF SSES 50 MILE INGESTION
EXPOSURE ZONE
Figure 4.1



SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2

MAP OF SUSQUEHANNA SES
VICINITY

FIGURE 4.1



SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
EMERGENCY PLAN

MAP OF SUSQUEHANNA SES
50 MILE
INGESTION EXPOSURE ZONE

Figure 4.2

5.1.4 General Emergency

Events are in process or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Total activation of the onsite and offsite emergency organizations is required for such events. Actions involving offsite populations are probable. Conditions that constitute a General Emergency are ~~outlines~~ outlined in Tables R, F, S, H and C.

The ED or Recovery Manager declares a General Emergency within 15 minutes of having information necessary to make a declaration.

The emergency actions taken by Susquehanna and offsite agencies for a General Emergency are listed in Table 5.2. In general the actions will be similar to the actions taken for a Site Area Emergency with additional resources dedicated to the health and safety of the general public. Additional actions include the initiation of predetermined protective actions for the public.

5.2 SPECTRUM OF POSTULATED ACCIDENTS

The classification and corresponding protective actions relative to significant emergency conditions are based primarily on the resultant or potential radiation doses. Methods are described in this Plan and in EP Procedures for measuring, projecting and evaluating those doses.

The discrete accidents addressed in this section are those which are defined in the SSES FSAR as "design basis accidents" resulting in off-site dose consequences and accidents involving the spent fuel storage facility (ISFSI). The following discussion of these postulated accidents and Tables R, F, S, H, E and C identify the instrumentation and other mechanisms for prompt detection and continued assessment, and demonstrates how each accident is encompassed within the emergency classification system of this Plan. When an event also involves elevated off-site radiological consequences or other specific conditions, the event classification will be adjusted to reflect actual conditions.

5.2.1 Control Rod Drop Accident

This accident is described in FSAR Section 15.4.9 and is postulated to occur with the reactor in hot startup condition, and very conservative calculations indicate failure of fuel rods. The main steam line radiation monitors detect the significant increase in activity and initiate an alarm to alert operations personnel. Operations personnel would then validate the alarm condition, manually SCRAM the reactor and initiate closure of the main steam isolation valves (MSIV) and isolation of the main condenser. During the MSIV closing time period, noble gases and radioiodines are transported with the steam to the condenser. Release of radioactivity to the environment is by way of leakage from the turbine building.

Upon activation of Phase II, additional personnel are available, and control of the emergency and dissemination of in-plant teams shifts from the Control Room to the TSC.

Phase II - Activation of On-Site ERO - (Reference Table 6.1 and Figures 6.2 and 6.3.) Upon notification by the on-shift organization, the on-call Emergency Director reports to the site/Control Room to assume the role of Emergency Director. As specified in Figures 6.2 and 6.3, the minimum number of support coordinators and staffs also report to the site. These individuals form the nucleus of the ED's Team and activate the TSC and OSC. The TSC and OSC are fully functional within 60 minutes of event classification (Alert or higher emergency declaration). As the on-call Emergency Director and his support coordinators arrive, they are briefed and assume responsibility for their particular areas of expertise. Emergency management activities, including communications, are under the control of the Emergency Director; dose projection and assessment activities are directed by the Radiation Protection Coordinator; technical expertise is directed by the Tech Support Coordinator; the Operations Coordinator oversees Operations activities; and the Damage Control Team Coordinator oversees in-plant damage control actions. The OSC Coordinator supports the operations and damage control team coordinators by managing personnel in the OSC (back up OSC in the event the OSC is not habitable). The TSC takes over all emergency management and support activities from the on-shift organization, freeing them to devote their efforts towards establishing and maintaining the plant in a safe, stable condition.

The onsite ERO may be further augmented as shown in Figures 6.2 and 6.3 by personnel filling TSC positions and OSC positions not designated as minimum requirements. Figures 6.2 and 6.3 also designate minimum requirements for the TSC and OSC respectively.

In the event of hazards preventing site access or certain security related events, personnel who normally report to the Technical Support Center and Operations Support Center will report to the Alternate TSC and OSC at the Emergency Operations Facility. OSC personnel can be sent to the site to mitigate site damage as soon as the site is secured. The alternate TSC will be activated as soon as possible to support the site; however, it is recognized that the activation time for the alternate TSC may exceed 60 minutes. *

Phase III - Activation of Off-site ERO - (Reference Table 6.1 and Figure 6.4.) This organization staffs the Emergency Operations Facility to provide management of the overall emergency response as well as technical support, off-site radiological assessment, and communications.

Staffing of the EOF occurs following an Alert, a Site Area Emergency, or a General Emergency declaration. The EOF is required to activate following a Site Area Emergency or General Emergency classification and take over management of the emergency from the TSC or Control Room within 90 minutes of the Site Area Emergency or higher classification. Activation of the Emergency Operations Facility requires the minimum staff as identified in Figure 6.4. When the initial emergency classification is a Site Area Emergency or higher, the EOF will take over the management of the emergency within 90 minutes of the declaration of a Site Area Emergency. Due to the site response during a daytime security event that starts at the SAE level, the EOF may not be staffed within 90 minutes. With an event in progress, station personnel may be directed to take cover and therefore be unable to respond to the EOF until cleared by plant security. At the discretion of the Emergency Director, the EOF can be activated and take over management of the emergency earlier.

* Letter dated February 25, 2002 from Samuel J. Collins, Director, Office of Nuclear Reactor Regulations, to Robert G. Byram, Senior Vice President and Chief Nuclear Officer. Subject: Issuance of Order for Interim Safeguards and Security Compensatory Measures for – Susquehanna Steam Electric Station, Units 1 & 2.

c. Assure that appropriate notifications of emergency classification and protective action recommendations to state and local agencies are made within 15 minutes of declaration of an EAL.

d. Assure that appropriate notifications and recommendations to the NRC are made immediately after notification to state and local agencies, but not later than one hour after declaration of an emergency classification.

e. Augment the on-site ERO with duty roster personnel and other available station staff members as dictated by the emergency condition.

f. Continue reassessment of emergency status and make appropriate recommendations including protective actions to off-site organizations.

g. Ensure that information released is accurate and released through the proper channels.

h. Activate Emergency Facilities described in Section 8.0, as required.

i. Assign a technical liaison to the state EOC when requested.

j. Communicate with and provide information to the Recovery Manager and the Public Information Manager.

k. Authorize issuance of Radioprotective Drugs in accordance with prescribed procedures. This should include consultation with the Radiation Protection Coordinator and medical consultants.

l. Authorize Emergency dose extensions. This should include consultation with the Radiation Protection Coordinator.

m. Authorize taking essential corrective action that may involve the risk of emergency radiation exposure to ERO personnel. Table 7.2 provides the basic criteria for this decision.

n. Implement RCA and site evacuations as required.

o. Request Federal assistance to augment ERO capabilities as necessary. Such requests should be coordinated with PEMA and/or DEP/BRP and are normally done through the Recovery Manager and the EOF staff.

p. Provide personnel and work schedules for relieving emergency personnel.

6.2.2 Operations Coordinator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Prepare the TSC for activation if the TSC ED has relieved the Control Room ED of responsibility.

b. Advise the Shift Manager in directing the Control Room and in-plant operational activities.

c. Direct activities of the Damage Control Team Coordinator, and TSC Communicator.

d. Advise the ED on plant operations and conditions.

e. Establish and set priorities for mitigation with the concurrence of the ED.

f. Make recommendations to the Shift Manager for mitigation of the effects of Severe Accidents when Severe Accident Management (SAM) procedures are entered.

6.2.3 TSC NRC Communicator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Maintain communications with the NRC.

b. Maintain records during the emergency.

6.2.4 TSC Emergency Plan Communicator (Table 6.1 60 Minute Response, Figure 6.2)

a. Make proper notification to off-site organizations.

b. Function as liaison for emergency-related communications between the ED and on-site and off-site emergency groups.

c. Maintain records during the emergency.

6.2.5 Radiation Protection Coordinator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Ensures dose projections are performed and results are provided to the to the Dose Assessment Supervisor until relieved by the EOF.

b. Provide radiological advice to the ED concerning on-site emergency activities.

c. Provide protective action recommendations to the ED.

d. Maintain communication with and provide information to the EOF Dose Assessment Supervisor.

e. Maintain communication with and provide radiological information to DEP/BRP until relieved by the EOF.

f. Provide on-site radiation monitoring personnel for effluent release assessment.

g. Provide radiation monitoring personnel for emergency team efforts.

h. Direct personnel and area contamination control and decontamination activities.

~~i. Provide dose projections to the Dose Assessment Supervisor until relieved of that responsibility by the EOF.~~

~~i~~j. Perform initial off-site environmental assessment until relieved by the EOF.

~~k~~j. Ensure radiological data is communicated to the NRC via the Health Physics Network.

~~l~~k. Advise the Emergency Director and organization on use of KI and emergency dose extensions.

6.2.6 Technical Support Coordinator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Analyze mechanical, electrical, and instrument and control problems; determine alternate solutions, design and coordinate the installation of short-term modifications.

b. Analyze thermo hydraulic and thermodynamic problems and develop solutions.

c. Assist in the development of procedures necessary for conducting emergency operations and damage control.

d. Analyze conditions and develop guidance for the ED and operations personnel.

e. Resolve questions concerning Operating License requirements with NRC representatives.

f. Maintain lead technical responsibility, coordinate technical information with the EOF as appropriate, and request technical support from the EOF or other engineering/technical resources.

g. Maintain communication with and provide technical information to DEP/BRP Technical, as required, until relieved by the EOF.

h. Provide core damage estimates.

i. Until relieved, provide direction to Chemistry Technician to perform emergency plan actions.

6.2.7 Security Coordinator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Maintain plant security and institute appropriate contingency measures.

b. Account for personnel as directed by EP-PS procedures.

c. Act as liaison with outside groups in providing additional resources such as manpower, equipment, supplies, and transportation.

d. Coordinate provisions for transportation, food, and other logistical support for emergency personnel.

~~e. Provide personnel and work schedules for relieving emergency personnel.~~

6.2.8 OSC Coordinator (Table 6.1 60 Minute Response, Figures 6.2 & 6.3)

Responsibilities:

a. Report to the OSC.

b. Organize, brief, dispatch, and direct, as necessary, the onsite damage control teams.

c. Coordinate the availability and assignment of personnel supporting activities for the ED and other ERO managers.

d. Organize and manage emergency response personnel in the OSC.

e. Ensure communications with all in-plant teams is maintained.

6.2.9 Damage Control Team Coordinator (Table 6.1 60 Minute Response, Figure 6.2)

Responsibilities:

a. Participate in briefings with the TSC ED and helping to set priorities.

b. Ensure damage control resources are allocated on the correct priorities by providing priorities to the OSC Coordinator and monitoring INDIA Team assignments.

c. Communicate with Operations Coordinator, the Technical Support Coordinator, and the OSC Coordinator.

k. When requested, send a representative to the State EOC. If conditions result in implementation of the Federal Radiological Emergency Response Plan, assign a representative to the Federal Response Center, to the Federal Radiological Monitoring and Assessment Center, and to the Joint Information Center (most likely the PIM).

l. Authorize issuance of Radioprotective Drugs in accordance with prescribed procedures. This should include consultation with the Dose Assessment Supervisor and medical consultants.

m. If necessary, authorize Emergency dose extensions for monitoring field teams members under EOF command and control. This should include consultation with the Dose Assessment Supervisor.

6.3.1.2 Engineering Support Supervisor
(Table 6.1 90 Minute Response, Figure 6.4)

Responsibilities:

a. Manage engineering support resources in the EOF.

b. Provide technical support to aid in decision making process.

c. Keep BRP informed concerning technical status of the plant and any mitigating actions being considered or in progress.

d. Provide technical information concerning plant status and mitigating actions to the off-site agencies.

6.3.1.3 EOF Support Supervisor (Table 6.1 90 Minute Response, Figure 6.4)

Responsibilities:

a. Provide support to the Recovery Manager in review of plant data.

b. Oversee formal communications leaving the EOF.

c. Oversee proper facility set up.

d. Provide administrative support.

e. Support the Recovery Manager with off-site agency interface.

6.3.1.4 Dose Assessment Supervisor (Table 6.1 90 Minute Response, Figure 6.4)

Responsibilities:

a. Ensure dose projections are performed.

b. Evaluate the magnitude and effects of actual or potential radioactive releases from the plant.

c. Recommend appropriate off-site protective measures to the Recovery Manager.

d. Recommend appropriate emergency classifications to the Recovery Manager.

e. Communicate with the Radiation Protection Coordinator in the TSC and with DEP/BRP radiological personnel.

f. Control field monitoring teams.

g. Perform off-site environmental assessment.

h. Advise the Recovery Manger and organization on use of KI and emergency dose extensions, if necessary, for the monitoring field team members under EOF command and control.

6.3.1.5 Emergency Plan Communicator
(Table 6.1 90 Minute Response, Figure 6.4)

Responsibilities:

a. Assume responsibility from the TSC for off-site notifications (except ENS communications).

b. Transmit information about the emergency to off-site organizations.

c. Function as liaison for questions received from other organizations.

d. Maintain a record of emergency notifications.

6.3.1.6 Radiological Support Staff (Dose Assessment Staffer, Field Team Director, "B" Radiological Monitoring Team)
(Table 6.1 90 Minute Response, Figure 6.4)

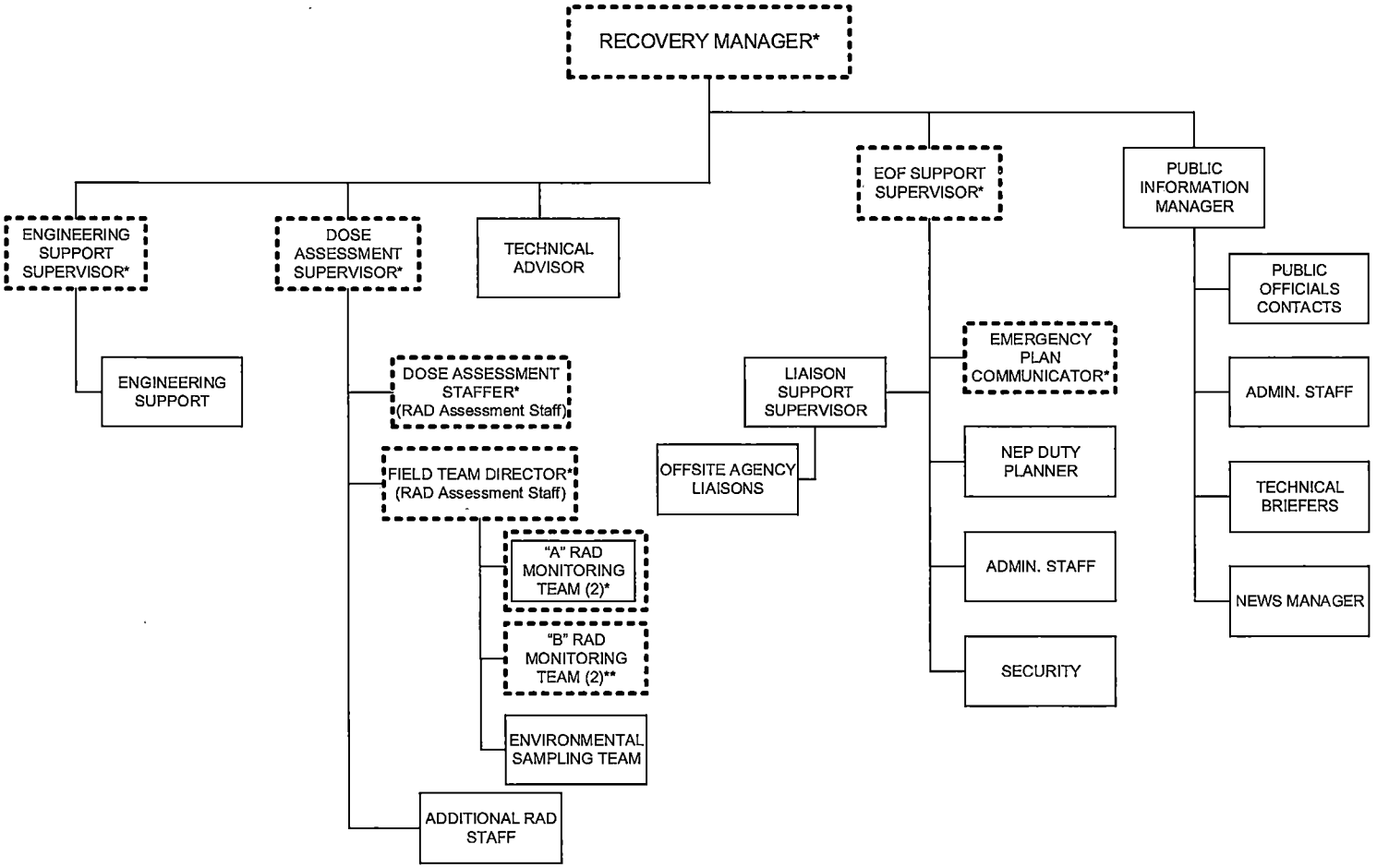
Responsibilities:

a. Perform dose calculations, as required. (Dose Assessment Staffer)

b. Monitor and control field teams. (Field Team Director)

c. Perform monitoring of areas around the plant as directed. ("B" Radiological Monitoring Team)

EOF ORGANIZATION



Designates minimum requirements in accordance with Table 6.1 for 90 minute response.

* Designates positions required for EOF activation.

** Not required for activation unless "A" team unavailable.

NOTE: RAD Monitoring Team (2) refers to 1 Team with 2 people.

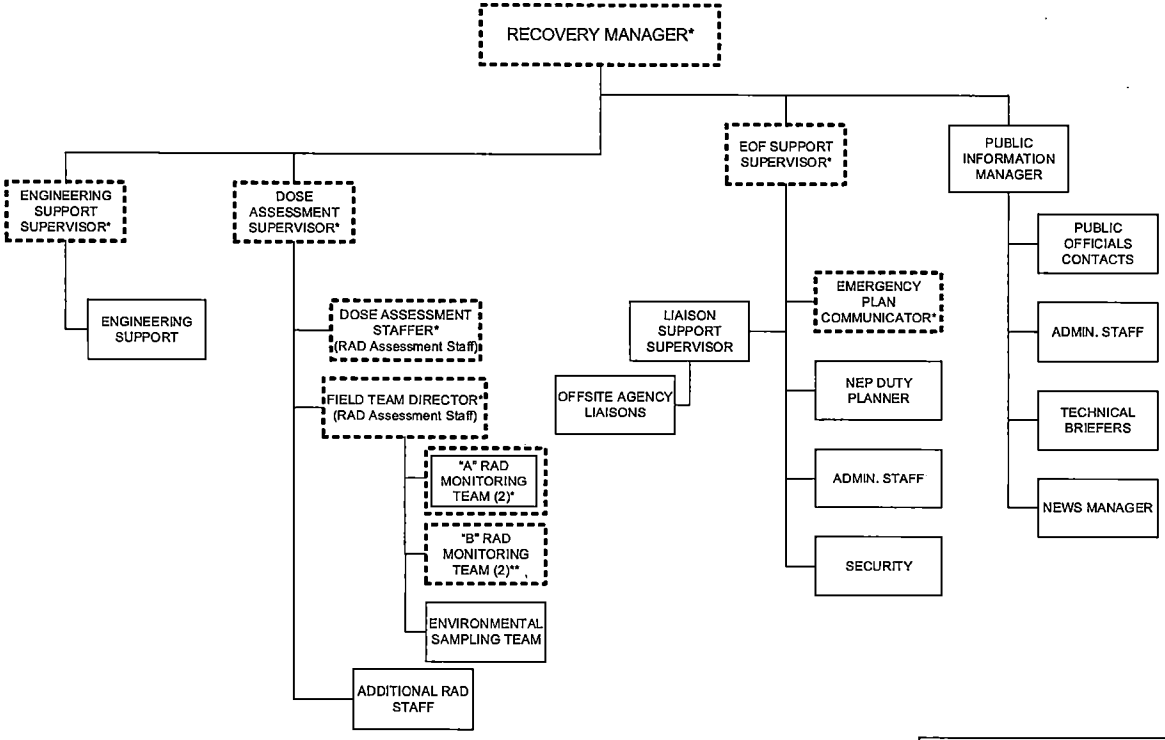
Designates minumum requirements in accordance with Table 6.1 for 60 minute response.

Susquehanna Steam Electric Station
Units 1 and 2
Emergency Plan

EOF ORGANIZATION

FIGURE 6.4

EOF ORGANIZATION



Designates minimum requirements in accordance with Table 6.1 for 90 minute response.

* Designates positions required for EOF activation.

** Not required for activation unless "A" team unavailable.

NOTE: RAD Monitoring Team (2) refers to 1 Team with 2 people.

Designates minumum requirements in accordance with Table 6.1 for 60 minute response.

Susquehanna Steam Electric Station
Units 1 and 2
Emergency Plan

EOF ORGANIZATION

FIGURE 6.4

7.0 EMERGENCY MEASURES

7.1 ASSESSMENT ACTIONS FOR ALL EMERGENCY CLASSIFICATIONS

Provisions are made for assessment through the course of an emergency to ensure effective coordination, direction and upgrading of emergency activities in a timely manner. The assessment actions are described in detail in Emergency Plan Position Specific Instructions (EP-PSs).

Continuous assessment of the status of plant systems and radiological conditions is provided by plant instrumentation and is supplemented by routine surveillance functions. The occurrence of an Unusual Event is recognized by instrument alarms or indications, surveillance results, or other observation of an off-normal condition by an individual at the station.

Assessment actions are described below. For a Notification of Unusual Event, one or more of the actions listed below will be initiated; for higher emergency classifications, actions are continued, intensified, and increased in frequency.

Table 7.1 provides a Summary of Notification & Response Actions outlined in Section 7.1.

- Perform surveillance of in-plant instrumentation.
- Initial and continued observation of off-normal conditions.
- Obtain assistance from off-duty personnel and/or off-site support groups.
- Deploy on-site damage control teams.
- Perform reactor coolant sampling and analysis.
- Deploy field radiological monitoring teams to perform direct radiation measurements and air sampling.
- Perform dose calculation activities. Correlate with field team data.
- ~~Deploy field radiological monitoring teams to perform direct radiation measurements and air sampling.~~
- Perform sampling and analysis of environmental media.
- ~~Deploy on-site damage control teams.~~
- ~~Perform reactor coolant sampling and analysis.~~

7.1.1 Off-Site Dose Calculations

The Emergency Director is responsible for initiating off-site dose calculation and assessment activities. These activities are performed by Radiation Protection trained personnel who report to the Technical Support Center (TSC) (or the Control Room for all initial entries into the Emergency Plan). Data from the vent effluent monitors and the

meteorological towers serve as inputs for the off-site dose calculation methods.

The ED is responsible for calling in personnel to the TSC to perform off-site dose assessment activities. The Radiation Protection Coordinator reports to the TSC within 60 minutes of notification.

Field monitoring teams are directed to selected monitoring location(s) by either the Radiation Protection Coordinator, Dose Assessment Supervisor, Dose Assessment Staffer, or Field Team Director via radio and/or phone communication. The results of the teams' surveys are used to update projected doses and dose calculational assumptions.

The initial field monitoring team is staffed within 60 minutes and is dispatched from the vicinity of the plant within 60 minutes. An additional field monitoring team is staffed within 90 minutes and dispatched from the EOF. See Table 6.1 and Figures 6.2 and 6.4.

Each radiological monitoring team is supplied with a survey meter and low volume air sampler. TLDs are located at 17 sites around the station to provide early information on accumulated off-site doses. Two sets of TLDs are provided at each of these sites; one set for dose accumulation during the period of releases and one set maintained for the normal monitoring period or exchanged early at the Dose Assessment Supervisor's discretion to meet information needs.

The ED and Recovery Manager recommend appropriate protective actions to PEMA Operations Center, Harrisburg, based upon the results of the off-site dose assessment activities.

7.1.1.1 Meteorology

The SSES on-site meteorological measurement system is based upon an on-site primary meteorological tower located to the east southeast of the station. The primary tower provides measurements of wind speed, wind direction, and wind direction variability at its 10 and 60-meter levels, temperature differential between the 10 and 60-meter levels, and ambient temperature and dew point at the 10-meter level. Precipitation is measured at ground level. In case of primary tower failure, a 10-meter on-site backup meteorological tower will provide measurements of wind speed, wind direction, and wind direction variability.

~~A permanent supplemental tower is installed in the river valley near the station to provide additional meteorological data to more accurately model the effects of surrounding terrain on atmospheric dispersion and transport. The tower is located approximately 3.6 miles SW of the station off Route 93 just east of Nescopeck.~~

~~The tower measures wind speed, wind direction, and sigma theta at the 33-foot level. The tower also measures temperature at a height of approximately 6.6 feet. The meteorological data collected from this tower is used only to support assessment and~~

~~restoration efforts in the event there is an accidental release of radioactive material from SSES.~~

The meteorological systems are instrumented to provide continuous data to the control room and the Plant Integrated Computer System (PICSY) for utilization in the TSC and EOF. Data that enters PICSY is viewable through various display formats and is also transmitted to the NRC via ERDS. Digital dataloggers are present at all of the SSES meteorological towers. All data is stored locally and is available for acquisition by interrogation across telephone lines. Primary and backup tower strip chart recorders are located in the control room.

Site specific, meteorological information for emergency dose assessment purposes can also be obtained by contacting either a meteorologist or the National Weather Service Station using the phone numbers provided in the SSES Emergency Telephone Directory.

7.1.1.2 Radiation Protection Considerations

In the event of an unplanned radioactive release from either the reactor building vents, the turbine building vents, or the standby gas treatment vent; continuous gross noble gas readings are available from the vent monitors. Each monitor is also equipped with in-line iodine and particulate sampling capability. These in-line samples are periodically removed and analyzed in order to provide iodine and particulate release rate information. Event declarations are based on Noble Gas readings or iodine and particulate sample results.

The following Radiation Protection considerations are taken into account: selection of the accident type to closely approximate the isotopic mix and average gamma energies of the release occurring, radioactive decay from time of reactor shutdown, plume decay-in-transit and iodine and particulate depletion due to precipitation.

7.1.1.3 Dose Calculations for Airborne Releases

A dose calculation model is used to make current, site specific estimates and predictions of atmospheric effluent transport and diffusion during and immediately following an accidental airborne radioactivity release. The purpose of the prediction is to provide an input to the assessment of the consequences of accidental radioactive releases to the atmosphere and to aid in the implementation of emergency response decisions.

The dose calculation model used is a fast running, time-dependent, variable trajectory plume segment "B" model with the following capabilities:

NOTE: A class "B" model is a numerical model that represents the actual spatial and temporal variations of plume distribution.

- Computes atmospheric dispersion at the site based on atmospheric stability as a function of site specific terrain conditions with 15-minute upgrades of source term and meteorological conditions.

- Provides estimates of deposition and relative concentration of radioactivity within the plume exposure and ingestion EPZs for the duration of the release.

- Incorporated in the calculations is wet and dry deposition which enables dose estimates from three pathways - plume, ground shine, and ingestion.

The dose program complies with the "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," (EPA-400), adopting the dose calculation methodology in ICRP #26/30. The accident dose assessments are based on the adult physiology per EPA 400, except for one case-that is, child thyroid dose conversion factors are used in calculating thyroid CDE. However adult physiology is used in calculating thyroid CDE for purposes of evaluating the need for a sheltering only PAR ~~and~~ when evaluating controlled venting of containment. Calculations of TEDE are made using the (adult) dose factors provided in EPA-400. The following calculational options are available:

- TEDE (Total Effective Dose Equivalent) integrated doses consisting of the sum of external doses from plume shine, 50 year committed effective dose equivalent from inhalation (CEDE), and 4 day ground shine doses.

- EDE and CDE dose rates for field team management.

- Fifty year thyroid committed dose (CDE), from inhalation of radioactive materials.

- Population dose (person rem) out to 50 miles.

- Summary print of projected doses for each of four projection times.

- Integrated ground dose for projected times specified by the user.

TABLE 7.2
EMERGENCY EXPOSURE CRITERIA

Additional General Criteria

- Only volunteers are given planned emergency exposure.
- Attached tables provide information concerning acute and delayed health effects.
- Whenever practical, consideration is given to dividing exposure among as many personnel as possible.
- Potassium Iodide utilization for iodide prophylaxis requires the approval of the Emergency Director or the Recovery Manager in consultation with the Radiation Protection Coordinator or the Dose Assessment Supervisor and medical consultants, if available. It is recommended that potassium iodide be administered in situations where potential exposure of the thyroid is anticipated to exceed 10 rem or at lower dose levels if judged as needed by the RPC or DASU.
- All reasonable measures must be taken to control contamination and internal exposure.
- Persons performing emergency activities should be familiar with exposure consequences.
- Women capable of reproduction should not take part in these actions.
- Retrospective doses are evaluated on an individual case basis.
- ~~To the extent reasonable, persons with high lifetime cumulative radiation exposure should not take part in these actions.~~
- As in the case of normal occupational exposure, doses received under emergency conditions should be maintained as low as reasonably achievable.

Health Effects Associated with Whole Body Absorbed Doses Received Within a Few Hours[a]

Whole Body Absorbed Dose (rad)	Early Fatalities[b] (percent)	Prodromal Effects[c] (percent affected)
050	–	2
100	–	15
140	5	–
150	–	50
200	15	85
250	–	98
300	50	–
400	85	–
460	95	–

a Risks will be lower for protracted exposure periods.

b Supportive medical treatment may increase the dose at which these frequencies occur by approximately 50 percent.

c Forewarning symptoms of more serious health effects associated with large doses of radiation.

8.0 EMERGENCY FACILITIES AND EQUIPMENT

8.1 ON-SITE EMERGENCY CENTERS

8.1.1 Control Room

The Control Room is the primary location for the initial assessment and coordination of corrective actions for all emergency conditions. The Control Room is equipped with the display and controls for all critical plant systems, radiological and meteorological monitoring systems, and all station communication systems. Reference Appendix D, Enclosure 7.

Off-site emergency functions initially served by the Control Room are transferred to the TSC or EOF for an Alert, a Site Area Emergency, or a General Emergency as deemed appropriate by the ED. If the TSC and/or EOF are staffed, the functions may also be transferred at the Notification of Unusual Event level. The primary consideration is to ensure that the number of personnel involved with the emergency in the Control Room shall not impair the safe and orderly shutdown of the reactor or the operation of plant safety systems.

8.1.2 Operations Support Center

The OSC is the primary on-site assembly area for operations support team personnel during an emergency. There are 2 OSC areas-a primary OSC located separate from the TSC and Control Room and a backup OSC located in the Control Structure. The primary OSC is located on the first floor of the South (Administrative) Building. The backup OSC occupies 340 square feet adjacent to the Control Room on Elevation 729'-1" of the control structure.

The OSC is utilized initially as the central location for assembly and accountability of on-shift emergency team personnel required to perform such functions as: firefighting, first aid, search and rescue, damage control, and on-site radiation monitoring. If and when the TSC is activated, all non-operations support team personnel assemble and are accounted for in the OSC (or ~~TSC~~ CR if the backup OSC is being utilized.) TSC personnel assess the need for emergency team personnel and based on this assessment, the OSC dispatches available team personnel and call in additional personnel as needed. The OSC and TSC assembly areas will be monitored continuously for habitability. If these areas become uninhabitable, retained personnel will be directed to alternate holding areas. Control and dispatch of these teams is the responsibility of the OSC Coordinator. The OSC Coordinator manages operations and other support personnel.

Equipment required for these teams to perform their functions, as outlined in Appendix D is stored and maintained in the Control Room, Operations Support Center, Radiation Protection access control points and Maintenance tool areas.

8.3 COUNTY AND STATE EMERGENCY CENTERS

8.3.1 County Emergency Centers

Both LCEMA and CCEMA have EOCs that meet or exceed the minimum Federal criteria for sufficient space, communications, warning systems, self-sufficiency in supplies and accommodations and radiological protection factor. Both counties maintain full-time employees, providing 24-hour per day coverage either at their EOC or their "911" Centers, to coordinate emergency planning and evaluation. "CTN" telephone connections exist between SSES and each County EOC.

Location of the county EOCs:

- Luzerne County
  Emergency Management Building
  Wilkes-Barre, Pennsylvania
- Columbia County
  Columbia County Courthouse 911 Annex
  Bloomsburg, Pennsylvania

8.3.2 State Emergency Center

The ~~State EOC is located at the PEMA headquarters~~Commonwealth Response Coordination Center (CRCC)~~,~~ is located at ~~1325~~ 1310 Elmerton Avenue in Harrisburg. This center has 24 hour per day coverage and is equipped with a reliable communications system that includes "CTN" telephone connections between the ~~EOC~~ CRCC and SSES, and ties to all area and county EOCs. During an emergency, representatives from appropriate State agencies will assemble at the ~~State EOC~~CRCC to manage and support the emergency response activities. Facilities are also available at the EOF for PEMA personnel.

8.4 ASSESSMENT CAPABILITIES

8.4.1 Radiation Monitoring System

This on-site system, consisting of ARMs, CAMs, and process monitors, contributes to personnel protection, equipment monitoring and accident assessment by measuring and recording radiation levels and concentrations at selected locations throughout the station. Reference Appendix D.

8.4.2 Fire Protection

Fire protection at SSES is provided by a network of fire detection, suppression, and extinguishing systems. These systems and associated fire alarms are activated by a variety of fire and smoke detection devices throughout the plant. Types of detectors include combustion product, smoke, thermal, and flame. For more detail, reference the SSES Fire Protection Review Report.

8.5.4 Alert Notification System

An ANS consisting of sirens with ratings of 121 dB at 100' exists within the ten-mile EPZ around SSES. Siren location (see Figure 8.4) was determined by a detailed study including field surveys, actual determination of average background noise level, and consideration of population distribution within the 10-mile EPZ.

Activation of the ANS is via radio control from either the LCEMA Emergency Operations Center or CCEMA Emergency Operations Center. A back-up satellite system can also activate the sirens from LCEMA or CCEMA. A redundant control station located at ~~SSES and~~ the EOF has full radio control capabilities, and will be used for the purpose of testing and maintenance activities. Direct Current (DC) batteries provide a back-up source of power to the normal Alternating Current (AC) supply. The Nuclear Emergency Alert signal is a 3 minute steady tone. Public response to this signal is to proceed indoors and tune their radio or television to the Emergency Alert System Network serving their local area for additional information.

Testing of the system takes place annually and includes verification of the system's ability to alert the general public.

8.6 ADDITIONAL COMMUNICATIONS SYSTEMS

8.6.1 Commercial Telephone System

Two independent telecommunications networks exist to provide primary and backup telephone communications between ERFs and offsite agencies. These systems are the Centrex Telephone Network (CTN) and Electronic Tandem Network (ETN).

CTN extension locations include: Control Room, TSC, EOF, JIC, SEIC, DEP/BRP, PEMA, LCEMA, and CCEMA. This is the primary system for emergency communications.

8.6.2 Plant Emergency Alarm System

A plant emergency alarm system provides audible warning of emergency conditions to plant personnel. The system consists of a multi-tone generator, tone selector switch, area selector switch, and message tape recorder. The Emergency Alarm System is integral to the PA System and is powered via the Vital AC UPS. The Plant Emergency Alarm System is tested at least weekly.

8.7 ON-SITE FIRST AID AND MEDICAL FACILITIES

A first aid treatment facility, equipped with normal industrial first aid supplies, is located on the first floor of the S&A Building. Standard first aid kits are at designated locations throughout the station. Inventories are performed regularly.

8.8 DAMAGE CONTROL EQUIPMENT

Damage control equipment consists of normal and special purpose tools and devices used for maintenance functions throughout the station. The ED has access to keys for maintenance tool cribs, shops and other locations where damage control equipment is stored. Inventories are performed regularly.

8.9 INFORMATION SYSTEMS

8.9.1 Plant Integrated Computer System

The PICSY is used for emergency data configuration for the following reasons:

- It contains graphic and trending capabilities.
- It provides for historical data recording and retrieval.
- It has flexibility to permit interfacing to additional I/O equipment and other sources of data.
- Its design provides for a high degree of reliability.
- It is capable of ~~scanning and processing~~displaying and reporting ~~all of~~ plant ~~the~~ data needed in the EOF and TSC.
- It is located in a secure area within the control structure.
- It has a redundant system design.
- The ERDS and SPDS functions are integrated into its design.
- All of the PICSY data and functions are easily made available at locations remote from SSES.

8.9.1.1 Data Acquisition

Data is acquired from I/O hardware in the plant as well as over data interfaces to various other plant equipment. All data is checked for validity and errors before being displayed to the user. Isolation is applied to all safety-related inputs. All data is archived. Both short term and long term data are available for retrieval at any PICSY SDS. Long term data is available for at least the previous fuel cycle.

8.9.1.2 Data Preparation

Display formats needed by the ERF are generated and stored within the PCS using standard proven PICSY software. A configuration management software system is employed to track changes to all formats and the database itself.

Proven system and application software has been developed which performs data display and system security. The database includes raw data, data converted to engineering units, data checked on a real-time basis, and various types of calculated data.

User interaction from the PICSY SDS is independent from each station and controlled by multiple copies of the identical software.

9.1.3 Overall Coordination of Nuclear Emergency Preparedness

The ~~Manager-Emergency~~Manager-Security/Emergency Preparedness is responsible for the overall coordination of all nuclear emergency planning activities. The ~~Manager-Emergency~~Manager-Security/Emergency Preparedness is assisted in this effort by: the Plant Manager for activities involving the Susquehanna Site, the General Manager-Nuclear Engineering for engineering issues, the Manager-Nuclear Training for on-site training, the Community Relations Manager-Susquehanna for communications with the public and news media, and the Manager-Nuclear Oversight for audits of Emergency Planning.

The ~~Manager-Emergency~~Manager-Security/Emergency Preparedness is typically responsible for:

- Revising of the SSES Emergency Plan
- Revising of EP-PSs and other Emergency Planning Administrative procedures
- Conducting of integrated drills and exercises and communication drills
- Defining EP training scope for ERO
- Defining EOF and JIC EP Training
- Coordinating EP interface between State and Federal agencies
- Coordinating maintenance and testing of ANS
- Coordinating interface between state, county, municipal, and Susquehanna ERO
- Assuring operational readiness of Emergency Response Facilities

9.2 REVIEW AND UPDATING

9.2.1 SSES Emergency Plan

The ~~Manager-Emergency~~Manager-Security/Emergency Preparedness is responsible for the review and revision of the SSES Emergency Plan, ensuring:

- A review of the SSES Emergency Preparedness Program is performed periodically by persons who have no direct responsibility for implementation of the program in accordance with 10CFR50.54t.
- Annual review of the SSES Emergency Plan.
- Annual review of Letters of Agreement.
- Recommendation of Emergency Plan changes to PORC.
- PORC review of Emergency Plan changes and submission of changes to NSRB.
- Revisions or a report of change to the Emergency Plan that do not change the effectiveness of the plan are submitted to the NRC within 30 days from the implementation of such change(s).
- Perform an annual review of the Evacuation Time Estimate (ETE) to ensure 10CFR50 Appendix E Section IV and NUREG 0654 Element J.8 requirements are maintained. Update the full ETE should the criteria from Appendix E be met and re-submit the ETE to the NRC.

9.2.2 Emergency Plan Procedures

The ~~Manager-Emergency~~Manager-Security/Emergency Preparedness is responsible for the review and revision(s) of the Emergency Plan Procedures, ensuring:

- The periodic review is accomplished in accordance with established plant procedures.
- Revisions to procedures are done in accordance with established plant procedures.
- Controlled copies of procedure revisions are issued by station document control programs.
- ERO personnel are briefed on revisions as required.

9.3 MAINTENANCE AND INVENTORY OF EMERGENCY EQUIPMENT/SUPPLIES

The ~~Manager-Emergency~~Manager-Security/Emergency Preparedness is responsible for periodic inventory and inspection of emergency equipment and supplies, and for periodic testing of emergency communications systems. This testing includes verification of phone numbers that are contained in Emergency Plan procedures.

Equipment, supplies, and parts having limited shelf lives are checked and replaced as necessary. Monthly communications drills and tests are also conducted from Susquehanna ERFs and offsite agencies.

Any deficiencies found during these activities are either cleared immediately or documented for corrective action.

9.4 PUBLIC EDUCATION AND INFORMATION

Under the direction of the ~~Manager-Emergency~~Manager-Security/Emergency Preparedness, the following methods are utilized to ensure that emergency planning information and education is provided and transmitted to residents and transients in the EPZ annually.

9.4.1 Telephone Directory Inserts

With the cooperation of Pennsylvania Emergency Management Agency, Luzerne County Emergency Management Agency, and Columbia County Emergency Management Agency, emergency information is provided in all telephone directories distributed within the ten mile EPZ. This information includes:

- explanation of Emergency Classifications
- what to do when you hear the sirens
- public Protective Actions
- student pick-up points
- evacuation routes to reception centers
- evacuation Plan Map
- callback number for special needs

9.4.2 Programs are Offered to Acquaint the News Media With:

- SSES Emergency Plan
- information concerning radiation
- points of contact for the release of public information during an emergency

9.4.3 Educational Training Programs

Educational training programs on emergency preparedness are made available to the general public through the staffs of the Susquehanna Energy Information Center and Nuclear Emergency Preparedness.

9.4.4 Other Distributed Publication(s) ~~(For example: Offsite Emergency Calendars)~~

This information includes:

- explanation of Emergency Classifications
- what to do when you hear the sirens
- public Protective Actions
- student pick-up points
- evacuation routes to reception centers
- evacuation Plan Map
- callback number for special needs

LETTERS OF AGREEMENT

Letters of Agreement have been established with those State and Local agencies as well as local and industry support service groups that are responsible to ensure a high level of emergency preparedness for the SSES. These agreements have been established to assure all parties are aware of their commitment to SSES and the public in the vicinity of the SSES during an emergency including a HOSTILE ACTION event.

The following list of agencies and support groups have signed letters of agreement:

Agency/Support Group

Berwick Ambulance Association
Berwick Hospital Center
Berwick Volunteer Fire Department
Columbia County Commissioners
Dan E. Bower, Inc
Department of Energy
Department of Environmental Protection/Bureau of Radiation Protection
Federal Radiation Monitoring and Assessment Center (FRMAC)
GE BWR Emergency Support
Geisinger Medical Center
Hobbie Volunteer Fire Co. - EMS
Hunlock Creek Ambulance Association
Institute of Nuclear Power Operations
Lackawanna County Commissioners
Latona Trucking
Luzerne County Council
Medico Industries
Mocanaqua Volunteer Fire Company
Nanticoke Ambulance/Medic 25
Nanticoke Fire Department
National Weather Service
Pennsylvania Emergency Management Agency
Pond Hill-Lily Lake Ambulance Association
~~PPL Electric Utilities~~
Salem Township Volunteer Fire Co.
~~Shickshinny Volunteer Fire Department~~
Shickshinny Volunteer Ambulance Assoc.
Stell Enterprises
Summerhill Fire Department
Wilkes Barre Scranton International Airport

Timothy S. Rausch
Senior Vice President & Chief Nuclear Officer

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Berwick, PA 18603
Tel. 570.542.3445 Fax 570.542.1504
Timothy.Rausch@talenenergy.com

TALEN ENERGY

April 2, 2018

Attn: Mr. Stephen G. Bower, Vice President
Don E. Bower, Inc.
1206 Salem Boulevard
Berwick, PA 18603

SUSQUEHANNA STEAM ELECTRIC STATION
LETTER OF AGREEMENT – 2018
DON E. BOWER, INC.
PLE-0026052

Dear Mr. Bower:

This letter will serve as an agreement between Don E. Bower, Inc. and the Susquehanna Steam Electric Station concerning heavy equipment support operations at the Susquehanna Steam Electric Station.

Don E. Bower, Inc. agrees to provide heavy equipment support operations, including personnel and equipment, at the Susquehanna Steam Electric Station as may be required. Services provided will be at a negotiated rate agreed upon by both parties. The Susquehanna Steam Electric Station agrees to pay for any damages to equipment incurred as a result of the performance of this agreement. In the event any such equipment cannot be decontaminated, Susquehanna Steam Electric Station will replace it. This agreement will remain in effect indefinitely unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify acceptance of the provisions of this letter by executing the agreement and returning the original copy in the self-addressed prepaid envelope included in this mailing.

You may keep a copy for your files. If you have any questions, please contact Joseph Meter at 570-542-3789.

Thank you for your cooperation in this matter.

Very truly yours,

Timothy S. Rausch, Sr. Vice President & Chief Nuclear Officer
Susquehanna Steam Electric Station

TSR:db

(Continued)

PLE-0026052

I Stephen G. Bower (Name) Vice President (Title),
[Print] [Print]

an authorized representative of Don E. Bower, Inc., on this 30 day of

April, 2018, agree to the provisions contained herein.

[Signature]

Copy:
NUC EPlan File (Original) NUCSA4

Timothy S. Rausch
Senior Vice President & Chief Nuclear Officer

Susquehanna Nuclear, LLC
769 Salem Boulevard
Berwick, PA 18603
Tel. 570.542.3445 Fax 570.542.1504
Timothy.Rausch@talenenergy.com

TALEN ENERGY

August 21, 2018

Attn: Fire Chief
Summerhill Fire Company
422 Summerhill Road
Berwick, PA 18603

SUSQUEHANNA STEAM ELECTRIC STATION
LETTER OF AGREEMENT – 2018
SUMMERHILL FIRE DEPARTMENT
PLE- 0026081

Dear Fire Chief:

This letter will serve as an agreement between the Summerhill Fire Company and the Susquehanna Steam Electric Station concerning firefighting assistance at the Susquehanna Steam Electric Station.

Summerhill Fire Company agrees to provide firefighting assistance, including personnel and equipment, at the Susquehanna Steam Electric Station as may be required, to include response to hostile action based events. Susquehanna Steam Electric Station agrees to pay for any damages to firefighting equipment incurred as a result of in the performance of this agreement. In the event any such equipment cannot be decontaminated, The Susquehanna Steam Electric Station will replace it.

Susquehanna Steam Electric Station also agrees to provide appropriate training for those firefighting personnel designated by an authorized representative of the Summerhill Fire Company. This will include familiarization training involving specific firefighting equipment and systems at the Susquehanna Steam Electric Station. This agreement will remain in effect indefinitely unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify acceptance of the provisions of this letter by executing the agreement and returning the original copy in the self-addressed prepaid envelope included in this mailing.

You may keep a copy for your files. If you have any questions, please contact Megean Brown at 570-542-3601.

Thank you for your cooperation in this matter.

Very truly yours,

Timothy S. Rausch, Sr. Vice President & Chief Nuclear Officer
Susquehanna Steam Electric Station

TSR:db

(Continued)

PLE-0026081

I Craig Fisher (Name) Fire Chief (Title),
[Print] [Print]

an authorized representative of Summerhill Fire Company on this 28 day of August, 2018, agree to the provisions contained herein.

[Signature]

Copy:
NUC EPlan File (Original) NUC

These letters of agreement provide for:

- Coordination of planning efforts by State and local agencies; industry support groups; fire ambulance and hospital support services; and Susquehanna.
- Appropriate emergency response to assure employee and public safety during an emergency condition at SSES.
- Mutual notification capabilities.
- Appropriate training and exercising of emergency response capabilities.
- Fire, first aid and medical support.
- Environmental monitoring and assessment support.
- Other emergency support services as deemed necessary

The ~~Manager-Emergency~~Manager-Security/Emergency Preparedness is responsible for renewing letters of agreement every year where applicable. In some instances, where the letter of agreement is for a specified duration longer than 1 year, letters need not be renewed until the end of the specified duration. Copies are maintained and controlled within Document Control Services to assure appropriate review and updating takes place.

NOTE:	Reference Action Request 1066721 for why separate LOA is not needed for Pennsylvania State Police.

APPENDIX C
SSES EMERGENCY PLAN POSITION SPECIFIC PROCEDURES (TYPICAL)

EMERGENCY PLAN POSITION SPECIFIC PROCEDURES (Response Procedures)	
CR Procedures	**EOF Procedures**
Emergency Director	Recovery Manager
Emergency Plan Communicator	EOF Support Supervisor
NRC Communicator	NEP Duty Planner
	EOF Emergency Plan Communicator
TSC Procedures	Environmental Sampling Team
Emergency Director	Radiological Monitoring Team
TSC Technical Support Coordinator	EOF Administrative Assistant
TSC Operations Coordinator	EOF Liaison Support Supervisor
Radiation Protection Coordinator	EOF Dose Assessment Staffer
TSC Dose Calculator	EOF Dose Assessment Supervisor
RP Tech I (Oscar)	Field Team Director
Security Coordinator	EOF Environmental Sampling Director
TSC Administrative Coordinator	EOF Technical Advisor
TSC E Plan Communicator	~~EOF Information Coordinator~~
HPN Communicator	Engineering Support Supervisor
RP II Dose Calculator	Fuels Lead Engineer / Core Thermal Hydraulics Engineer
Damage Control Team Coordinator	EOF Systems Lead Engineer
Severe Accident Management Coordinator	EOF Support Engineer
TSC NRC Communicator	
TSC Information Coordinator	**JIC Procedures**
Fuels Lead Engineer / Core Thermal Hydraulics Engineer	Public Information Manager
TSC RP Radio Communicator	News Manager
	JIC Technical Briefer
	Support Services Manager
OSC Procedures	Media & Public Officials Contact
OSC Coordinator	JIC Logkeeper
RP Specialist	JIC Writer
Maintenance Foreman/Field Unit Supervisor	JIC Administrative Coordinator
Chemistry Coordinator	
~~OSC Clerk~~	
OTHER EMERGENCY PLAN RESPONSE PROCEDURES	
Offsite Organization Response to Plant Events	
Emergency Telephone Instructions and Directory	Susquehanna Offsite Organization Response to Plant Events
Remote Assembly Area Contamination Control	Termination and Restoration
Brief Non-Technical Description of EALs	EAL Classification Bases
SSES MIDAS-NU User Manual	Personnel Accountability

ENCLOSURE 1 TO APPENDIX D

Typical Station Decontamination Area Equipment

Decontamination Procedures
~~Cotton Gloves~~
Coveralls ~~(Disposable)~~
Decontamination Soap
Disposable Bath Towels
~~Disposable Gloves~~Plastic Gloves + Cotton Inserts
Frisker
Hand Brushes
~~Hand Cream~~
~~Lotion Skin Cleaner~~
Masking Tape
Paper Towels
Shoe Covers, paper
~~Spare Frisker Cable~~
~~Spare Frisker Probe~~
Sponges

Typical Damage Control Equipment Storage Box Contents

Amprobe
Bars, Pry, Large
Bars, Pry, Rolling Lead
Black Wire, 1/4 lb. Rolls, 16 Gauge
Box, Tool, 23"
Bucket, 14 quart, Plastic
Cable Cutters
Clamps, C, Medium
Clamps, C, Large
Clamps, C, Small
Electricians Pouch with Miscellaneous Hand Tools
Enerpac, Rescue Unit
Flashlight, 5 cell
Hammer, Ball Peen, 16 oz.
Hammer, Sledge, 10 lb.
Hammer, Sledge, 8 lb.
Multimeter
Nylon Rope, 100' coils, 3/4"
Nylon Rope, 25' coils, 3/8"
Nylon Rope, 50' coils, 3/8"
Nylon Rope, 50' coils, 3/4"
Plastic Sheet, 20' X 20', Fire Retardant
Pliers, Lineman
Pliers, Water Pump
Plugs, Wood, 1" & 6"
Plugs, Wooden Box, 1", 1¼', 1½', 2", 2½", 3"
Rubber, Roll 1/16" thick, 10' X 3'
Screwdrivers, Large Standard
Screwdrivers, Medium Standard
Screwdrivers, Phillips, Large
Screwdrivers, Phillips, Medium
String, Ball
Twine, Bale
Wedges, Wooden
Wrench, Adjustable, 12"
Wrench, Adjustable, 8"
Wrench, Allen Pac 3/16", 7/32", 1/4", 5/16", 3/8"
Wrench, Allen Pac .050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", 5/32", 3/16", 7/32"
Wrench, Chain
Wrench, Hex, #110
Wrench, Hex, #17
Wrench, Hex, 24"
Wrench, Pipe, 18"
Wrench, Pipe, 14"

ENCLOSURE 2 TO APPENDIX D

Typical Onsite Search and Rescue/First Aid, Ambulance, and Hospital Radiation Emergency Equipment and Supplies

Onsite Search Rescue/First Aid:

Adjustable Litter
Basket Stretcher (Stokes)
First Aid Team Initial Response Kit with Inventory Sheet
Folding Litter
Portable Oxygen-Demand Valve (size D tank With assorted airways, cannulas, and masks)
Scoop Stretcher
Trauma Kit
Assorted Splinting Devices

Ambulance Kit:

Masking Tape ~~roll~~
~~Misc. Plastic~~Waste "Rad" Bags
Plastic Gloves
Cotton Gloves
~~Plastic Sheeting, 8' X 20'~~Herculite
~~Plastic~~ Shoe Covers
Portable Frisker and Probe
~~Set of Anti-contamination Clothing~~Lab Coats

Hospital:

Dosimeter Charger
Survey Meter
Frisker with Probe
Herculite ~~- white, green and yellow~~
Lead Container, high activity samples
Self Reading Dosimeters
Set of Radiation Signs and Ribbon
Stanchions/Pylons
Step-off Pad
Thermoluminescent Dosimeters, badge type
Thermoluminescent Dosimeters, ring type

Enclosure 5 to Appendix D (Cont'd.)

ENVIRONMENTAL MONITORING SYSTEMS

2. **Typical Radiological Monitoring Team Equipment**

Emergency Planning and Grid Coordinate Maps
Stopwatch, tweezers, masking tape
Gamma Survey Meter with current calibration
Low Volume Air Sampler and Head
Potassium Iodide Tablets
Radioactive Material Stickers
Particulate Filters, box
Silver Zeolite Cartridges
Disposable Plastic Gloves
Plastic sample bags and labels
Flashlight
Spare Batteryies ~~and Fuse kit~~
~~Self Reading Dosimetry~~Portable Frisker with Probe

3. **Typical Emergency Environmental Sample Kit Contents**

Assortment of Sampling Bags	~~Rubber/~~Plastic Gloves
Flashlight	Sample Containers
Grid Coordinate Map	Sample Labels
~~Low and High Range~~Electronic Dosimeters	Scale
Pliers	Scissors
~~Self Reading Dosimetry~~	Spare Batteries

Timothy S. Rausch
Sr. VP and CNO

Susquehanna Nuclear LLC
769 Salem Boulevard
Berwick, PA 18603
Tel. 570.542.3445
Timothy.Rausch@TalenEnergy.com

TALEN ENERGY

July 17, 2015

SUSQUEHANNA NUCLEAR LLC POLICY STATEMENT:

SUSQUEHANNA STEAM ELECTRIC STATION EMERGENCY MANAGEMENT

Immediate response, assessment, and the implementation of protective and corrective measures pertaining to an emergency condition at the Susquehanna Steam Electric Station shall be the responsibility of the SSES Emergency Director until relieved of this function by the Recovery Manager. The individuals who shall act in the capacity of SSES Emergency Managers are determined as follows:

Immediately upon the occurrence of an emergency, the Shift Manager on duty at the station shall assume the role of SSES Emergency Director, as described in the SSES Emergency Plan, until relieved of that responsibility by the Emergency Director or his designated alternate.

If the emergency requires activation of the Emergency Operations Facility (EOF), the SSES Recovery Manager shall assume responsibility for overall management of the emergency and off-site Protective Action Recommendations: The SSES Emergency Director retains responsibility for on-site operations.

The SSES Emergency Managers shall implement applicable portions of the SSES Emergency Plan to prevent or mitigate the consequences of emergencies at the Susquehanna Steam Electric Station. They shall have the authority to act on behalf of Susquehanna Nuclear, LLC, in all matters concerning an emergency, at least until such time as the scope, severity, and potential radiological consequences have been assessed, and the appropriate protective and corrective actions have been implemented. Following that critical period, but still with complete regard for health and safety, major decisions and Corporate commitments are the responsibility of Susquehanna Nuclear, LLC, Management.

Throughout the course of an emergency condition, all expertise and support available within the Susquehanna Nuclear, LLC organization shall be provided at the request of the SSES Emergency Managers.

Timothy S. Rausch

Brad Berryman
Sr. Vice President & Chief Nuclear Officer

Susquehanna Nuclear, LLC
769 Salem Boulevard
Berwick, PA 18603
Tel. 570.542.2904
brad.berryman@talenenergy.com

TALEN ENERGY

October 29, 2018

SUSQUEHANNA NUCLEAR LLC POLICY STATEMENT:

SUSQUEHANNA STEAM ELECTRIC STATION EMERGENCY MANAGEMENT

Immediate response, assessment, and the implementation of protective and corrective measures pertaining to an emergency condition at the Susquehanna Steam Electric Station shall be the responsibility of the SSES Emergency Director until relieved of this function by the Recovery Manager. The individuals who shall act in the capacity of SSES Emergency Managers are determined as follows:

> Immediately upon the occurrence of an emergency, the Shift Manager on duty at the station shall assume the role of SSES Emergency Director, as described in the SSES Emergency Plan, until relieved of that responsibility by the Emergency Director or his designated alternate.
>
> If the emergency requires activation of the Emergency Operations Facility (EOF), the SSES Recovery Manager shall assume responsibility for overall management of the emergency and off-site Protective Action Recommendations: The SSES Emergency Director retains responsibility for on-site operations.

The SSES Emergency Managers shall implement applicable portions of the SSES Emergency Plan to prevent or mitigate the consequences of emergencies at the Susquehanna Steam Electric Station. They shall have the authority to act on behalf of Susquehanna Nuclear, LLC, in all matters concerning an emergency, at least until such time as the scope, severity, and potential radiological consequences have been assessed, and the appropriate protective and corrective actions have been implemented. Following that critical period, but still with complete regard for health and safety, major decisions and Corporate commitments are the responsibility of Susquehanna Nuclear, LLC, Management.

Throughout the course of an emergency condition, all expertise and support available within the Susquehanna Nuclear, LLC organization shall be provided at the request of the SSES Emergency Managers.

Brad Berryman

E-PLAN REV 62

Attachment A, 10CFR50.54q Screening Form

Screening Number: S2018-10-25-01	

Part I. Description of Activity Being Reviewed (event or action, or series of actions that may result in a change to the Emergency Plan or affect the implementation of the Emergency Plan). Provide the existing text and the revised text (attaching a mark-up of the existing text with proposed change can be used as an alternative):

1. Revision 62 of the Emergency Plan takes credit for the 2018 annual review.
2. Replaced "Manager-Emergency Preparedness" with "Manager-Security/Emergency Preparedness" throughout the document per AR-2018-04646 (S2018-03-28-01)
3. Updated Figures 4.1 and 4.2 per AR-2018-13801. (this screening)
4. Replaced "outlines" with "outlined" in second paragraph of section 5.1.4. (this screening)
5. Added "(Alert or higher emergency declaration)" after "classification" in Section 6.0, phase II section. (this screening)
6. Removed section 6.2.7e from the Security Coordinator responsibility to section 6.2.1.p per AR-2017-09053 and AR-2017-20479. (this screening)
7. Combined sections 6.2.5.a with 6.2.5.i in current step 6.2.5.a and renumbered the remaining steps. (this screening)
8. Added steps 6.3.1.1.m and 6.3.1.4.h per AR-2018-13835 (S2018-10-02-01, changes 1.a, 7c and 7.e).
9. Corrected typo in section 6.3.1.5 (this screening)
10. Added EOF Technical Advisor position to Figure 6.4 per AR-2018-13095. (this screening)
11. Reordered bullets in bulleted list in section 7.1. (this screening)
12. Deleted reference to supplemental meteorological tower from section 7.1.1.1 per AR-2017-17969 (S2018-10-29-01/E2018-10-29-03)
13. Replaced "wind variability" with "wind direction variability" in the first paragraph of section 7.1.1.1. (this screening)
14. Replaced and with when in the seventh paragraph in Section 7.1.1.3. (this screening)
15. Deleted "To the extent reasonable, persons with high lifetime cumulative radiation exposure should not take part in these actions." from Table 7.2 per AR-2018-13465. (S2018-10-24-01/E2018-10-24-01)
16. Replaced "—" with empty spaces in Health Effects Associated with Whole Body Absorbed Doses Received Within a Few Hours Table in Table 7.2. (this screening)
17. Replaced TSC with CR in the second paragraph of section 8.1.2. (this screening)
18. Updated name and address for PEMA Headquarters in section 8.3.2 per AR-2018-06092. (this screening)
19. Updated location of the redundant control for ANS station in section 8.5.4 per AR-2018-06919. (E2018-04-26-01)
20. Refined description of the plant computer capabilities in the 5th bullet in Section 8.9.1. (this screening)
21. Removed the phrase "For Example: Offsite Emergency Calendars)" from section 9.4.4 per DPA-10-DI-2018-06672. (this screening)
22. Updated MOA for heavy equipment in Appendix A per ACT-02-CR-2018-03742. (E2018-10-29-01)
23. Updated Fire Department MOA in Appendix A per ACT-02-CR-2018-12173. (E2018-10-29-02)
24. Deleted "EOF Information Coordinator" from Appendix C per DPA-06-DI-2018-06672 (S2017-10-25-01).
25. Deleted "OSC Clerk" from Appendix C per AR-2017-20382 (S2017-11-21-01)
26. Changed Appendix D Enclosures per AR-2018-04987 (E2018-04-13-01)
27. Updated Corporate Policy letter in Appendix E with current ~~CFO~~ CNO signature. (this screening) JJM 12/18/18

This screening addresses only changes 1, 3, 4, 5, 6, 7, 9, 10, 11, 13, 14, 16, 17, 18, 20, 21 and 27. All the other changes were addressed by separate 10CFR50.54(q) screening and evaluations indicated in the parenthesis. All changes are shown in Attachment 1.

Part II. Activity a Change per Section 3.1.3? Does the activity constitute a change per definition 3.1.3 - An action that results in modification or addition to, or removal from the SSES Emergency Plan, **OR** the resources, capabilities and methods identified in the plan? Justification: Change 1, 3, 18 and 27 are administrative changes concerning up-revving the SSES Emergency Plan Rev 61 (E-Plan) to rev 62 to account for the annual review and updating old maps and FEMA EOC address or updating MOA with current ~~CFO~~ CNO signature without changing any content. JJM 12/10/18 Changes 5, 7, 10, 13, 20 and 21 are enhancements that do not change the intent of, or affect the resources, capabilities and methods in the E-Plan. In particular, change 10 updates the EOF Organization chart with EOF Tech Advisor position that is part of the EOF organization since 2003. Note that this position is not considered a key position, has an administrative 90 minute requirement to report to EOF after receiving a pager but is not reflected in Table 6.1 of the E-Plan. This position is the equivalent of TSC Operations Coordinator who is permanently on line with the Shift Manager and, if EOF is in control of emergency, will readily communicate and advise the Recovery Manager on plant status. This change just aligns the E-Plan with the current EOF operations since 2003 and anchors this position in the E-Plan. Changes 4, 9, 14 and 17 corrected typos. In particular, change 17 corrects the location of the backup TSC that, being in the Shift Manager office, is closer to the CR than TSC. Change 6 aligns responsibilities of TSC Emergency Director (ED), TSC Security Coordinator and TSC Administrative Coordinator in the E-Plan with SSES operations since at least 1999. Per EP-PS procedures for which documentation could be found (at least since 1999), the TSC ED is responsible for ensuring next shift through the TSC Administrative Coordinator not through the TSC Security Coordinator. No training is necessary for thins change since the TSC is operating that way per their procedures since at least 1999. This change merely aligns the responsibilities in the E-Plan with those delineated in the implementing EP-PS procedures. Changes 11 and 16 are formatting changes. None of the applicable changes of this screening described above alter any E-Plan commitments or constitute a change per 3.1.3 of EP-102 procedure.	☐ YES Continue to next part	☒ NO 10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.
Part III. Activity Previously Reviewed? Is this activity fully bounded by an NRC approved 10 CFR 50.90 submittal or Alert and Notification System Design Report (44 CFR 350.14)? If YES, identify bounding source document number/approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below: Justification: ☐ Bounding document attached (optional)	☐ YES 10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	☐ NO Continue to next part

Part IV. Editorial Change Is this activity an editorial or typographical change such as formatting, paragraph numbering, spelling, or punctuation that does not change intent per definition 3.1.4?	☐ YES 10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	☐ NO Continue to next part
Justification:		

Part V. Emergency Planning Element/Function Screen (Associated 10 CFR 50.47(b) planning standard function identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.

1.	Responsibility for emergency response is assigned. [1]	☐
2.	The response organization has the staff to respond and to augment staff on a continuing basis (24/7 staffing) in accordance with the Emergency Plan. [1]	☐
3.	The process ensures that on shift emergency response responsibilities are staffed and assigned. [2]	☐
4.	The process for timely augmentation of on-shift staff is established and maintained. [2]	☐
5.	Arrangements for requesting and using off site assistance have been made. [3]	☐
6.	State and local staff can be accommodated at the EOF in accordance with the Emergency Plan. [3]	☐
7.	A standard scheme of emergency classification and action levels is in use. [4] (RSPS)	☐
8.	Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications. [5] (RSPS)	☐

Attachment A, 10CFR50.54q Screening Form, Continued

Part V. Emergency Planning Element/Function Screen (cont.) (Associated 10 CFR 50.47(b) planning standard identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.	
9. Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway. [5] (RSPS)	☐
10. The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter. [5] (RSPS)	☐
11. Systems are established for prompt communication among principal emergency response organizations. [6]	☐
12. Systems are established for prompt communication to emergency response personnel. [6]	☐
13. Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway Emergency Planning Zone (EPZ). [7]	☐
14. Coordinated dissemination of public information during emergencies is established. [7]	☐
15. Adequate facilities are maintained to support emergency response. [8]	☐
16. Adequate equipment is maintained to support emergency response. [8]	☐
17. Methods, systems, and equipment for assessment of radioactive releases are in use. [9] (RSPS)	☐
18. A range of public PARs is available for implementation during emergencies. [10] (RSPS)	☐
19. Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities. [10] (RSPS)	☐
20. KI is available for implementation as a protective action recommendation in those jurisdictions that chose to provide KI to the public [10]	☐
21. A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]	☐
22. The resources for controlling radiological exposures for emergency workers are established. [11]	☐
23. Arrangements are made for medical services for contaminated, injured individuals. [12]	☐
24. Plans for recovery and reentry are developed. [13]	☐
25. A drill and exercise program (including radiological, medical, health physics and other program areas) is established. [14]	☐
26. Drills, exercises, & training evolutions that provide performance opportunities to develop, maintain, & demonstrate key skills are assessed via a formal critique process in order to identify weaknesses. [14]	☐
27. Identified weaknesses are corrected. [14]	☐
28. Training is provided to emergency responders. [15]	☐
29. Responsibility for Emergency Plan development and review is established. [16]	☐
30. Planners responsible for Emergency Plan development and maintenance are properly trained. [16]	☐

APPLICABILITY CONCLUSION

☒ If no Part V criteria are checked, a 10 CFR 50.54(q) Evaluation is NOT required; complete Part VI.
☐ If any Part V criteria are checked, complete Part VI and perform a 10 CFR 50.54(q) Evaluation.

Part VI. Signatures:

Adrian Miron		10/25/18
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
JOE METER		11/2/18
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

Attachment A, 10CFR50.54q Screening Form

Screening Number: S2017-10-25-01	

Part I. Description of Activity Being Reviewed (event or action, or series of actions that may result in a change to the Emergency Plan or affect the implementation of the Emergency Plan). Provide the existing text and the revised text (attaching a mark-up of the existing text with proposed change can be used as an alternative):

EP-PS-207 Rev 26 Changes

1. Added EOF Information Coordinator duties of WebEOC to procedure since the EOF Information Coordinator position is being removed. Created Attachment A, Added sections 5.6 to 5.9
2. Updated the name of Logkeeping Instructions to Logkeeping Instruction and paper log forms (AR-2017-27157)

EP-PS-252 Rev 5 Changes

1. This procedure is being deleted due to the ERO Position of EOF Information Coordinator being removed from the Susquehanna Nuclear, LLC ERO. EOF Information Coordinator duties listed in this procedure have been relocated to EP-PS-207 as needed.

Part II. Activity a Change per Section 3.1.3?	☐ YES	☒ NO
Does the activity constitute a change per definition 3.1.3 - An action that results in modification or addition to, or removal from the SSES Emergency Plan, **OR** the resources, capabilities and methods identified in the plan? Justification: Removing the EOF Information Coordinator (EP-PS-252) and placing their duties into the EOF Support Supervisor (EP-PS-207) is in alignment with Rev 61 of the EPlan. There is no mention in EPLan Rev 61 of the EOF Information Coordinator or WebEOC. Adding WebEOC to the EOF Support Supervisor aligns with their existing duties in the EPlan Rev 61, section 6.3.1.3 of 'Provide support to the Recovery Manager in review of plant data'. Changing their duties from maintaining their own WebEOC entries to the maintaining the overall EOF WebEOC entries is not an additional burden to the positon. Item 2 of EP-PS-207 is an editorial change. None of the changes above result in modification or addition to, or removal from the SSES Emergency Plan or the resources capabilities and methods identified in the plan.	Continue to next part	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.

Part III. Activity Previously Reviewed?	☐ YES	☐ NO
Is this activity fully bounded by an NRC approved 10 CFR 50.90 submittal or Alert and Notification System Design Report (44 CFR 350.14)? If YES, identify bounding source document number/approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below: Justification: ☐ Bounding document attached (optional)	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	Continue to next part

Part IV. Editorial Change	☐ YES	☐ NO
Is this activity an editorial or typographical change such as formatting, paragraph numbering, spelling, or punctuation that does not change intent per definition 3.1.4? Justification:	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	Continue to next part

Part V. Emergency Planning Element/Function Screen (Associated 10 CFR 50.47(b) planning standard function identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.

1.	Responsibility for emergency response is assigned. [1]	☐
2.	The response organization has the staff to respond and to augment staff on a continuing basis (24/7 staffing) in accordance with the Emergency Plan. [1]	☐
3.	The process ensures that on shift emergency response responsibilities are staffed and assigned. [2]	☐
4.	The process for timely augmentation of on-shift staff is established and maintained. [2]	☐
5.	Arrangements for requesting and using off site assistance have been made. [3]	☐
6.	State and local staff can be accommodated at the EOF in accordance with the Emergency Plan. [3]	☐
7.	A standard scheme of emergency classification and action levels is in use. [4] (RSPS)	☐
8.	Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications. [5] (RSPS)	☐

Attachment A, 10CFR50.54q Screening Form, Continued

Part V. Emergency Planning Element/Function Screen (cont.) (Associated 10 CFR 50.47(b) planning standard identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.		
9.	Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway. [5] (RSPS)	☐
10.	The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter. [5] (RSPS)	☐
11.	Systems are established for prompt communication among principal emergency response organizations. [6]	☐
12.	Systems are established for prompt communication to emergency response personnel. [6]	☐
13.	Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway Emergency Planning Zone (EPZ). [7]	☐
14.	Coordinated dissemination of public information during emergencies is established. [7]	☐
15.	Adequate facilities are maintained to support emergency response. [8]	☐
16.	Adequate equipment is maintained to support emergency response. [8]	☐
17.	Methods, systems, and equipment for assessment of radioactive releases are in use. [9] (RSPS)	☐
18.	A range of public PARs is available for implementation during emergencies. [10] (RSPS)	☐
19.	Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities. [10] (RSPS)	☐
20.	KI is available for implementation as a protective action recommendation in those jurisdictions that chose to provide KI to the public [10]	☐
21.	A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]	☐
22.	The resources for controlling radiological exposures for emergency workers are established. [11]	☐
23.	Arrangements are made for medical services for contaminated, injured individuals. [12]	☐
24.	Plans for recovery and reentry are developed. [13]	☐
25.	A drill and exercise program (including radiological, medical, health physics and other program areas) is established. [14]	☐
26.	Drills, exercises, & training evolutions that provide performance opportunities to develop, maintain, & demonstrate key skills are assessed via a formal critique process in order to identify weaknesses. [14]	☐
27.	Identified weaknesses are corrected. [14]	☐
28.	Training is provided to emergency responders. [15]	☐
29.	Responsibility for Emergency Plan development and review is established. [16]	☐
30.	Planners responsible for Emergency Plan development and maintenance are properly trained. [16]	☐

APPLICABILITY CONCLUSION

☐ If no Part V criteria are checked, a 10 CFR 50.54(q) Evaluation is NOT required; complete Part VI.

☐ If any Part V criteria are checked, complete Part VI and perform a 10 CFR 50.54(q) Evaluation.		
Part VI. Signatures:		
Jacob Garcia		10-26-17
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
ADRIAN MIRON		10/26/17
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

Attachment A, 10CFR50.54q Screening Form

Screening Number: S2017-11-21-01	

Part I. Description of Activity Being Reviewed (event or action, or series of actions that may result in a change to the Emergency Plan or affect the implementation of the Emergency Plan). Provide the existing text and the revised text (attaching a mark-up of the existing text with proposed change can be used as an alternative):
Removing all Clerical support from the Emergency Response Organization (ERO). In addition, delete the OSC Clerk procedure EP-PS-120.

Part II. Activity a Change per Section 3.1.3?	☐ YES	☒ NO
Does the activity constitute a change per definition 3.1.3 - An action that results in modification or addition to, or removal from the SSES Emergency Plan, **OR** the resources, capabilities and methods identified in the plan? Justification: A review of the Emergency Plan Rev 61 shows no listing of clerical support other than in attachment C of the EPlan for the OSC Clerk position which is listed as a 'typical' position. The OSC Clerk, and the other clerical positions perform the administrative tasks of making copies, taking notes, taking phone calls or faxing information to other facilities. Having the OSC responders perform those functions on their own was tested during the Aug 1 2017 Full Scale drill which was very involved with the OSC. In addition, the TSC, EOF and JIC were tested without their clerical support during the Aug 1 Full Scale drill as well. There was no reduction in capability of the TSC, OSC, EOF or JIC to perform their roles based on this change. Rev 42 of the Emergency Plan, which is SSES SER in regards to staffing does not mention the OSC Clerk nor other clerical support in any place other than 'typical' procedures listed in attachment C. Removing clerical support is not a reduction to SSES implementation of the emergency plan. Therefore, removing the clerical support from the ERO is not a modification or addition to, or removal from the SSES Emergency Plan, **OR** the resources, capabilities and methods identified in the plan.	Continue to next part	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.

Part III. Activity Previously Reviewed?	☐ YES	☐ NO
Is this activity fully bounded by an NRC approved 10 CFR 50.90 submittal or Alert and Notification System Design Report (44 CFR 350.14)? If YES, identify bounding source document number/approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below: Justification: ☐ Bounding document attached (optional)	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	Continue to next part

Part IV. Editorial Change	☐ YES	☐ NO
Is this activity an editorial or typographical change such as formatting, paragraph numbering, spelling, or punctuation that does not change intent per definition 3.1.4? Justification:	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	Continue to next part

Part V. Emergency Planning Element/Function Screen (Associated 10 CFR 50.47(b) planning standard function identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.	
1. Responsibility for emergency response is assigned. [1]	☐
2. The response organization has the staff to respond and to augment staff on a continuing basis (24/7 staffing) in accordance with the Emergency Plan. [1]	☐
3. The process ensures that on shift emergency response responsibilities are staffed and assigned. [2]	☐
4. The process for timely augmentation of on-shift staff is established and maintained. [2]	☐
5. Arrangements for requesting and using off site assistance have been made. [3]	☐
6. State and local staff can be accommodated at the EOF in accordance with the Emergency Plan. [3]	☐
7. A standard scheme of emergency classification and action levels is in use. [4] (RSPS)	☐
8. Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications. [5] (RSPS)	☐

Attachment A, 10CFR50.54q Screening Form, Continued

Part V. Emergency Planning Element/Function Screen (cont.) (Associated 10 CFR 50.47(b) planning standard identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.	
9. Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway. [5] (RSPS)	☐
10. The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter. [5] (RSPS)	☐
11. Systems are established for prompt communication among principal emergency response organizations. [6]	☐
12. Systems are established for prompt communication to emergency response personnel. [6]	☐
13. Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway Emergency Planning Zone (EPZ). [7]	☐
14. Coordinated dissemination of public information during emergencies is established. [7]	☐
15. Adequate facilities are maintained to support emergency response. [8]	☐
16. Adequate equipment is maintained to support emergency response. [8]	☐
17. Methods, systems, and equipment for assessment of radioactive releases are in use. [9] (RSPS)	☐
18. A range of public PARs is available for implementation during emergencies. [10] (RSPS)	☐
19. Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities. [10] (RSPS)	☐
20. KI is available for implementation as a protective action recommendation in those jurisdictions that chose to provide KI to the public [10]	☐
21. A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]	☐
22. The resources for controlling radiological exposures for emergency workers are established. [11]	☐
23. Arrangements are made for medical services for contaminated, injured individuals. [12]	☐
24. Plans for recovery and reentry are developed. [13]	☐
25. A drill and exercise program (including radiological, medical, health physics and other program areas) is established. [14]	☐
26. Drills, exercises, & training evolutions that provide performance opportunities to develop, maintain, & demonstrate key skills are assessed via a formal critique process in order to identify weaknesses. [14]	☐
27. Identified weaknesses are corrected. [14]	☐
28. Training is provided to emergency responders. [15]	☐
29. Responsibility for Emergency Plan development and review is established. [16]	☐
30. Planners responsible for Emergency Plan development and maintenance are properly trained. [16]	☐

APPLICABILITY CONCLUSION

☐ If no Part V criteria are checked, a 10 CFR 50.54(q) Evaluation is NOT required; complete Part VI.
☐ If any Part V criteria are checked, complete Part VI and perform a 10 CFR 50.54(q) Evaluation.

Part VI. Signatures:

Jacob Garcia		11/21/2017
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
JOE METER		11/21/17
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

Attachment A, 10CFR50.54q Screening Form

Screening Number: S2018-03-28-01		
Part I. Description of Activity Being Reviewed (event or action, or series of actions that may result in a change to the Emergency Plan or affect the implementation of the Emergency Plan). Provide the existing text and the revised text (attaching a mark-up of the existing text with proposed change can be used as an alternative): The attached current organization chart and DLAP article describe the changes that are being made to the SSES organizational structure. These changes are being made by SSES Senior Management to streamline the organization.		
Part II. Activity a Change per Section 3.1.3? Does the activity constitute a change per definition 3.1.3 - An action that results in modification or addition to, or removal from the SSES Emergency Plan, **OR** the resources, capabilities and methods identified in the plan? Justification: See Part IV	☒ YES Continue to next part	☐ NO 10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.
Part III. Activity Previously Reviewed? Is this activity fully bounded by an NRC approved 10 CFR 50.90 submittal or Alert and Notification System Design Report (44 CFR 350.14)? If YES, identify bounding source document number/approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below: Justification: ☐ Bounding document attached (optional)	☐ YES 10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	☒ NO Continue to next part
Part IV. Editorial Change Is this activity an editorial or typographical change such as formatting, paragraph numbering, spelling, or punctuation that does not change intent per definition 3.1.4?	☒ YES 10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	☐ NO Continue to next part

Justification:Definition 3.1.4 states in part - Change to position titles when no responsibilities for that position have changed. The changes described in the attached DLAP do not affect the SSES Emergency Response Organization (ERO). Instead they are changes to titles and reporting relationships within the SSES normal operating organization.

These changes do not reduce or eliminate the responsibilities, activities or duties that are conducted by ERO. The changes also do not affect the function or description of Organization Control that is described in sections 4.2.2, 6.1, 6.2, 6.3, and Table 6.1, or the responsibilities of the Manager - Emergency Preparedness in sections 9.2, 9.3, 9.4 and Appendix A of the SSES Emergency Plan Revision 61.

The changes do affect the reporting path for the Emergency Preparedness (EP) group; however this change only affects the organizational position to which the EP group reports directly. This group had reported to the Site Vice President via the Plant Manager via the GM - Support via the Manager - Emergency Preparedness. The EP group will now report to the Site Vice President via the Manager - Security/Emergency Preparedness. This change will increase the organizational accessibility of the EP group to the Sr. Vice President and CNO. All of the current requirements for the Manager - Emergency Preparedness will be excuted or deligated as appropriate by the Manager - Security/Emergency Preparedness.

This change is organizational in nature and does not affect the SSES Emergency Plan commitments or the resources available to meet those commitments. In addition, these changes do not affect the ability to staff the required on-call ERO positions or the EP group.

AR-2018-04646 will track the need to change the Manager - Emergency Preparedness to Manager - Security /Emergency Preparedness in the Emergency Plan.

Part V. Emergency Planning Element/Function Screen (Associated 10 CFR 50.47(b) planning standard function identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.

1.	Responsibility for emergency response is assigned. [1]	☐
2.	The response organization has the staff to respond and to augment staff on a continuing basis (24/7 staffing) in accordance with the Emergency Plan. [1]	☐
3.	The process ensures that on shift emergency response responsibilities are staffed and assigned. [2]	☐
4.	The process for timely augmentation of on-shift staff is established and maintained. [2]	☐
5.	Arrangements for requesting and using off site assistance have been made. [3]	☐
6.	State and local staff can be accommodated at the EOF in accordance with the Emergency Plan. [3]	☐
7.	A standard scheme of emergency classification and action levels is in use. [4] (RSPS)	☐
8.	Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications. [5] (RSPS)	☐

Attachment A, 10CFR50.54q Screening Form, Continued

Part V. Emergency Planning Element/Function Screen (cont.) (Associated 10 CFR 50.47(b) planning standard identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.

9.	Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway. [5] (RSPS)	☐
10.	The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter. [5] (RSPS)	☐
11.	Systems are established for prompt communication among principal emergency response organizations. [6]	☐
12.	Systems are established for prompt communication to emergency response personnel. [6]	☐
13.	Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway Emergency Planning Zone (EPZ). [7]	☐
14.	Coordinated dissemination of public information during emergencies is established. [7]	☐
15.	Adequate facilities are maintained to support emergency response. [8]	☐
16.	Adequate equipment is maintained to support emergency response. [8]	☐
17.	Methods, systems, and equipment for assessment of radioactive releases are in use. [9] (RSPS)	☐
18.	A range of public PARs is available for implementation during emergencies. [10] (RSPS)	☐
19.	Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities. [10] (RSPS)	☐
20.	KI is available for implementation as a protective action recommendation in those jurisdictions that chose to provide KI to the public [10]	☐
21.	A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]	☐
22.	The resources for controlling radiological exposures for emergency workers are established. [11]	☐
23.	Arrangements are made for medical services for contaminated, injured individuals. [12]	☐
24.	Plans for recovery and reentry are developed. [13]	☐
25.	A drill and exercise program (including radiological, medical, health physics and other program areas) is established. [14]	☐
26.	Drills, exercises, & training evolutions that provide performance opportunities to develop, maintain, & demonstrate key skills are assessed via a formal critique process in order to identify weaknesses. [14]	☐
27.	Identified weaknesses are corrected. [14]	☐
28.	Training is provided to emergency responders. [15]	☐
29.	Responsibility for Emergency Plan development and review is established. [16]	☐
30.	Planners responsible for Emergency Plan development and maintenance are properly trained. [16]	☐

APPLICABILITY CONCLUSION

☐ If no Part V criteria are checked, a 10 CFR 50.54(q) Evaluation is NOT required; complete Part VI.
☐ If any Part V criteria are checked, complete Part VI and perform a 10 CFR 50.54(q) Evaluation.

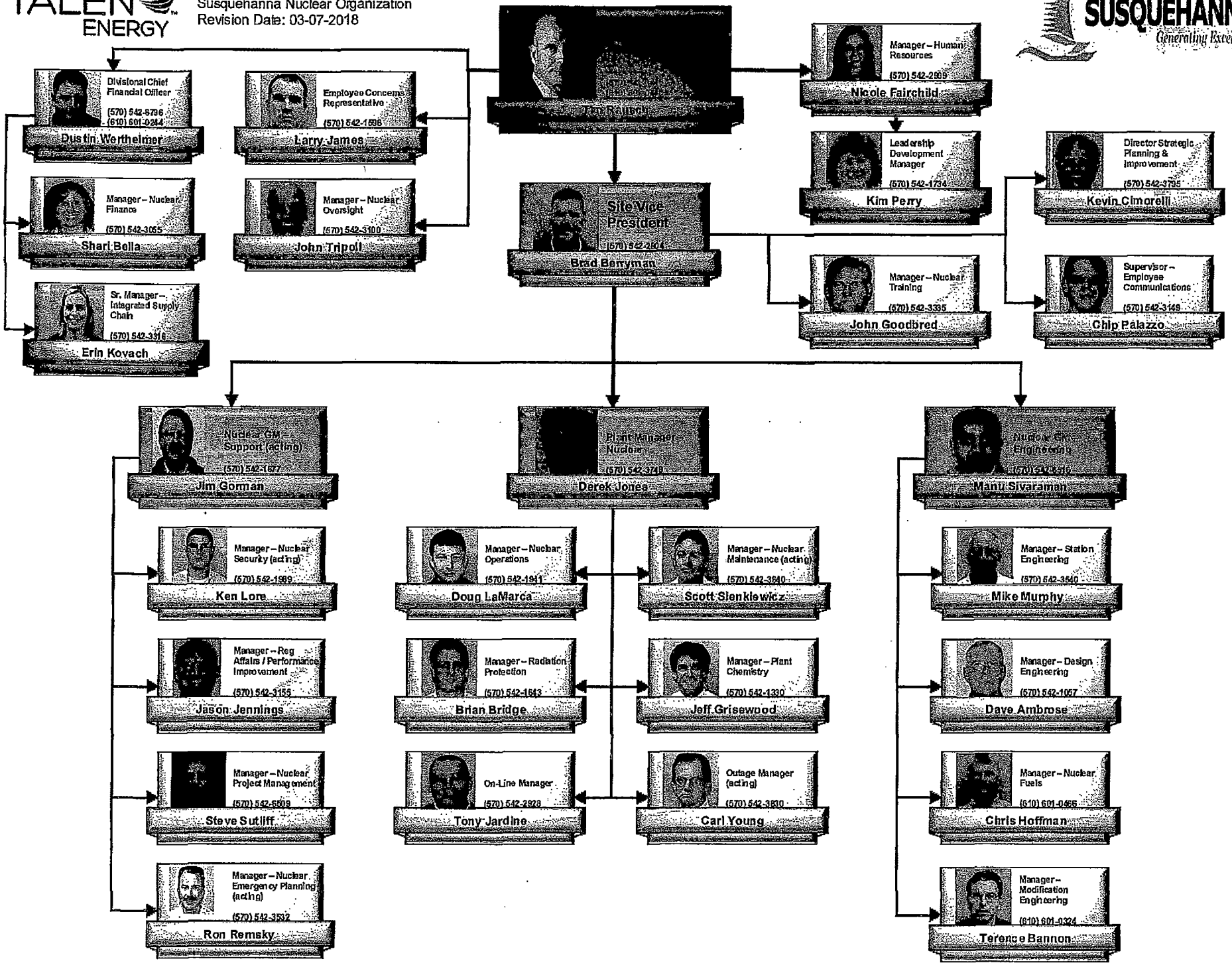
Part VI. Signatures:

Joe Meter	Joseph J. Meter	3/28/18
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
Ron Remsky	Joseph J. Meter FOR R. REMSKY VIA TELECON	3/28/18
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

TALEN ENERGY

Susquehanna Nuclear Organization
Revision Date: 03-07-2018

TEAM SUSQUEHANNA. Generating Excellence



News of immediate interest to Team Susquehanna
DLAP Insert: Weds.-Fri., Mar. 28-30, 2018

OUR PLANT OUR FUTURE

ORGANIZATIONAL EXCELLENCE

TRAINING EXCELLENCE

Gorman to serve as Nuclear Security/Emergency Planning Manager:

Timing result of key vacancies, strategy to maintain strong leadership presence

Article Contact: Site Vice President Brad Berryman (Ext. 2904)

Jim Gorman, who recently served as interim Programs General Manager, has accepted the role of Manager, Nuclear Security and Emergency Preparedness (EP), helping Susquehanna to become more efficient and provide a span of control and tested leadership for these areas. Jim reports to Site VP Brad Berryman effective today, Weds., Mar. 28, 2018.

Security and E-Plan will now report to Manager Jim Gorman.

Other organizational changes that provide a strategic fit for the Station include Nuclear Regulatory Affairs (NRA) and Performance Improvement (PI), led by Manager Jason Jennings, will now report to Site Vice President Brad Berryman.

Projects and Document Control Services (DCS) will report to Divisional Chief Financial Officer Dustin Wertheimer. For Projects, this alignment allows for improved accountability for spending, planning and more. DCS will not only gain an outside perspective, it will receive leadership to drive improvement and innovation within that organization. The Procedure Group will benefit from a new reporting structure to Plant Manager Derek Jones.

"These organizational changes are just another step on our journey to nuclear excellence at Susquehanna Station," said **Site Vice President Brad Berryman**. "With Jim's proven leadership to these crucial Station organizations, a new reporting relationship for Regulatory Affairs and Performance Improvement, Dustin lending financial and strategic insight to Projects and DCS, and Procedures now reporting directly to Derek, I expect we'll all help each of them excel in their own ways."

Projects and DCS will now report to Divisional CFO Dustin Wertheimer.

As for Nuclear Security and EP, Jim helped both of these organizations to improve rapidly when he led them earlier in his career. For EP, Jim helped lead them into the upper quartiles of nuclear performance in short order. As Nuclear Security Manager, their tactical performance became legend as they successfully defended the Station on multiple occasions during the U.S. Nuclear Regulatory Commission's Force-On-Force Drill in 2014.

Jim served as EP Manager for Susquehanna beginning in 2015, not only responsible for the oversight of the EP program and its team of nine, but as Senior EP Liaison to the Federal Emergency Management Agency, the NRC and the Pennsylvania Emergency Management Agency. From 2011 through 2015, Jim served as Susquehanna's Nuclear Security Manager, responsible for oversight of the physical security, access authorization, fitness for duty, medical services and security training programs.

You are encouraged to assist and support these organizations as they settle into their new reporting roles and these leaders as they provide new and tested direction to their teams.

Talking Points/Key Messaging for Supervisors re Organizational Changes March 2018 Draft v2

Supervisor Talking Points
Re: Organizational Changes in March 2018
March 27, 2018

What's Important to Know:

1. In light of Susquehanna's pursuit of Simplification, Engagement and Teamwork, rather than simply fill an open position with another qualified candidate from inside or outside Team Susquehanna, the Senior Leadership Team (SLT) thoughtfully reconfigured and merged the roles of Nuclear Security Manager and Emergency Planning Manager, to fit an internal candidate who will more than satisfy both of those roles.

2. Today, the SLT announced that the newly formed **Nuclear Security and Emergency Planning Manager** position will be led by Station veteran Jim Gorman, who will provide experienced, familiar leadership to departments which he's successfully led in the past.

3. Jim's effective date is today, Wednesday, March 28, 2018, and he will report to Site Vice President Brad Berryman. This move will help the Station become more efficient, providing these organizations with a strong leader, and will also give Jim a span of control in these areas.

4. Nuclear Regulatory Affairs (NRA)/Performance Improvement (PI), led by Jason Jennings, will report to Site Vice President Brad Berryman.

5. Projects and Document Control Services (DCS) will report to Divisional Chief Financial Officer Dustin Wertheimer. For Projects, this alignment allows improved accountability for spending, planning and more. For DCS, they'll not only gain an outside perspective, they will receive leadership to drive improvement and innovation within their organization.

6. The Procedure Group will benefit from a new reporting structure to Plant Manager Derek Jones.

Attachment B, 10CFR50.54q Evaluation Checklist

Evaluation Number: E2018-04-13-01	Screen Number: S not applicable

Part I. Description of Proposed Change (Copy applicable information from 50.54(q) screen form Part I or attach a mark-up of the existing text with the proposed change can be used as an alternative):
See Attachment

Part II. Evaluation of the Proposed Change for Compliance with the requirements of 10 CFR 50.47(b) and 10 CFR 50 Appendix E:
See Attachment

Part III. Evaluation of Emergency Planning Functions, Elements, and Commitments affected by the Proposed Change and the Licensing Basis for those Functions, Elements, and Commitments:
See Attachment

Part IV. Evaluation of the Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions:
See Attachment

Part V. Evaluation Conclusion
Answer the following questions about the proposed change.

1.	Does the proposed change comply with 10 CFR 50.47(b) and 10 CFR 50 Appendix E?	☒ YES ☐ NO
2.	Does the proposed change maintain the effectiveness of the Emergency Plan (i.e., no reduction in effectiveness)?	☒ YES ☐ NO
3.	Does the proposed change constitute an emergency action level scheme change?	☐ YES ☒ NO

If questions 1 or 2 are answered NO, or question 3 answered YES, obtain prior NRC approval under provisions of 10 CFR 50.90. If questions 1 and 2 are answered YES, and question 3 answered NO, implement applicable change process(es).

Part VI. Signatures:

Jacob Garcia	[signature]	4.16.18
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
JOE METER	[signature]	4/16/18
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

PLANNING STANDARD 8 TEMPLATE – EMERGENCY FACILITIES AND EQUIPMENT

Change information highlighted in yellow for applicable situation. Consider NRC finding examples in INSPECTION MANUAL CHAPTER 0609, APPENDIX B (9/22/15) when performing evaluation.

Background and Scope:

E2018-04-13-01 Attachment
EP-00-006 Rev 6 changes:

1. Attachment E, changed AC/P to AP/C (DI-2015-29572)

2. Attachment X, changed Bloomsburg Service Center to Susquehanna Environmental Lab (AR-2016-08585)

3. Attachment H, changed note 1 from Located in the HP Instrument Office to Located at Unit 2 HP Control Point, removed note 2 and changed note 3 to be note 2 (AR-2016-05912), changed protective gloves to disposable gloves, changed Tape, roll to Masking Tape, replaced portable frisker with probe to be portable frisker and probe, changed Sets of Anti-Contamination Clothing to Anti-Contamination Clothing (Coveralls, shoe covers, hoods)

4. Updated DS001 through DS006 to be DS003 through DS006 in Attachments P, Q and U. Added SAG-1/2 to replace DS001 and DS002.

5. Removed Attachment CC, Quarterly ERMS Checks (DPA-02-DI-2017-15922)

6. Attachment H, changed Survey Instrument Check Source to Gamma Survey Meter Check Source, removed the spare frisker cable

7. Attachment J, Changed PC's to be more specific in quantity; 1 case of coveralls is now 12, Plastic and Cotton Gloves are now 24, Shoe Covers and Hoods are now 12

8. Attachment T, removed Electronic Dosimetry PDA and Spare batteries, removed frisker 110v power cord, changed plastic bags sizes to be just plastic bags count 100, changed Portable Filters to be Particulate Filters

9. Attachment C, changed plastic bags sizes to be just plastic bags count 100, removed frisker 110v power cord, changed Portable Filters to be Particulate Filters

10. Attachment I, Changed Floor covering Material to Herculite and updated count to be as sufficient, added Shoe Covers with a count of 4

11. Attachment K, changed NDAP-QA-0672-2 Forms to be entire procedure 1 copy, added a copy of the entire procedures HP-TP-510 NDAP-QA-0627 SP-00-308, updated PC clothing to be 6 (Coveralls, Shoe Covers, Hoods) and gloves to be 12 pair, removed box from paper towels (now paper towels 3 rolls) , removed Spare frisker probe and cable

12. Attachment G, removed SP-00-308-1, NDAP-QA-0627-2 and SP-00-308 Forms, removed second frisker, removed colors from hercultite, removed 2" from masking tape

13. Attachment F, removed SP-00-308-1, NDAP-QA-0627-2 and SP-00-308 Forms, removed second frisker, removed colors from hercultite, removed 2" from masking tape

14. Removed C batteries throughout the procedure

15. Attachment D, removed spare frisker power cord

Attachment W, removed procedure counts (example 2 each after the procedure number is now blank)

Items 1, 2, and 3 are editorial.

Item 4 is due to DS001 and DS002 Damage Support Boards that were replaced by the SAG-1/2 boards respectively and is an administrative change.

Item 5 was to align procedure with recent EPlan Rev 61 which removed ERMS (reference eval E2017-07-03-01).

Item 6: changing the name of Survey Instrument Check Source to Gamma Survey Meter Check is editorial; removing the spare frisker cable does not impact the ability of the frisker and is an editorial change.

Item 7 is being more specific on quantifies for Protective Clothing and is an administrative change.

Item 8: electronic dosimetry PDA and spare batteries are not required - 6 electronic dosimetry will remain for dose tracking; removing friskers 110v power cord does not impact frisker reliability and is an administrative change; changing specific plastic bag sizes to just be plastic bags count 100 still ensures plastic bags are available and is an administrative change; changing portable filters to glass fiber filters is an editorial change.

Item 9: changing specific plastic bag sizes to just be plastic bags count 100 still ensures plastic bags are available and is an administrative change; changing Portable Filters to be Particulate Filters is an editorial change.

Item 10: changing floor covering material to Herculite is an editorial change, changing the amount to as sufficient from 1 set is an administrative change. Adding Shoe Covers with a count of 4 is an administrative change; changing Portable Filters to be Particulate Filters is an editorial change.

Item 11: changing NDAP-QA-0672-2 Forms to be entire procedure 1 copy is an administrative change; adding a copy of the entire procedures HP-TP-510 NDAP-QA-0627 SP-00-308 is an administrative change; updating PC clothing/glove count is an administrative change; removing box from paper towels (now paper towels 3 rolls) is an administrative change; removing Spare frisker probe and cable is an administrative change.

Items 12&13: removing SP-00-308-1, NDAP-QA-0627-2 and SP-00-308 Forms is an administrative change; removing second frisker still ensures one frisker is available and is an administrative change, removing specific colors from Herculite still ensures Herculite is available and is an administrative change; removing 2" from masking tape still ensures masking tape is available and is an administrative change.

Item 14: is an administrative change, no equipment uses C batteries

Item 15: removing spare frisker power cord is an administrative change

Item 16: removing specific procedure counts still ensures that at least one copy of the procedure is available and is an administrative change.

Items 3 and 6 – 16 are the result of RP input. RP provided input for these changes and that work group is most knowledgeable with respect to the equipment needed for response to a radiological emergency.

Changes to the Emergency Plan Rev 61 will also need to occur to align with these changes above. See attached mark up for the EPlan changes. AR-2018-04987 generated to make this administrative changes next EPlan revision.

Part II. Evaluation of the Proposed Change for Compliance with the requirements of 10 CFR 50.47(b) and 10 CFR 50 Appendix E:

Evaluation of 10CFR50.47(b) requirements associated with ***Emergency Planning Standard [8]:***

- *10 CFR 50.47(b)(8) - Adequate emergency facilities and equipment to support the emergency response are provided and maintained.*

Items 1-16 still ensure that adequate emergency facilities and equipment will still be provided and maintained. Friskers will still be available and calibrated, Protective Clothing will still be available, electronic dosimetry will still be available, plastic bags are still available for samples and floor covering material (Herculite) is still available.

The changes to the EPlan are administrative in nature and still ensure that adequate emergency facilities and equipment will still be provided and maintained. Friskers will still be available and calibrated, Protective Clothing will still be available, electronic dosimetry will still be available, plastic bags are still available for samples and floor covering material (Herculite) is still available.

Evaluation of Sections IV.E.1–4, IV.E.8, and IV.G of 10CFR50 Appendix E requirements associated with ***Emergency Planning Standard [8]:***

IV.E.1-4

Adequate provisions shall be made and described for emergency facilities and equipment, including:

1. Equipment at the site for personnel monitoring;

2. Equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment;

3. Facilities and supplies at the site for decontamination of onsite individuals;

4. Facilities and medical supplies at the site for appropriate emergency first aid treatment.

IV.E.8

a. (i) A licensee onsite technical support center and an emergency operations facility from which effective direction can be given and effective control can be exercised during an emergency;

(ii) For nuclear power reactor licensees, a licensee onsite operational support center;

b. For a nuclear power reactor licensee's emergency operations facility required by paragraph 8.a of this section, either a facility located between 10 miles and 25 miles of the nuclear power reactor site(s), or a

primary facility located less than 10 miles from the nuclear power reactor site(s) and a backup facility located between 10 miles and 25 miles of the nuclear power reactor site(s). An emergency operations facility may serve more than one nuclear power reactor site. A licensee desiring to locate an emergency operations facility more than 25 miles from a nuclear power reactor site shall request prior Commission approval by submitting an application for an amendment to its license. For an emergency operations facility located more than 25 miles from a nuclear power reactor site, provisions must be made for locating NRC and offsite responders closer to the nuclear power reactor site so that NRC and offsite responders can interact face-to-face with emergency response personnel entering and leaving the nuclear power reactor site. Provisions for locating NRC and offsite responders closer to a nuclear power reactor site that is more than 25 miles from the emergency operations facility must include the following:

(1) Space for members of an NRC site team and Federal, State, and local responders;

(2) Additional space for conducting briefings with emergency response personnel;

(3) Communication with other licensee and offsite emergency response facilities;

(4) Access to plant data and radiological information; and

(5) Access to copying equipment and office supplies;

c. By June 20, 2012, for a nuclear power reactor licensee's emergency operations facility required by paragraph 8.a of this section, a facility having the following capabilities:

(1) The capability for obtaining and displaying plant data and radiological information for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves;

(2) The capability to analyze plant technical information and provide technical briefings on event conditions and prognosis to licensee and offsite response organizations for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves; and

(3) The capability to support response to events occurring simultaneously at more than one nuclear power reactor site if the emergency operations facility serves more than one site; and

d. For nuclear power reactor licensees, an alternative facility (or facilities) that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff and collectively having the following characteristics: the capability for communication with the emergency operations facility, control room, and plant security; the capability to perform offsite notifications; and the capability for engineering assessment activities, including damage control team planning and preparation, for use when onsite emergency facilities cannot be safely accessed during hostile action. The requirements in this paragraph 8.d must be implemented no later than December 23, 2014, with the exception of the capability for staging emergency response organization personnel at the alternative facility (or facilities) and the capability for communications with the emergency operations facility, control room, and plant security, which must be implemented no later than June 20, 2012.

e. A licensee shall not be subject to the requirements of paragraph 8.b of this section for an existing emergency operations facility approved as of December 23, 2011;

IV.G

Provisions to be employed to ensure that the emergency plan, its implementing procedures, and emergency equipment and supplies are maintained up to date shall be described.

Items 1-16 still ensure that adequate emergency facilities and equipment will still be provided and maintained. Friskers will still be available and calibrated, Protective Clothing will still be available, electronic dosimetry will still be available, plastic bags are still available for samples and floor covering material (Herculite) is still available.

The changes to the EPlan are administrative in nature and still ensure that adequate emergency facilities and equipment will still be provided and maintained. Friskers will still be available and calibrated, Protective Clothing will still be available, electronic dosimetry will still be available, plastic bags are still available for samples and floor covering material (Herculite) is still available.

Part III. Evaluation of Emergency Planning Functions, Elements, and Commitments affected by the Proposed Change and the Licensing Basis for those Functions, Elements, and Commitments:

Emergency Planning Functions [8] *from 10CFR50.54(q) Screening Form:*

- *Adequate facilities are maintained to support emergency response.*
- *Adequate equipment is maintained to support emergency response.*

Items 1-16 still ensure that adequate emergency facilities and equipment will still be provided and maintained. Friskers will still be available and calibrated, Protective Clothing will still be available, electronic dosimetry will still be available, plastic bags are still available for samples and floor covering material (Herculite) is still available.

The changes to the EPlan are administrative in nature and still ensure that adequate emergency facilities and equipment will still be provided and maintained. Friskers will still be available and calibrated, Protective Clothing will still be available, electronic dosimetry will still be available, plastic bags are still available for samples and floor covering material (Herculite) is still available.

NUREG-0654 Section II.H Program Elements associated with the above ***Emergency Planning Standard [8]:***

- *Each licensee shall establish a Technical Support Center and an onsite operations support center (assembly area) in accordance with NUREG-0696, Revision 1.*
- *Each licensee shall establish an Emergency Operations Facility from which evaluation and coordination of all licensee activities related to an emergency is to be carried out and from which the licensee shall provide information to Federal, State and local authorities responding to radiological emergencies in accordance with NUREG-0696, Revision 1.*
- *Each organization shall establish an emergency operations center for use in directing and controlling response functions.*
- *Each organization shall provide for timely activation and staffing of the facilities and centers described in the plan.*
- *Each licensee shall identify and establish onsite monitoring systems that are to be used to initiate emergency measures in accordance with Appendix 1, as well as those to be used for conducting assessment. The equipment shall include:*
  - *a. geophysical phenomena monitors, (e.g., meteorological , hydrologic, seismic);*
  - *b. radiological monitors, (e.g., process, area, emergency, effluent, wound and portable monitors and sampling equipment);*
  - *c. process monitors, (e.g., reactor coolant system pressure and temperature, ontainment pressure and temperature, liquid levels, flow rates, status or lineup of equipment components); and*
  - *d. fire and combustion products detectors.*
- *Each licensee shall make provision to acquire data from or for emergency access to offsite monitoring and analysis equipment including:*
  - *a. geophysical phenomena monitors, (e.g., meteorological , hydrologic, seismic);*
  - *b. radiological monitors including ratemeters and sampling devices. Dosimetry shall be*

provided and shall meet, as a minimum, the NRC Radiological Assessment Branch Technical Position for the Environmental Radiological Moni taring Program; and
c. laboratory facilities, fixed or mobile.

- *Each organization, where appropriate, shall provide for offsite radiological monitoring equipment in the vicinity of the nuclear facility.*
- *Each licensee shall provide meteorological instrumentation and procedures which satisfy the criteria in Appendix 2, and provisions to obtain representative current meteorological information from other sources.*
- *Each licensee shall provide for an onsite operations support center (assembly area) which shall have adequate capacity, and supplies, including, for example, respiratory protection, protective clothing, portable lighting, portable radiation monitoring equipment, cameras and communications equipment for personnel present in the assembly area.*
- *Each organization shall make provisions to inspect, inventory and operationally check emergency equipment/instruments at least once each calendar quarter and after each use. There shall be sufficient reserves of instruments/equipment to replace those which are removed from emergency kits for calibration or repair. Calibration of equipment shall be at intervals recommended by the supplier of the equipment.*
- *Each plan shall, in an appendix, include identification of emergency kits by general category (protective equipment, communications equipment, radiological monitoring equipment and emergency supplies).*
- *Each organization shall establish a central point (preferably associated with the licensee's near-site Emergency Operations Facility), for the receipt and analysis of all field monitoring data and coordination of sample media.*
- ***REFERENCE NSIR/DPR-ISG-01 SECTION I.D EMERGENCY RESPONSE ORGANIZATION AUGMENTATION AT ALTERNATE FACILITY (HOSTILE ACTION).***

Items 1-16 still ensure that adequate emergency facilities and equipment will still be provided and maintained. Friskers will still be available and calibrated, Protective Clothing will still be available, electronic dosimetry will still be available, plastic bags are still available for samples and floor covering material (Herculite) is still available.

The changes to the EPlan are administrative in nature and still ensure that adequate emergency facilities and equipment will still be provided and maintained. Friskers will still be available and calibrated, Protective Clothing will still be available, electronic dosimetry will still be available, plastic bags are still available for samples and floor covering material (Herculite) is still available.

Applicable sections of the Emergency Plan associated with NUREG-0654 Sections II.H Program Elements:

1.	Chapter 8, Sections 8.1.2.1, 8.1.1.2, 8.1.3
2.	Chapter 8, Section 8.1.2.2
4.	Chapter 6, Sections Phase I, Phase II, Phase III
5.	Appendix D, Enclosures 3, 4, 5, 7
5.a.	Appendix D, Enclosure 3
5.b.	Appendix D, Enclosure 4
5.c.	Appendix D, Enclosures 4, 7
5.d.	Appendix D, Enclosure 7
6.a., b.	Chapter 7, Section 7.1, 7.1.1

6.c.	Appendix C, Position Specific Instructions for: • Chemistry Coordinator • Field Team Director Table 6.2
7.	Appendix D, Enclosures 4, 5
8.	Chapter 7, Section 7.1.1.1, Appendix D, Enclosure 3
9.	Chapter 8, Section 8.1.2
10.	Chapter 9, Section 9.3
11.	Appendix D
12.	Chapter 6, Sections 6.2.4f), 6.3.1.4f)

Part IV. Evaluation of the Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions and Commitments:

There is no negative impact of the proposed change on the effectiveness of the Emergency Plan Functions for the reasons stated above. There is no negative impact of the proposed change to commitments for the following reasons.

Reg. Guide 1.219 Revision 1 section 4.8 was reviewed for examples of changes that could require prior NRC approval and none were found to be applicable.

Per the guidance in EP-102 Attachments F and G, this change does not constitute a scheme change.

The proposed change is not a reduction in effectiveness of the Emergency Plan and therefore does not require prior NRC approval.

ENCLOSURE 1 TO APPENDIX D

Typical Station Decontamination Area Equipment

Decontamination Procedures
~~Cotton Gloves~~
Coveralls ~~(Disposable)~~
Decontamination Soap
Disposable Bath Towels
~~Disposable Gloves~~ Plastic inserts Gloves + cotton
Frisker
Hand Brushes
~~Hand Cream~~
~~Lotion Skin Cleaner~~
Masking Tape
Paper Towels
Shoe Covers, ~~paper~~
~~Spare Frisker Cable~~
~~Spare Frisker Probe + cable~~
Sponges

Typical Damage Control Equipment Storage Box Contents

Amprobe
Bars, Pry, Large
Bars, Pry, Rolling Lead
Black Wire, 1/4 lb. Rolls, 16 Gauge
Box, Tool, 23"
Bucket, 14 quart, Plastic
Cable Cutters
Clamps, C, Medium
Clamps, C, Large
Clamps, C, Small
Electricians Pouch with Miscellaneous Hand Tools
Enerpac, Rescue Unit
Flashlight, 5 cell
Hammer, Ball Peen, 16 oz.
Hammer, Sledge, 10 lb.
Hammer, Sledge, 8 lb.
Multimeter
Nylon Rope, 100' coils, 3/4"
Nylon Rope, 25' coils, 3/8"
Nylon Rope, 50' coils, 3/8"
Nylon Rope, 50' coils, 3/4"
Plastic Sheet, 20' X 20', Fire Retardant
Pliers, Lineman
Pliers, Water Pump
Plugs, Wood, 1" & 6"
Plugs, Wooden Box, 1", 1¼', 1½', 2", 2½", 3"
Rubber, Roll 1/16" thick, 10' X 3'
Screwdrivers, Large Standard
Screwdrivers, Medium Standard
Screwdrivers, Phillips, Large
Screwdrivers, Phillips, Medium
String, Ball
Twine, Bale
Wedges, Wooden
Wrench, Adjustable, 12"
Wrench, Adjustable, 8"
Wrench, Allen Pac 3/16", 7/32", 1/4", 5/16", 3/8"
Wrench, Allen Pac .050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", 5/32", 3/16", 7/32"
Wrench, Chain
Wrench, Hex, #110
Wrench, Hex, #17
Wrench, Hex, 24"
Wrench, Pipe, 18"
Wrench, Pipe, 14"

ENCLOSURE 2 TO APPENDIX D

Typical Onsite Search and Rescue/First Aid, Ambulance, and Hospital Radiation Emergency Equipment and Supplies

Onsite Search Rescue/First Aid:

Adjustable Litter
Basket Stretcher (Stokes)
First Aid Team Initial Response Kit with Inventory Sheet
Folding Litter
Portable Oxygen-Demand Valve (size D tank With assorted airways, cannulas, and masks)
Scoop Stretcher
Trauma Kit
Assorted Splinting Devices

Ambulance Kit:

~~Tape roll~~ Masking Tape
~~Misc. Plastic Bags~~ waste "Rad" Bags
Plastic Gloves
Cotton Gloves
~~Plastic Sheeting, 8' X 20'~~ Herculite
~~Plastic~~ Shoe Covers
Portable Frisker and Probe
~~Set of Anti-contamination Clothing~~ Lab Coats

Hospital:

Dosimeter Charger
Survey Meter
Frisker with Probe
Herculite ~~- white, green and yellow~~
Lead Container, high activity samples
Self Reading Dosimeters
Set of Radiation Signs and Ribbon
Stanchions/Pylons
Step-off Pad
Thermoluminescent Dosimeters, badge type
Thermoluminescent Dosimeters, ring type

Enclosure 5 to Appendix D (Cont'd.)
ENVIRONMENTAL MONITORING SYSTEMS

2. Typical Radiological Monitoring Team Equipment (Kits)

Emergency Planning and Grid Coordinate Maps
Stopwatch, tweezers, masking tape
Gamma Survey Meter with current calibration
Low Volume Air Sampler and Head
Potassium Iodide Tablets
Radioactive Material Stickers
Particulate Filters, ~~box~~
Silver Zeolite Cartridges
Disposable Plastic Gloves
Plastic sample bags and labels
Flashlight
Spare batteries → ~~Spare Battery and Fuse kit~~
~~Self Reading Dosimetry~~ Part of EOF + WB supplies (DON'T add this to Eplan for Instr only)
Portable Friskar W/ probe

3. Typical Emergency Environmental Sample Kit Contents

Assortment of Sampling Bags	~~Rubber/~~Plastic Gloves
Flashlight	Sample Containers
Grid Coordinate Map	Sample Labels
Electronic ~~Low and High Range~~ Dosimeters	Scale
Pliers	Scissors
~~Self Reading Dosimetry~~	Spare Batteries

ENCLOSURE 6 TO APPENDIX D

Typical Radiation Protection Van Radiation Emergency Monitoring Equipment

Survey Meter with current calibration
Portable Frisker with probe
Low Volume Air Sampler with head (AC powered)
Low Volume Air Sampler with DC power plug
~~Spare Frisker Cable~~
DC to AC Inverter
VHF mobile radio
Respirators
Iodine Canister
Potassium Iodide Tablets
Sets of Anti-contamination Clothing
Disposable ~~Protective~~ gloves
Calculator
~~Emergency Planning Map~~
Frisker Check source
Silver Zeolite cartridges
Particulate Filters
Tweezers
Gamma survey meter check source

Stopwatch
~~Tape~~ Masking Tape
~~Survey Data Labels~~
Microfiber Wipes
Smear Papers
Plastic bags for samples
Extension cord
Work light
Flashlight
First Aid Kit
Spare batteries
~~Spare fuses for Air Sampler~~
Safety Vests
~~Self reading Dosimetry~~

ENCLOSURE 8 TO APPENDIX D

Typical Emergency Equipment for Initial Incident Response

Portable frisker with probe
Low volume Air Sample with Head
~~High Volume Air Sampler with Head~~
Gamma Survey Meter
~~Spare frisker cable and probe~~
Particulate ~~filter paper~~ Filters
Silver Zeolite Cartridges
Spare Batteries ~~and fuses.~~
Portable Worklight
~~Extension Cord~~
Self Reading Dosimetry
Potassium Iodine Tablets
Anti-contamination Clothing
Full face Respirator
Iodine Filter Canisters
SCBA Equipment
Emergency Plan
Emergency Plan Position Specific Instructions
Emergency Planning Map with offsite sampling locations
Onsite Monitoring Locations Map
~~First Aid Kit~~
~~Keys to Radiation Protection Van~~
~~Emergency Plan Keys~~
Food and potable water adequate to support 10 people for 5 days.
~~*Available at OSC and at RP control point to the RCA.~~

Typical Technical Support Center Equipment

Plant Technical Specifications
Operating Procedures Manual
Emergency Operating Procedure Manual
Final Safety Analysis Report
EP and EP-PSs
Safety Procedure Manual
Offsite Dose Calculation Manual
Plant as built drawings
Emergency Phone Directory
Copy Machine and Telecopier

Attachment B, 10CFR50.54q Evaluation Checklist

Evaluation Number: E2018-04-26-01	Screen Number: S not applicable

Part I. Description of Proposed Change (Copy applicable information from 50.54(q) screen form Part I or attach a mark-up of the existing text with the proposed change can be used as an alternative):
See Attachment

Part II. Evaluation of the Proposed Change for Compliance with the requirements of 10 CFR 50.47(b) and 10 CFR 50 Appendix E:
See Attachment

Part III. Evaluation of Emergency Planning Functions, Elements, and Commitments affected by the Proposed Change and the Licensing Basis for those Functions, Elements, and Commitments:
See Attachment

Part IV. Evaluation of the Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions:
See Attachment

Part V. Evaluation Conclusion
Answer the following questions about the proposed change.

1.	Does the proposed change comply with 10 CFR 50.47(b) and 10 CFR 50 Appendix E?	☒ YES ☐ NO
2.	Does the proposed change maintain the effectiveness of the Emergency Plan (i.e., no reduction in effectiveness)?	☒ YES ☐ NO
3.	Does the proposed change constitute an emergency action level scheme change?	☐ YES ☒ NO

If questions 1 or 2 are answered NO, or question 3 answered YES, obtain prior NRC approval under provisions of 10 CFR 50.90. If questions 1 and 2 are answered YES, and question 3 answered NO, implement applicable change process(es).

Part VI. Signatures:

Jacob Garcia	[signature]	4.26.18
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
JOE METER	[signature]	4/27/18
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

PLANNING STANDARD 5 TEMPLATE – EMERGENCY NOTIFICATIONS

E2018-04-26-01

Background and Scope:

Remove the redundant Alert Notification System (siren) control station located at SSES.

EPlan Rev 61 8.5.4 states "A redundant control station located at SSES and the EOF has full radio control capabilities, and will be used for the purpose of testing and maintenance activities."

It will be changed to read "A redundant control station, located at the EOF, has full radio control capabilities, and will be used for the purpose of testing and maintenance activities.

EPlan History

Rev. 6 – NRC SER version
2 control stations, 1 at Luzerne and 1 at Columbia
No redundant testing and maintenance stations

From Rev 6 Section 6.6 Public Notification System "Activation of the Siren System is via radio control from Luzerne County Civil Defense and Columbia County Emergency Management Agency EOC. Activation by either County EOC will activate the entire siren system."

Rev. 51 – No prior NRC Approval
2 control stations, 1 at Luzerne and 1 at Columbia
2 redundant control stations for testing and maintenance at SSES and SFC

From Rev 51 Section 8.5.4 Public Notification System "Activation of the PNS is via radio control from either the LCEMA Emergency Operations Center or CCDPS Emergency Operations Center. Redundant control stations located at PPL Susquehanna LLC and the System Facility Center (SFC) have full capabilities and will be used for the purpose of testing and maintenance activities."

Rev. 58 – No prior NRC Approval
2 control stations, 1 at Luzerne and 1 at Columbia
2 redundant control stations for testing and maintenance at SSES and EOF

From Rev 58 Section 8.5.4 Public Notification System "Activation of the ANS is via radio control from either the LCEMA Emergency Operations Center or CCEMA Emergency Operations Center. A back-up satellite system can also activate the sirens from LCEMA or CCEMA. A redundant control station located at SSES and the EOF has full radio control capabilities, and will be used for the purpose of testing and maintenance activities."

Part II. Evaluation of the Proposed Change for Compliance with the requirements of 10 CFR 50.47(b) and 10 CFR 50 Appendix E:

Evaluation of 10CFR50.47(b) requirements associated with ***Emergency Planning Standard [5]:***

- *10 CFR 50.47(b)(5) - "Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and followup messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established."*

There is no change to activation of the siren system. Luzerne and Columbia Counties will continue to have their own control stations to activate the siren system to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone.

Evaluation of Sections IV.D.1 and IV.D.3 of 10CFR50 Appendix E requirements associated with ***Emergency Planning Standard [5]:***

IV.D

1. Administrative and physical means for notifying local, State, and Federal officials and agencies and agreements reached with these officials and agencies for the prompt notification of the public and for public evacuation or other protective measures, should they become necessary, shall be described. This description shall include identification of the appropriate officials, by title and agency, of the State and local government agencies within the EPZs.

3. A licensee shall have the capability to notify responsible State and local governmental agencies within 15 minutes after declaring an emergency. The licensee shall demonstrate that the appropriate governmental authorities have the capability to make a public alerting and notification decision promptly on being informed by the licensee of an emergency condition. Prior to initial operation greater than 5 percent of rated thermal power of the first reactor at a site, each nuclear power reactor licensee shall demonstrate that administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway EPZ. The design objective of the prompt public alert and notification system shall be to have the capability to essentially complete the initial alerting and initiate notification of the public within the plume exposure pathway EPZ within about 15 minutes. The use of this alerting and notification capability will range from immediate alerting and notification of the public (within 15 minutes of the time that State and local officials are notified that a situation exists requiring urgent action) to the more likely events where there is substantial time available for the appropriate governmental authorities to make a judgment whether or not to activate the public alert and notification system. The alerting and notification capability shall additionally include administrative and physical means for a backup method of public alerting and notification capable of being used in the event the primary method of alerting and notification is unavailable during an emergency to alert or notify all or portions of the plume exposure pathway EPZ population. The backup method shall have the capability to alert and notify the public within the plume exposure pathway EPZ, but does not need to meet the 15-minute design objective for the primary prompt public alert and notification system. When there is a decision to activate the alert and notification system, the appropriate governmental authorities will determine whether to activate the entire alert and notification system simultaneously or in a graduated or staged manner. The responsibility for activating such a public alert and notification system shall remain with the appropriate governmental authorities

There is no change to activation of the siren system. Luzerne and Columbia Counties will continue to have their own control stations to activate the siren system. No change to the backup method of route alerting for sectors that may experience a siren failure.

Part III. Evaluation of Emergency Planning Functions, Elements, and Commitments affected by the Proposed Change and the Licensing Basis for those Functions, Elements, and Commitments:

Emergency Planning Functions [5] *from 10CFR50.54(q) Screening Form:*

- *Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications.*
- *Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway.*
- *The public ANS meets the design requirements of FEMA-REP-10, "Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants" (Ref. 16), or is compliant with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter.*

There is no change to activation of the siren system. Luzerne and Columbia Counties will continue to have their own control stations to activate the siren system.

The FEMA Approved Design report, dated Nov 7 2008, was reviewed. There is no mention of specific control stations. The FEMA Satellite Enhancement Approval dated Feb 3 2011 was also reviewed. There is no mention of specific control stations.

NUREG-0654 Section II.E Program Elements and Appendix 3 associated with the above ***Emergency Planning Standard [5]:***

- *Each organization shall establish procedures which describe mutually agreeable bases for notification or response organizations consistent with the emergency classification and action level scheme set forth in Appendix 1. These procedures shall include means for verification of messages. The specific details of verification need not be included in the plan.*

- *Each organization shall establish procedures for alerting, notifying and mobilizing emergency response personnel.*

- *The licensee in conjunction with State and local organizations shall establish the content of the initial emergency messages to be sent from the plant. These measures shall contain information about the class of emergency, whether a release is taking place, potentially affected populations and areas, and whether protective actions may be necessary.*

- *Each licensee shall make provisions for follow up messages from the facility to offsite authorities which shall contain the following information if it is known and appropriate:*

    - *Location of incident and name and telephone number (or communications channel identification) of caller;*
    - *Date/time of incident;*
    - *Class of emergency;*
    - *Type of actual or projected release (airborne, waterborne, surface spill), and estimated duration/impact times;*
    - *Estimate of quantity of radioactive material released or being released and the points and heights of releases;*
    - *Chemical and physical form of released material, including estimates of the relative quantities and concentrations of noble gases, iodines and particulates;*
    - *Meteorological conditions at appropriate levels (wind speed, direction (to and from), indicator of stability, precipitation, if any);*
    - *Actual or projected dose rates at site boundary; projected integrated dose at site boundary;*
    - *Projected dose rates and integrated dose at the projected peak and at 2, 5, and 10 miles, including sector(s) affected;*
    - *Estimate of any surface radioactive contamination inplant, onsite, or offsite;*
    - *Licensee emergency response actions underway;*
    - *Recommended emergency actions, including protective measures;*
    - *Request for any needed offsite support by offsite organizations; and*
    - *Prognosis for worsening or termination of event based on plant information*

- *Each organization shall establish administrative and physical means, and the time required for notifying and providing prompt instructions to the public within the plume exposure pathway Emergency Planning Zone (**See Appendix 3 of NUREG 0654.**) It shall be the licensee's responsibility to demonstrate that such means exist, regardless of who implements this requirement. It shall be the responsibility of the State and local governments to activate such a system.*

- *Each organization shall provide written messages intended for the public, consistent with the licensee's classification scheme. In particular, draft messages to the public giving instructions with regards to specific protective actions to be taken by occupants of affected areas shall be prepared and included as part of the State and local plans. Such messages should include the appropriate aspects of sheltering, ad hoc, respiratory protection, e.g., handkerchief over mouth, thyroid blocking or evacuation. The role of the licensee is to provide supporting information for the messages. For ad hoc respiratory protection see "Respiratory Protective devices Manual" American Industrial Hygiene Association, 1963 pp. 123-126.*

- ***REFERENCE NSIR/DPR-ISG-01 SECTION IV.J BACKUP MEANS FOR ALERT AND NOTIFICATIONS SYSTEMS***

There is no change to activation of the siren system. Luzerne and Columbia Counties will continue to have their own control stations to activate the siren system. No change to backup method of route alerting requirements in NSAI/DPR-ISG-01 Section IV.J are not affected.

The FEMA-approved ANS design report is associated with the above ***Emergency Planning Function [5]:***

> Because the performance of an ANS is an offsite concern, FEMA has the primary responsibility and authority for evaluating the design of an ANS, including primary and backup means. If the licensee has assumed responsibility for the installation and maintenance of the ANS on behalf of the State or local government, the licensee will have prepared a site-specific ANS design report. The State would submit this report to FEMA for its review. The ANS design report defines the design of the ANS, including the alerting system (e.g., sirens, tone alert radio, and route alert) and the notification system. The ANS design report identifies commitments for testing and maintenance. The NRC considers the approved ANS design report to be part of the facility's licensing basis because it establishes the basis of the NRC's determination that the licensee has complied with Section IV.D.3 of Appendix E to 10 CFR Part 50. Changes to the licensee's commitments documented in the approved ANS design report are evaluated against the criteria of 44 CFR 350.14, "Amendments to State Plans." If warranted, the responsible State official must submit the proposed changes to FEMA for review and approval in accordance with 44 CFR 350.14.

There is no change to activation of the siren system. Luzerne and Columbia Counties will continue to have their own control stations to activate the siren system.

The FEMA Approved Design report, dated Nov 7 2008, was reviewed. There is no mention of specific control stations. The FEMA Satellite Enhancement Approval dated Feb 3 2011 was also reviewed. There is no mention of specific control stations.

Local EP Procedures were reviewed. EP-108, EP-109, and EP-110. There is no mention of the on-site control station.

Applicable sections of the Emergency Plan associated with NUREG-0654 Section II.E Program Elements:

1.	Chapter 6, Figure 6.7 Appendix C, Position Specific Instructions for: • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • EOF Communicator • Radiation Protection Coordinator • Technical Support Coordinator • Recovery Manager • Dose Assessment Supervisor
2.	Appendix C, Position Specific Instructions for: • Emergency Director • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • Security Coordinator
3.	Appendix C, Position Specific Instructions for: • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • EOF Communicator
4.a., b., c., k., n.	Appendix C, Position Specific Instructions for: • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • EOF Communicator
4.d., e., f., g., h., i., j., l.	Appendix C, Position Specific Instructions for: • Radiation Protection Coordinator • Dose Assessment Supervisor
4.m.	Appendix C, Position Specific Instructions for: • Control Room Emergency Plan Communicator • TSC Emergency Plan Communicator • EOF Communicator
6.	Chapter 6, Sections 6.2.1, 6.3.1.1 Chapter 7, Sections 7.1.1, 7.3.2 Chapter 8, Section 8.5.4
7.	Chapter 6, Sections 6.2, 6.2.1, 6.2.3, 6.3.1.1, 6.3.1.5 Chapter 7, Section 7.3.2, Table 7.3

EPlan Rev 61 8.5.4 states "A redundant control station located at SSES and the EOF has full radio control capabilities, and will be used for the purpose of testing and maintenance activities."

It will be changed to read "A redundant control station, located at the EOF, has full radio control capabilities, and will be used for the purpose of testing and maintenance activities.

Part IV. Evaluation of the Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions and Commitments:

There is no negative impact of the proposed change on the effectiveness of the Emergency Plan Functions for the reasons stated above. There is no negative impact of the proposed change to

commitments for the reasons that all required functions stated in the NRC SER Version Rev 6 are maintained.

Reg. Guide 1.219 Revision 1 section 4.5 was reviewed for examples of changes that could require prior NRC approval and none were found to be applicable.

Per the guidance in EP-102 Attachments F and G, this change does not constitute a scheme change.

The proposed change is not a reduction in effectiveness of the Emergency Plan and therefore does not require prior NRC approval.

Attachment A, 10CFR50.54q Screening Form

Screening Number: S2018-10-02-01	

Part I. Description of Activity Being Reviewed (event or action, or series of actions that may result in a change to the Emergency Plan or affect the implementation of the Emergency Plan). Provide the existing text and the revised text (attaching a mark-up of the existing text with proposed change can be used as an alternative):

The following changes were considered for the EP-PS-001, Rev 16 procedure:

1) Performed following changes to EP-PS-001-3 form:
   a. Added Note before the approval line per AR-2018-12575.
   b. Replaced "or 0.4 rem (TEDE) for a woman who has declared that she is pregnant" with "Women capable of reproduction should not take part in these actions" in note 1 per AR-2016-27032.
   c. Deleted everything after "4 rem TEDE" in note 2 and replaced with "Women capable of reproduction should not take part in these actions" per AR-2016-27032.
2) Performed following changes to EP-PS-001-11 form per AR-2018-10701:
   a. Removed items 4 and 8 (S2016-10-18-01 / E2016-10-18-01 and S2014-09-29-01 / E2014-09-29-01, respectively).
   b. Replaced "Chronology of" with "EOF Significant" in item 9 (current item 7). (S2013-01-14-01)
   c. Added FNR to item 6 (current item 5) and replaced ENR with FNR in item 7(current item 6). (S2016-10-18-[illegible] / E2016-10-18-01)
3) Added "Priority" field to EP-PS-001-14 form per DPA-06-DI-2017-20364.
4) Added Scanning and Emailing instructions under step 1 in "ENR/FOLLOWUP NOTIFICATION REPORT TRANSMITTAL INSTRUCTIONS" in EP-PS-001-34 per AR-2018-03176.
5) Performed following changes to EP-PS-001-41 form:
   a. Corrected steps to obtain VML02 computer point trends in step A.4. (technical review comment)
   b. Added "A." in note below "Plant Computer Meteorological Data Point Identifiers" table AR 2018 11831.
6) Deleted "RMS" from EP-PS-001-42 form per AR-2018-10704. (E2017-07-03-01)
7) Performed following changes to EP-PS-001-45 form:
   a. Added "not" before "permissible" in step 1.1.2 and deleted everything after "permissible" per AR-2016-27032).
   b. Removed "such as shellfish" from step 3.1.12.b and c.
   c. Moved note within Step 4 in Emergency Exposure Extensions section before step 4. Added examples after second and third sentence in note per AR-2018-12575.
   d. Removed first row of the table in step 4 in Emergency Exposure Extensions section per AR-2016-27032
   e. Removed "or RM" from last row of the table in step 4 in Emergency Exposure Extensions section per AR-2018-12575.
   f. Removed "or 0.4 rem (TEDE) for a woman who has declared that she is pregnant" and "(and, for the woman who has declared that she is pregnant, risks to the embryo/fetus)" in step 5 in Emergency Exposure Extensions section per AR-2016-27032.
   g. Removed "(0.4 rem to declared pregnant woman)" from note before step 1.3.2 in RADIATION PROTECTION AND ALARA CONSIDERATIONS DURING EMERGENCIES section per AR-2016-27032.

Part II. Activity a Change per Section 3.1.3? Does the activity constitute a change per definition 3.1.3 - An action that results in modification or addition to, or removal from the SSES Emergency Plan, **OR** the resources, capabilities and methods identified in the plan? Justification: EP-PS-001 procedures provides forms and supplementary instructions for the On-shift staff and Emergency Response Organization (ERO) personnel. The Emergency Plan Position Specific (EP-PS) procedures provide guidance on how Station personnel implement specific actions described in SSES Emergency Plan Rev 61 (E-Plan) Sections 6 and 7. All EP-PS procedures refer to one or multiple forms or special instructions in EP-PS-001. **Changes 1.a, 7.c and 7.e** - E-Plan sections 6.2.1.l and 6.2.5.l state that Emergency Director (ED) and Radiation Protection Coordinator (RPC) approve dose extensions. Section 6.3.1.1 for the Recovery Manager (RM) does not list a responsibility for approving dose extensions. The note added before the approval lines on forms EP-PS-001-3 (Emergency Exposure Extension Request) states that ED/RPC continue to approve in-plant (INDIA) team dose extensions even after EOF took over the management of the emergency since INDIA teams always remain under command and control of the TSC, while Recovery Manger (RM) and Dose Assessment Supervisors (DASU) in the EOF approve dose extension only on the team members (ex. field monitoring teams) that are under their command and control. The duties of the ED and RM mirror each other with respect to classification, notification and protective actions (PARs and KI to emergency workers). This change allows the EOF operation (RM/DASU) to mirror TSC operation (ED/RPC) for dose exposure extension for team members under their command and control for an improved efficiency in obtaining the dose extensions to allow emergency workers to better protect the health and safety of the public. Dose extensions > 25000 mrem TEDE are not plausible for field monitoring teams since they are moved out of very high dose fields and therefore RM approval is not needed in this situation. (**change 7.e**). AR-2018-13835 was generated to align the E-Plan with this operation and add instructions in sections 6.3.1.1 and 6.3.1.4 in the Emergency Plan for the Recovery Manager and Dose Assessment Supervisor to process and approve dose extensions for field monitoring teams, if necessary and if EOF is in control of emergency.	☐ YES Continue to next part	☒ NO 10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.

Changes 1.b, 1.c and 7.a, 7.d, 7.f and 7.g – These sections had been aligned with NDAP-QA-0625 on limits of occupational exposure for pregnant women. While NDAP-QA-0625 refers to occupational exposure, the E-Plan is silent about this limit; it just mentions in a Note at the bottom of the first Table in Table 7.2 that the Emergency limits apply to "non-pregnant adults". E-Plan Table 7.2, Emergency Exposure Criteria, states that "*women capable of reproduction should not take part in these actions*". Therefore, changes align procedure with the E-Plan statement and exclude women capable of reproduction from consideration for dose extensions. **Changes 2 and 6** - aligned the procedure with previously analyzed changes and added additional details on the procedural step. **Changes 3, 4 and 5.a** - are enhancements that do not modify the technical content of the procedure and **change 5.b** is editorial. **Change 7.b** - aligned the procedure with the latest FDA guidance that "*A seafood or shellfish allergy does not necessarily mean that you are allergic or hypersensitive to iodine.*" (Question 7 in Frequently Asked Questions on Potassium Iodide (KI) on https://www.fda.gov/drugs/emergencypreparedness/bioterrorismanddrugpreparedness/ucm072265.htm; KI in Radiation Emergencies-Questions and Answers Guidance for Industry (2002) and Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies Guidance (2001)). Therefore, this change eliminated shellfish as a potential allergen for KI administration. Changes proposed in Part I were either analyzed previously and screened out or found not to decrease the effectiveness of the E-Plan, and thus are alignment changes, are editorial in nature or enhanced procedures by adding additional directions that do not change the technical content or challenge any commitments in the E-Plan. Therefore, changes in Revision 16 to EP-PS-001 did not constitute a change per definition 3.1.3 of EP-102 procedure and did not affect any of the requirements specified in the E-Plan. Thus, the changes were implemented and the procedure was up-revved to Rev 17.		
Part III. Activity Previously Reviewed? Is this activity fully bounded by an NRC approved 10 CFR 50.90 submittal or Alert and Notification System Design Report (44 CFR 350.14)? If YES, identify bounding source document number/approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below: Justification: ☐ Bounding document attached (optional)	☐ YES 10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	☐ NO Continue to next part

Part IV. Editorial Change Is this activity an editorial or typographical change such as formatting, paragraph numbering, spelling, or punctuation that does not change intent per definition 3.1.4?	☐ YES 10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	☐ NO Continue to next part
Justification:		

Part V. Emergency Planning Element/Function Screen (Associated 10 CFR 50.47(b) planning standard function identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.

1.	Responsibility for emergency response is assigned. [1]	☐
2.	The response organization has the staff to respond and to augment staff on a continuing basis (24/7 staffing) in accordance with the Emergency Plan. [1]	☐
3.	The process ensures that on shift emergency response responsibilities are staffed and assigned. [2]	☐
4.	The process for timely augmentation of on-shift staff is established and maintained. [2]	☐
5.	Arrangements for requesting and using off site assistance have been made. [3]	☐
6.	State and local staff can be accommodated at the EOF in accordance with the Emergency Plan. [3]	☐
7.	A standard scheme of emergency classification and action levels is in use. [4] (RSPS)	☐
8.	Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications. [5] (RSPS)	☐
9.	Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway. [5] (RSPS)	☐
10.	The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter. [5] (RSPS)	☐
11.	Systems are established for prompt communication among principal emergency response organizations. [6]	☐
12.	Systems are established for prompt communication to emergency response personnel. [6]	☐
13.	Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway Emergency Planning Zone (EPZ). [7]	☐
14.	Coordinated dissemination of public information during emergencies is established. [7]	☐
15.	Adequate facilities are maintained to support emergency response. [8]	☐
16.	Adequate equipment is maintained to support emergency response. [8]	☐
17.	Methods, systems, and equipment for assessment of radioactive releases are in use. [9] (RSPS)	☐
18.	A range of public PARs is available for implementation during emergencies. [10] (RSPS)	☐
19.	Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities. [10] (RSPS)	☐
20.	KI is available for implementation as a protective action recommendation in those jurisdictions that chose to provide KI to the public [10]	☐
21.	A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]	☐
22.	The resources for controlling radiological exposures for emergency workers are established. [11]	☐
23.	Arrangements are made for medical services for contaminated, injured individuals. [12]	☐
24.	Plans for recovery and reentry are developed. [13]	☐
25.	A drill and exercise program (including radiological, medical, health physics and other program areas) is established. [14]	☐
26.	Drills, exercises, & training evolutions that provide performance opportunities to develop, maintain, & demonstrate key skills are assessed via a formal critique process in order to identify weaknesses. [14]	☐
27.	Identified weaknesses are corrected. [14]	☐
28.	Training is provided to emergency responders. [15]	☐
29.	Responsibility for Emergency Plan development and review is established. [16]	☐

30. Planners responsible for Emergency Plan development and maintenance are properly trained. [16]	☐

APPLICABILITY CONCLUSION

☐ If no Part V criteria are checked, a 10 CFR 50.54(q) Evaluation is NOT required; complete Part VI.
☐ If any Part V criteria are checked, complete Part VI and perform a 10 CFR 50.54(q) Evaluation.

Part VI. Signatures:

Adrian Miron		10/2/18
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
JOE METER		10/4/18
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

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EMERGENCY EXPOSURE EXTENSION REQUEST

DATE _____ TIME _____ TEAM _____

TYPE OF DOSE EXTENSION (✓):

☐ Extend to 25 Rem ☐ Extend to _____ Rem

NOTE

The ED approves extensions for all personnel until the EOF is in control of the emergency. The Recovery Manager approves dose extensions for EOF based personnel after the EOF is in control of the emergency (ex. Field Monitoring Team personnel). The ED continues to approve dose extensions for all site based personnel (ex. INDIA teams).

Approved by/date (RPC): _____ / _____

Approved by/date (ED/RM): _____ / _____

Name	Soc Sec #	Signature [1]	Current year, dose, mrem [2]	Lifetime dose, mrem [2]	E-plan Function

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Signature of volunteer denotes an understanding and an awareness of the risks involved, including the numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effects.

[1] Required for extension to greater than 4 rem (TEDE). ~~or 0.4 rem (TEDE) for a woman who has declared that she is pregnant~~ Women capable of reproduction should not take part in these actions.

[2] Required for extension to greater than 4 rem (TEDE). Women capable of reproduction should not take part in these actions ~~or 0.4 rem (TEDE) for a Declared Pregnant Woman. For a Declared Pregnant Woman, dose history is to be sufficient to establish dose to the embryo/fetus since the beginning of the gestation period.~~

EOF SUPPORT TURNOVER CHECKLIST

☐ 1. Affected Unit _____

☐ 2. Classification: Unusual Event ☐ Site Area Emergency ☐
Alert ☐ General Emergency ☐

☐ 3. EAL # _____

☐ ~~4. Brief Non-Technical Description:~~

☐ ~~45.~~ Protection Action Recommendation to Pennsylvania:

☐ ~~65.~~ All ENRs/FNRs read:

☐ a. Control Room: CR#1 through CR# _____

☐ b. TSC: TSC#1 through TSC# _____

☐ c. EOF: EOF#1 through EOF# _____

☐ ~~76.~~ Next FENR due: _____

☐ ~~8. Event Status Reports (Radiological)~~

☐ ~~79.~~ ~~Chronology of~~EOF Significant Events read.

☐ ~~108.~~ Status Boards read.

☐ ~~119.~~ Log reviewed.

☐ ~~1210.~~ EOF Equipment not operable:

☐ ~~1311.~~ Review procedure steps that have been completed or are due.

☐ ~~1412.~~ EOF Support Supervisor notified of turnover.

INDIA TEAM DISPATCH FORM

INDIA TEAM NO. _____ (Assigned by OSC Coordinator) _____ Priority ☐

Time of Notification: _____ Hr. Estimated Completion Time: _____ Hr.

Dispatch Time: _____ Hr. Return Time: _____ Hr.

		Name (print)	ED READING, mR	DOSE AVAIL, mrem
1)	Discipline Lead		N/A	N/A
	Team Leader:			
	Members:			

NOTE: INDIA Team Members are to sign in on RWP# YYYY-8000 or 8888.

2) Job Location: Unit # _____ (0,1,2) Bldg. _____ Elev(s) _____ Ft.

Job Site: _____
(e.g. HPCI Room, RHR Pump Room, ESW Pump House, etc.)

3) Job Description (Brief):

4) Radiological Review:

5) Job Progress/Debriefer

Form Completed by: _____
(Maintenance Foreman, FUS, Chem. Coord.)

ENR/FOLLOWUP NOTIFICATION REPORT TRANSMITTAL INSTRUCTIONS

> **NOTE**
> IF experiencing difficulties with scanning/emailing ENR form, skip this step and proceed immediately to Step 2. DO NOT delay '191' phone call.

1. ~~1.~~ **SCAN AND EMAIL** form to "ENR Distribution List" using RICOH copy machine.

   a. Press Scanner button in Main Menu of the printer

   b. Press the E-Mail Folder Tab

   c. Find and press "ENR Distribution List" button

   d. Place message in scanner feeder (face up)

   e. Press the START button

2. **DIAL** '191' (use purple button telephone (must press purple button) in the CR)

3. **IF** "191" conference bridge is not available,

   THEN INITIATE one the following back-up methods.

   a. Conference bridge "196"

   OR

   b. Individual agency telephone numbers:
      (1) PEMA: 717-651-2001 or 717-651-2148 (Ask for Watch Officer)
      (2) LCEMA: 1-800-821-3715
      (3) CCEMA: 570-389-5720

4. **IDENTIFY** yourself as each agency answers.

5. As agencies answer, **STATE** the Call Status (Drill or Actual Emergency) and the following:

   "This is Susquehanna Nuclear Station with an Emergency Notification. Susquehanna has declared an (STATE CURRENT EMERGENCY CLASSIFICATION LEVEL). Please verify that you have received the Emergency Notification Report and standby for transmittal."

6. **WHEN** agencies are on line, **TRANSMIT** ENR **AND REQUEST** repeat back from one agency.

7. **LOG** the time the Emergency Classification Level was communicated to each agency in your position log (for ENR only).

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3. If the Primary Met Tower ΔT data is not available, determine the wind speed corrected stability class as follows:

   a. Determine the initial (uncorrected) stability class using the measured value of sigma theta and the Supplemental Meteorological Information Table 1 (or page 2 of the PSS screen).

   b. Determine the wind speed corrected stability classification using the initial classification, the measured wind speed, and, as appropriate, either Table 2 or Table 3.

4. If the Precipitation Rate data from computer point RAININHR is not available or not accurate, determine Precipitation Rate from computer point VML02 (Instrument range is 0-1 inch).

   a. ~~Click the Group Display button~~Select "Trends" from the PSS Main Menu.

      1) Under Tabular Display Trends, Select "Trend-1"~~Select the Tabular Group Display button.~~

      2) Click in "Pt. 1:" white field.~~Select a block to add a point.~~

      3) Under "Point Search, Text", enter "VML02"~~Select VML02 from the list.~~

      4) Select ~~ADD~~OK to display selected data.

      5) Under start time, enter a date and time using the format shown for the trend of interest (can make wider trend of "15 minutes" in "Archive Sample Rate" and then select specific time if desired), (end time is defaulted to current)~~Click OK to display the selected data.~~

      6) With trend displayed, click and hold while dragging vertical time line, to date / time of interest (white box). Dynamic value is displayed for this date and time in the white box

      7) Record Reading 2 at current time and Reading 1 at 15 minutes earlier.

NOTE
~~Time between Reading 2 and Reading 1 is 15 minutes.~~ Instrument dumps the water at 1 inch.

   b. $(VML02_{Reading\ 2} - VML02_{Reading\ 1})$ = in / 15 min

5. The PSS QUALITY CODES for the display colors are as follows:

YELLOW:	**DATA ACCEPTABLE**
RED:	**DATA EXCEEDS WARNING LIMIT**
MAGENTA:	**DATA EXCEEDS ALARM SETPOINT**
WHITE:	**DATA SUSPECT**

PLANT COMPUTER METEOROLOGICAL DATA POINT IDENTIFIERS

METEOROLOGICAL PARAMETER	POINT ID*	UNITS	AVERAGING PERIOD
PRIMARY TOWER - east of the plant, 300' high red/white tower.			
10m Wind Direction	vma03	degrees	15 minutes
10m Wind Speed	vma06	mph	15 minutes
Delta T "A"	vma01	°C/50m	15 minutes
Delta T "B"	vma02	°C/50m	15 minutes
60m Wind Direction	vma04	degrees	15 minutes
60m Wind Speed	vma07	mph	15 minutes
10m Sigma Theta	vma10	degrees	15 minutes
60m Sigma Theta	vmx24	degrees	15 minutes
Precipitation Rate	RAININHR**	in/hr	15 minutes
Ambient Temperature	vmt08b	°F	1 hour
BACKUP TOWER - across from the SSES Learning Center.			
10m Wind Direction	vma05	degrees	15 minutes
10m Wind Speed	vma08	mph	15 minutes
10m Sigma Theta	vma12	degrees	15 minutes
DOWNRIVER TOWER - on Route 93 just east of Nescopeck.			
10m Wind Direction	vmx09b	degrees	2 minutes**
10m Wind Speed	vms05b	mph	2 minutes**
10m Sigma Theta	vmx10b	degrees	2 minutes**

- **Letters are given here in lower case to differentiate the letter o from the number 0.**
- **** Data from computer point VML02 may be used in place of that from RAININHR. (See Step A.4 in this instruction)**

MIDAS FIELD TO PROJECTION MEASUREMENT COMPARISON

Field to projection comparison should always be performed for EPB (boundary) dose rates and OSCAR location dose rates. If OSCAR is unavailable, use Field Team(s) dose rates and OSCAR locations. If radiation conditions for OSCAR are too high, relocate OSCAR 1 to 2 miles away from the plant and perform field to projection measurement on this data.

A. **REVIEW** most recent (collected within the last 1/2 hour) OSCAR data.

1. **DETERMINE** the sector with the highest whole body (EDE) dose rate and/or frisker CPM (or RMS field CDE reading).

> **CAUTION**
>
> All dose rate reports obtainable under "More Reports" show the dose rate immediately prior to the dose projection time (0.25, 1, 2, or 16 hours) selected to be displayed. The MIDAS Dose Assessment Summary Sheet shows the dose rate immediately prior to the shortest (0.25-hour) dose projection time. That implies that there will most likely be a variation between the time when the OSCAR (or fixed station RMS) data was collected and the time at which the projected dose rate information is a fully valid "snapshot" of dose rates. Since the primary purpose of the MIDAS Field To Projection Dose Comparison is to identify an unmonitored release path, it is important to compare the Field Monitor Reading with an appropriate MIDAS projected dose rate in order to determine if a release is unmonitored.

B. **IF** measured data were collected more than 0.25 hours after the start of the release, **USE** the projected dose rate information from More Reports for the time period most closely representing the time at which measured data were collected.

1. **To obtain the corresponding projection data, it may be necessary to re-run *exactly* the same MIDAS-NU case and change projection times at the beginning of the run to the time of interest given by the field data.**

2. **RECOGNIZE** that radioactive decay to the selected time leads to a small uncertainty in the ratio of measured to projected EDE dose rate.

C. Review the MIDAS EDE Dose Rate Report for the corresponding release time and sector.

1. From MIDAS-NU graphic output screen showing map and plume, **SELECT** EDE tab located at bottom of screen.

2. **SELECT** tab with exposure time of interest.

3. **SELECT** table tab.

4. **SELECT** confirm tab.

EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION GUIDE

CHECK ☐

1.0 Limits for **EMERGENCY** doses.

☐ 1.1 Doses will be maintained within occupational dose limits to the extent practicable during emergencies. Susquehanna and the federal government recognize, however, that conformance with regulations developed for normal operations should not limit actions necessary for the protection of health and safety. As directed by 10CFR50, Susquehanna uses the Environmental Protection Agency guidance on dose limits for workers performing emergency services such as lifesaving or maintaining confinement of radioactive materials.

1.1.1 Doses to all workers during emergencies should, to the extent practicable, be limited to 5 rem.

1.1.2 Dose to the embryo/fetus of a Declared Pregnant Woman (DPW; see NDAP-QA-0625) should, to the extent practicable, be limited to 0.4 rem. Planned dose which would result in the embryo/fetus exceeding 0.4 rem is not permissible~~, with appropriate management approval (see Emergency Exposure Extensions), only in an exceptional situation when there is no practical alternative available.~~

1.1.3 The dose limit for members of offsite support groups providing emergency (e.g., fire fighting or ambulance) services on the Susquehanna site but outside of the protected area, during a declared emergency event, is set at 5 rem (0.4 rem to a woman who has declared that she is pregnant), absent authorization for an Emergency Exposure Extension. This limit is set recognizing that the offsite support group personnel have received radiological emergency response training from government and/or licensee instructors. Further, the provision of support services (e.g., radiation protection, security, and emergency response management) to the offsite support group personnel, outside the protected area to maintain doses in compliance with a lower dose limit, is not considered practicable. This is due to the need for these support personnel to be providing other services inside the protected area directly related to management of the declared emergency event and specifically to the protection of public and worker health and safety.

EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION GUIDE

CHECK ☐

In summary, FDA understands that a KI administration program that sets different projected thyroid radioactive exposure thresholds for treatment of different population groups may be logistically impractical to implement during a radiological emergency. If emergency planners reach this conclusion, FDA recommends that KI be administered to all adults, regardless of age.

The Pennsylvania Department of Health has concluded that anyone who is not allergic to iodine can take KI. Taken in the dose recommended, KI is relatively safe and free of side effects, except for people who are allergic to iodide.

Declaration of a General Emergency is indicative of plant conditions that are expected to result in significant airborne radioactivity. KI should be offered to INDIA plant teams and Field Teams (OSCAR, ALPHA and BRAVO) unless it is clear that there is no substantial radioiodine component to the atmosphere they will be entering.

3.1.2 KI should not be administered to any emergency worker who:

a. does not concur with its use, or

b. has a known allergic reaction to iodine and/or foods containing iodine ~~such as shellfish~~, or

c. has been directed by their Physician or Pharmacist to avoid ingestion of iodine and/or foods containing iodine ~~such as shellfish~~.

EMERGENCY EXPOSURE EXTENSIONS

CHECK ☐

NOTE

The ED approves extensions for all personnel until the EOF is in control of the emergency. The Recovery Manager approves dose extensions for EOF based personnel after the EOF is in control of the emergency (Ex. Field Monitoring Team personnel). The ED continues to approve dose extensions for site based personnel (Ex. INDIA Teams).

4. Obtain appropriate approval signatures as outlined in the table below.

EXTENSION		APPROVAL	ACTIONS
FROM mrem (TEDE)	TO mrem (TEDE)		
~~500 (Row is intended to apply to women who have declared they are pregnant)~~	~~Value to be specified by (ED or RM) and RPC*~~	~~(ED or RM) and RPC~~	~~ALARA REVIEW AND DETERMINATION OF NO PRACTICAL ALTERNATIVE; APPLY EMERGENCY EXPOSURE CONSIDERATIONS~~
4000	<25000	(ED or RM) and RPC	ALARA REVIEW AND APPLY EMERGENCY EXPOSURE CONSIDERATIONS
>25000		~~(ED or RM)~~ and RPC	ALL OF ABOVE AND BRIEFING ON RISKS

~~* The intent is to specify the minimum value consistent with the task to be performed. A value < 2500 mrem would be expected to be chosen. Specification of a higher number is permissible only with independent confirmation that there is no practical alternative to the use of the pregnant woman, and the pregnant volunteer is given a briefing on risks from this form and NRC Regulatory Guide 8.13/8.29.~~

NOTE

~~The ED approves extensions for all personnel until the EOF is in control of the emergency. The Recovery Manager approves dose extensions for EOF based personnel after the EOF is in control of the emergency. The ED continues to approve dose extensions for site based personnel.~~

EMERGENCY EXPOSURE EXTENSIONS

CHECK ☐

5. If the Emergency Exposure Extension is for greater than 4 rem (TEDE) ~~or 0.4 rem (TEDE) for a woman who has declared that she is pregnant~~, have the volunteer sign the **EMERGENCY EXPOSURE EXTENSION REQUEST** Form acknowledging that they are a volunteer and are fully aware of the radiological risks of acute and delayed effects ~~(and, for the woman who has declared that she is pregnant, risks to the embryo/fetus)~~.

6. Upon completion of the activity requiring the Emergency Exposure perform the following:

   ☐ Collect, process, and evaluate personnel dosimetry devices when technically appropriate.

   ☐ Investigate the circumstances of all emergency exposures and confirm the dose received.

   ☐ Notify the NRC of emergency exposure as follows:

   Immediate notification of the NRC is required for:

   a. Exposure of the whole body of greater than 25 rem (TEDE); or

   b. Exposure of the skin of the whole body of greater than 150 rem (SDE); or

   c. Exposure of the extremities of greater than 375 rem (SDE).

   Notification of the NRC **within 24 hours** is required for:

   a. Exposure of the whole body of greater than 5 rem (TEDE); or

   b. Exposure of the skin of the whole body of greater than 30 rem (SDE); or

   c. Exposure of the extremities of greater than 75 rem (SDE).

   ☐ Assess the health consequences of all emergency exposures. Consult with a physician to determine the need for and extent of physical and biochemical examinations.

   ☐ Whole body greater than 25 rem (TEDE) should result in an examination of the exposed person by a physician.

   ☐ If internal exposure is suspected, quantitative measurements should be made as soon as reasonably feasible. Bioassays are required based on the following:

   - Nasal smear or facial contamination greater than 1,000 cpm above background.
   - Greater than 4 DAC-HRS in a day or less, or 20 DAC-HRS in a week or less.

RADIATION PROTECTION AND ALARA CONSIDERATIONS DURING EMERGENCIES

CHECK ☐

1.0 Evaluate radiological conditions.

1.1 Obtain detailed survey data to ascertain:

1.1.1 Beta-Gamma radiation levels

1.1.2 Need for neutron measurements

1.1.3 Contamination levels and protective clothing requirements

1.1.4 Airborne radioactive materials

1.1.5 Variability of conditions over space and time

1.2 Evaluate personnel status.

1.2.1 Determine available dose under normal administrative dose objectives.

1.2.2 If essential, obtain approval from **RADIATION PROTECTION COORDINATOR/EMERGENCY DIRECTOR** for persons expected to exceed administrative objectives.

1.2.3 Follow criteria in Emergency Personnel Dose Assessment and Protective Action Guide in this attachment when emergency exposures are deemed appropriate by **EMERGENCY DIRECTOR**.

1.2.4 Assess individual's history of exposure to airborne materials.

1.2.5 Assess individual's skills in relation to proposed task.

1.2.6 Assess individual's lifetime exposure history.

1.3 Determine proper type and placement of dosimeters.

1.3.1 Evaluate need for additional whole body dosimeters.

> **NOTE**
>
> **For emergency exposures above 4 rem ~~(0.4 rem to declared pregnant woman)~~, the placement of several dosimeters on an individual is recommended to determine spatial distribution of dose.**

1.3.2 Evaluate need and placement of extremity dosimeters.

Attachment A, 10CFR50.54q Screening Form

Screening Number: S2018-10-24-01	

Part I. Description of Activity Being Reviewed (event or action, or series of actions that may result in a change to the Emergency Plan or affect the implementation of the Emergency Plan). Provide the existing text and the revised text (attaching a mark-up of the existing text with proposed change can be used as an alternative):
Remove "*To the extent reasonable, persons with high lifetime cumulative radiation exposure should not take part in these actions.*" from Table 7.2, Emergency Exposure Criteria, Additional General Criteria Section and all applicable EP implementing procedures (ex. EP-PS-001)

Part II. Activity a Change per Section 3.1.3?	☒ YES	☐ NO
Does the activity constitute a change per definition 3.1.3 - An action that results in modification or addition to, or removal from the SSES Emergency Plan, **OR** the resources, capabilities and methods identified in the plan? Justification:	Continue to next part	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.

Part III. Activity Previously Reviewed?	☐ YES	☒ NO
Is this activity fully bounded by an NRC approved 10 CFR 50.90 submittal or Alert and Notification System Design Report (44 CFR 350.14)? If YES, identify bounding source document number/approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below: Justification: ☐ Bounding document attached (optional)	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	Continue to next part

Part IV. Editorial Change	☐ YES	☒ NO
Is this activity an editorial or typographical change such as formatting, paragraph numbering, spelling, or punctuation that does not change intent per definition 3.1.4? Justification:	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	Continue to next part

Part V. Emergency Planning Element/Function Screen (Associated 10 CFR 50.47(b) planning standard function identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.

1.	Responsibility for emergency response is assigned. [1]	☐
2.	The response organization has the staff to respond and to augment staff on a continuing basis (24/7 staffing) in accordance with the Emergency Plan. [1]	☐
3.	The process ensures that on shift emergency response responsibilities are staffed and assigned. [2]	☐
4.	The process for timely augmentation of on-shift staff is established and maintained. [2]	☐
5.	Arrangements for requesting and using off site assistance have been made. [3]	☐
6.	State and local staff can be accommodated at the EOF in accordance with the Emergency Plan. [3]	☐
7.	A standard scheme of emergency classification and action levels is in use. [4] (RSPS)	☐
8.	Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications. [5] (RSPS)	☐

Attachment A, 10CFR50.54q Screening Form, Continued

Part V. Emergency Planning Element/Function Screen (cont.) (Associated 10 CFR 50.47(b) planning standard identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.	
9. Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway. [5] (RSPS)	☐
10. The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter. [5] (RSPS)	☐
11. Systems are established for prompt communication among principal emergency response organizations. [6]	☐
12. Systems are established for prompt communication to emergency response personnel. [6]	☐
13. Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway Emergency Planning Zone (EPZ). [7]	☐
14. Coordinated dissemination of public information during emergencies is established. [7]	☐
15. Adequate facilities are maintained to support emergency response. [8]	☐
16. Adequate equipment is maintained to support emergency response. [8]	☐
17. Methods, systems, and equipment for assessment of radioactive releases are in use. [9] (RSPS)	☐
18. A range of public PARs is available for implementation during emergencies. [10] (RSPS)	☐
19. Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities. [10] (RSPS)	☐
20. KI is available for implementation as a protective action recommendation in those jurisdictions that chose to provide KI to the public [10]	☐
21. A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]	☒
22. The resources for controlling radiological exposures for emergency workers are established. [11]	☒
23. Arrangements are made for medical services for contaminated, injured individuals. [12]	☐
24. Plans for recovery and reentry are developed. [13]	☐
25. A drill and exercise program (including radiological, medical, health physics and other program areas) is established. [14]	☐
26. Drills, exercises, & training evolutions that provide performance opportunities to develop, maintain, & demonstrate key skills are assessed via a formal critique process in order to identify weaknesses. [14]	☐
27. Identified weaknesses are corrected. [14]	☐
28. Training is provided to emergency responders. [15]	☐
29. Responsibility for Emergency Plan development and review is established. [16]	☐
30. Planners responsible for Emergency Plan development and maintenance are properly trained. [16]	☐

APPLICABILITY CONCLUSION

☐ If no Part V criteria are checked, a 10 CFR 50.54(q) Evaluation is NOT required; complete Part VI.
☒ If any Part V criteria are checked, complete Part VI and perform a 10 CFR 50.54(q) Evaluation.

Part VI. Signatures:

Adrian Miron		10/24/18
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
JOE MEYER		10/25/18
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

Evaluation Number: E2018-10-24-01	Screen Number: S2018-10-24-01

Part I. Description of Proposed Change (Copy applicable information from 50.54(q) screen form Part I or attach a mark-up of the existing text with the proposed change can be used as an alternative):

Remove "*To the extent reasonable, persons with high lifetime cumulative radiation exposure should not take part in these actions.*" from Table 7.2, Emergency Exposure Criteria, Additional General Criteria Section and all applicable EP implementing procedures (ex. EP-PS-001)

S2018-10-24-01 identified 2 Emergency Planning Elements/Functions potentially associated to this change:

- 21. A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]
- 22. The resources for controlling radiological exposures for emergency workers are established. [11]

These are associated with 10CFR50.47.b(10) and 10CFR50.47.b(11) requirements, respectively.

Background information on the change:

- SSES Emergency Plan Rev 6 (E-Plan) issued on 11/2/82 is the original SER version of the E-Plan and included a range of protective actions for plant emergency workers for controlling radiological exposures in Table 6.2. The E-Plan was approved by NRC on 10/31/83. At that time, the sentence above was not included in Table 6.2.
- SSES Emergency Plan Rev 10 (E-Plan) issued on 1/14/87 added a section and therefore, Table 6.2 became Table 7.2. The change was processed without NRC approval. The sentence above was not included in Table 7.2 of the E-Plan.
- The sentence was added in Table 7.2 of the SSES Emergency Plan Rev 18 (E-Plan) issued on 5/20/93. The change was processed without NRC approval and the reason for addition was not documented. Subsequently, the sentence is present in Table 7.2 in all E-Plan reviews up to current rev 61.
- No other NRC SERs were sought on Table 7.2 up to this date.

Part II. Evaluation of the Proposed Change for Compliance with the requirements of 10 CFR 50.47(b) and 10 CFR 50 Appendix E:

10 CFR 50.47(b)(10) - A range of protective actions has been developed for the plume exposure pathway EPZ for emergency workers and the public. In developing this range of actions, consideration has been given to evacuation, sheltering, and, as a RG-1.219, Rev. 1, Page 30 supplement to these, the prophylactic use of potassium iodide (KI), as appropriate. Evacuation time estimates have been developed by applicants and licensees. Licensees shall update the evacuation time estimates on a periodic basis. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place, and protective actions for the ingestion exposure pathway EPZ appropriate to the locale have been developed.

There are no 10CFR50 Appendix E requirements associated with Emergency Planning Standard [10].

The change described in Part I is not applicable to this requirement.

*10 CFR 50.47(b)(11) - **Means for controlling radiological exposures, in an emergency, are established for emergency workers. The means for controlling radiological exposures shall include exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides.***

The change described in Part I is applicable to this requirement; however, as discussed in Part III, the guidance proposed for deletion is not applicable to EPA-400-R-92-01, Manual for Protective Action Guides and Protective Actions for Nuclear Incidents, that SSES is committed to and means for controling radiological exposure are still in place with this change.

Sections IV.E.1 of 10CFR50 Appendix E requirements associated with Emergency Planning Standard [11]: Equipment at the site for personnel monitoring.

The change described in Part I is not applicable to this requirement.

Therefore, deleting "*To the extent reasonable, persons with high lifetime cumulative radiation exposure should not take part in these actions.*" from Table 7.2, Emergency Exposure Criteria, Additional General Criteria Section from E-Plan and all applicable EP implementing procedures does not affect the requirements in 10CFR50.47(b) and Appendix E to 10CFR Part 50.

Part III. Evaluation of Emergency Planning Functions, Elements, and Commitments affected by the Proposed Change and the Licensing Basis for those Functions, Elements, and Commitments:
Emergency Planning Standards (Function) for 10 CFR 50.47(b)(10) that are applicable to this change is:
A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events

A range of protective actions for emergency workers are considered in Table 7.2 of the SSES Emergency Plan rev 61 and applicable implementing EP procedures. As stated in the first paragraph, "*Planned exposure to the whole body and/or specific organs should not exceed the following recommendations of the National Council on Radiation Protection and Measurements and the Manual of Protective Action Guides and Protective Actions for Nuclear Incidents (EPA 400).*" The statement proposed for deletion is just one guidance among a host of other guidance from EPA 400 that is applicable only to dose extensions over 25 rem. As will be discussed below, this guidance is not included in the EPA 400 PAG manual to which SSES is committed to.

No applicable Program Elements from NUREG-0654 Sections II.J.1–8 and Section II.J.10 associated with the Emergency Planning Function [10] were found applicable to the change described in Part I.

Emergency Planning Standards (Function) for 10 CFR 50.47(b)(11) that are applicable to the change described in part I is: *The resources for controlling radiological exposures for emergency workers are established.*

A range of protective actions for controlling radiological exposures are considered in Table 7.2 of the SSES Emergency Plan rev 61 and applicable implementing EP procedures. As stated in the first paragraph, "*Planned exposure to the whole body and/or specific organs should not exceed the following recommendations of the National Council on Radiation Protection and Measurements and the Manual of Protective Action Guides and Protective Actions for Nuclear Incidents (EPA 400).*" The statement proposed for deletion is just one guidance among a host of other guidance from EPA 400 that is applicable only to dose extensions over 25 rem. As will be discussed below in the section on EPA 400, this guidance is not included in the EPA 400 manual to which SSES is committed to.

Applicable Program Elements from NUREG-0654 Sections II.K associated with the Emergency Planning Function [11] are:

- ***Each licensee shall establish onsite exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective Actions Guides (EPA 520/1-75/001)*** *for:*
  a. removal of injured persons;
  b. undertaking corrective actions;
  c. performing assessment actions;
  d. providing first aid;
  e. performing personnel decontamination;
  f. providing ambulance service; and
  g. providing medical treatment services.

- ***Each licensee shall provide an onsite radiation protection program to be implemented during emergencies, including methods to implement exposure guidelines. The plan shall identify individual(s), by position or title, who can authorize emergency workers to receive doses in excess of 10 CFR Part 20 limits. Procedures shall be worked out in advance for permitting onsite volunteers to receive radiation exposures in the course of carrying out lifesaving and other emergency activities. These procedures shall include expeditious decision making and a reasonable consideration of relative risks.***

The statement proposed for deletion described in Part I does not apply to any of the applicable NUREG 0654 guidance listed above.

NSIR/DPR-ISG-01 Section IV.F Protective Actions For Onsite Personnel (Hostile Action) was reviewed and found to be not applicable to the change described in Part I.

Reg. Guide 1.219 Revision 1 sections 4.10 and 4.11 were reviewed for examples of changes that could require prior NRC approval and none were found to be applicable for the change described in Part I.

As discussed above, SSES is committed to EPA-400-R-92-01, Manual for Protective Action Guides and Protective Actions for Nuclear Incidents. Applicable guidance for establishing protective actions for controlling radiological exposures for emergency workers are as follows:

Guidance on dose limits for workers performing emergency services is summarized in Table 2-2. ***These limits apply to doses incurred over the duration of an emergency. That is, in contrast to the PAGs, where only the future dose that can be avoided by a specific protective action is considered, all doses received during an emergency are included in the limit. Further, the dose to workers performing emergency services may be treated as a once-in-a lifetime exposure, and not added to occupational exposure accumulated under nonemergency conditions for the purpose of ascertaining conformance to normal occupational limits, if this is necessary.*** *However, any radiation exposure of workers that is associated with an incident, but accrued during nonemergency operations, should be limited in accordance with relevant occupational limits for normal situations. Federal Radiation Protection Guidance for occupational exposure recommends an upper bound of five rem per year for adults and one tenth this value for minors and the unborn (EP-87). We recommend use of this same value here for the case of exposures during an emergency. To assure adequate protection of minors and the unborn during emergencies, the performance of emergency services should be limited to nonpregnant adults. As in the case of normal occupational exposure, doses received under emergency conditions should also be maintained as low as reasonably achievable (e.g., use of stable iodine, where appropriate, as a prophylaxis to reduce thyroid dose from inhalation of radioiodines and use of rotation of workers).*

Doses to all workers during emergencies should, to the extent practicable, be limited to 5 rem. ***There are some emergency situations, however, for which higher exposure limits may be justified. Justification of any such exposure must include the presence of conditions that prevent the rotation of workers or other commonly-used dose reduction methods. Except as noted below, the dose resulting from such emergency exposure should be limited to 10 rem for protecting valuable property, and to 25 rem for life saving activities and the protection of large populations. In the context of this guidance, exposure of workers that is incurred for the protection of large populations may be considered justified for situations in which the collective dose avoided by the emergency operation is significantly larger than that incurred by the workers involved.***

Situations may also rarely occur in which a dose in excess of 25 rem for emergency exposure would be unavoidable in order to carry out a lifesaving operation or to avoid extensive exposure of large populations. It is not possible to prejudge the risk that one should be allowed to take to save the lives of others. However, persons undertaking any emergency operation in which the dose will exceed 25 rem to the whole body should do so only on a voluntary basis and with full awareness of the risks involved, including the numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effects.

Tables 2-3 and 2-4 provide some general information that may be useful in advising emergency workers of risks of acute and delayed health effects associated with large doses of radiation. Table 2-3 presents estimated risks of early fatalities and moderately severe prodromal (forewarning) effects that are likely to occur shortly after exposure to a wide range of whole body radiation doses. Estimated average cancer mortality risks for emergency workers corresponding to a whole-body dose equivalent of 25 rem are given in Table 2-4, as a function of age at the time of exposure. To estimate average cancer mortality for moderately higher doses the results in Table 2-4 may be increased linearly. ***These values were calculated using a life table analysis that assumes the period of risk continues for the duration of the worker's lifetime.*** *Somewhat smaller risks of serious genetic effects (if gonadal tissue is exposed) and of nonfatal cancer would also be incurred. An expanded discussion of health effects from radiation dose is provided in Appendix B.*

Some workers performing emergency services will have little or no health physics training, so dose minimization through use of protective equipment cannot always be assumed. However, the use of respiratory protective equipment can reduce dose from inhalation, and clothing can reduce beta dose. Stable iodine is also recommended for blocking thyroid uptake of radioiodine in personnel involved in emergency actions where atmospheric releases include radioiodine. The decision to issue stable iodine should include consideration of established State medical procedures, and planning is required to ensure its availability and proper use.

The statement proposed for deletion described in Part I does not apply to any of the applicable EPA guidance listed above.

As discussed in Part I, Background Information section, the original SER version of the E-Plan included a range of protective actions for plant emergency workers for controlling radiological exposures in Table 6.2 but the sentence proposed for deletion was not included. It was introduced later, without requesting NRC approval. No other NRC SERs were sought on Table 7.2 up to this date. Therefore, deleting this sentence does not constitute a licensing or commitment violation.

To cover all bases, as part of AR-2016-17490 evaluation, EP organized a meeting with RP and ISD representatives on 8/1/18 to discuss the following:

- EP could not find any regulation or guidance (10CFR50.47(b), Appendix E to Part 50, NUREG 0654 and EPA 400) associated with the statement in EP-PS-001-45 form that "*use of personnel with high lifetime cumulative exposure should be discouraged" (for emergency exposure extensions)*. Note that the lifetime dose would also be used as criteria to select personnel for dose extension in ALARA brief (EP-PS-001-4).
- The guidance in EP-PS-001-45 is aligned with the guidance in Additional General Criteria in Table 7.2 of the SSES Emergency Plan Rev 61 (E-Plan) which states "*to the extent reasonable, persons with high lifetime cumulative radiation exposure should not take part in these actions*".
- Since the guidance above is not part of any known regulations or guidance, EP proposed deletion of the guidance in the E-Plan, EP-PS-001-45 and EP-PS-001-4 form.

Participants agreed with EP proposal and mentioned that there is no associated regulation in 10CFR20 on this issue either. In addition, participants agreed that older personnel are expected to have a high lifetime cumulative exposure and they are the preferred personnel to be used in a radiological emergency due to their experience and lower radiological risk when compared with the younger personnel. Therefore, the guidance is also not aligned with the current science.

In addition, EP performed a benchmark to attempt identification of any associated regulations or guidance on this issue and asked the industry the following questions:

Does your E-Plan or E-Plan Implementing Procedures base any decision on the emergency worker lifetime dose?

- *If so, what is the associated applicable regulation/guidance?*

The following answers were received:

Wolf Creek (WNOC)	*No*
Seabrook	*No*
First Energy	*No*
Callaway	Uses a "*plant requirement based on the judgement of our HP Staff at the time*" for use of personnel that "*Preferably has a lifetime dose (in rem) of less than his/her age and has not previously received a dose in excess of 10CFR20 limits*"

Therefore, deleting "*To the extent reasonable, persons with high lifetime cumulative radiation exposure should not take part in these actions.*" from Table 7.2, Emergency Exposure Criteria, Additional General Criteria Section from E-Plan and all applicable EP implementing procedures does not affect SSES Emergency Planning Functions, Elements, Commitments and Licensing Basis.

Part IV. Evaluation of the Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions:

As discussed in Section III, Applicable Program Elements from NUREG-0654 Sections II.K associated with the Emergency Planning Function [11], procedures on establishing protective actions for controlling radiological exposures for emergency workers ***"shall include expeditious decision making and a reasonable consideration of relative risks."***

To use lifetime dose as criteria for dose extension over 25 rem will be very time consuming and thus not appropriate in an emergency. To obtain lifetime doses for personnel hired at SSES and who worked before at another nuclear plant is difficult to obtain. This type of record is not required for normal operation occupational exposure and can be obtained only on a voluntary basis. The previous dose tracking system (NIMS) had the capability to enter this information whereas in the new dose tracking systems (Sentinel) implemented at SSES this feature is not available anymore. Note that Sentinel can generate lifetime exposure for personnel involved in Special Non-Emergency Exposures based on their known personal dose accumulated at SSES and elsewhere. In this case, however, there is time to generate this report since the required work is not performed in an emergency.

Therefore deleting "*To the extent reasonable, persons with high lifetime cumulative radiation exposure should not take part in these actions.*" from Table 7.2, Emergency Exposure Criteria, Additional General Criteria Section from E-Plan can only improve the efficiency of making decisions for selecting personnel who volunteers for dose extension over 25 rem and thus does not decrease the effectiveness of the E-Plan.

Part V. Evaluation Conclusion

Answer the following questions about the proposed change.

1.	Does the proposed change comply with 10 CFR 50.47(b) and 10 CFR 50 Appendix E?	☒ YES ☐ NO
2.	Does the proposed change maintain the effectiveness of the Emergency Plan (i.e., no reduction in effectiveness)?	☒ YES ☐ NO
3.	Does the proposed change constitute an emergency action level scheme change?	☐ YES ☒ NO

If questions 1 or 2 are answered NO, or question 3 answered YES, obtain prior NRC approval under provisions of 10 CFR 50.90. If questions 1 and 2 are answered YES, and question 3 answered NO, implement applicable change process(es).

Part VI. Signatures:

Adrian Miron		10/24/18
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
JOE METER		10/25/18
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

Attachment B, 10CFR50.54q Evaluation Checklist

Evaluation Number: E2018-10-29-01	Screen Number: S2018-10-25-01

Part I. Description of Proposed Change (Copy applicable information from 50.54(q) screen form Part I or attach a mark-up of the existing text with the proposed change can be used as an alternative):
Per CR-2018-03742, PPL Electric Utilites is no longer providing major equipment support for Susquehanna SES. Don E. Bower, Inc. will instead provide major equipment support to the site. This change is being made to Appendix A - Letters of Agreement in the Emergency Plan.

Part II. Evaluation of the Proposed Change for Compliance with the requirements of 10 CFR 50.47(b) and 10 CFR 50 Appendix E:
See Attachment 1.

Part III. Evaluation of Emergency Planning Functions, Elements, and Commitments affected by the Proposed Change and the Licensing Basis for those Functions, Elements, and Commitments:
See Attachment 1.

Part IV. Evaluation of the Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions:
See Attachment 1.

Part V. Evaluation Conclusion
Answer the following questions about the proposed change.

1. Does the proposed change comply with 10 CFR 50.47(b) and 10 CFR 50 Appendix E?	☒ YES ☐ NO
2. Does the proposed change maintain the effectiveness of the Emergency Plan (i.e., no reduction in effectiveness)?	☒ YES ☐ NO
3. Does the proposed change constitute an emergency action level scheme change?	☐ YES ☒ NO

If questions 1 or 2 are answered NO, or question 3 answered YES, obtain prior NRC approval under provisions of 10 CFR 50.90. If questions 1 and 2 are answered YES, and question 3 answered NO, implement applicable change process(es).

Part VI. Signatures:

Megean M. Brown	Megean M. Brown	10/29/18
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
Ronald P. Remsby Jr.	R.P. Remsby Jr.	10/30/18
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

E2018-10-29-01 Attachment 1

Background and Scope:

Per CR-2018-03742, PPL Electric Utilites is no longer providing major equipment support for Susquehanna SES. Don E. Bower, Inc. will instead provide major equipment support to the site. This change is being made to Appendix A - Letters of Agreement in the Emergency Plan.

The new letter of agreement with Don E. Bower, Inc. is virtually identical to the agreement that had existed with PPL Electric Utilities. PLE-0026052 states in part "Don E. Bower, Inc. agrees to provide heavy equipment support operations, including personnel and equipment, at the Susquehanna Steam Electric Station as may be required".

There are currently three (3) other heavy equipment companies (in addition to Don E. Bower, Inc.) that have signed the 2018 letters of Agreement and continue to provide heavy equipment support service to SSES.

PPL Electric Utilities. is based approximately 25 miles south of the plant and Don E. Bower, Inc. is based approximately 7 miles west of the plant.

Part II. Evaluation of the Proposed Change for Compliance with the requirements of 10 CFR 50.47(b) and 10 CFR 50 Appendix E:

Evaluation of 10CFR50.47(b) requirements associated with ***Emergency Planning Standard [1] & [3]:***

- *10 CFR 50.47(b)(1) - Primary responsibilities for emergency response by the nuclear facility licensee and by State and local organizations within the Emergency Planning Zones have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis.*

- *10 CFR 50.47(b)(3)* - Arrangements for requesting and effectively using assistance resources have been made, arrangements to accommodate State and local staff at the licensee's Emergency Operations Facility have been made, and other organizations capable of augmenting the planned response have been identified.

SSES remains in compliance with this requirement since there were four total heavy equipemnt companies available to support SSES before and after this change.

Evaluation of Sections IV.A.6 of 10CFR50 Appendix E requirements associated with ***Emergency Planning Standard [1] & [3]:***

IV.A.6

A description of the local offsite services to be provided in support of the licensee's emergency organization.

SSES remains in compliance with these requirements since the new letter of agreement with Don E. Bower, Inc. is virtually identical to the agreement that had existed with PPL Electric Utilities. PLE-0026052 states in part "Don E. Bower, Inc. agrees to provide heavy equipment support operations, including personnel and equipment, at the Susquehanna Steam Electric Station as may be required".

Part III. Evaluation of Emergency Planning Functions, Elements, and Commitments affected by the Proposed Change and the Licensing Basis for those Functions, Elements, and Commitments:

Emergency Planning Standard [1] & [3]: *from 10CFR50.54(q) Screening Form:*

- *Arrangements for requesting and using off site assistance have been made.*
- *Adequate equipment is maintained to support emergency response.*

SSES remains in compliance with this requirement since there were four total heavy equipemnt companies available to support SSES before and after this change.

NUREG-0654 Section II.A, B and C Program Elements associated with the ***Emergency Planning Standard [1] & [3]:***

- *A. Primary responsibilities for emergency response by the nuclear facility, licensee, and by State and Local organizations within the Emergency Planning Zones have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continues basis.*
    - *A.1.a – Each plan shall identify the State, local, Federal and private escort organizations (including utilities), that are intended to be part of the overall response organization for Emergency Planning Zones.*
    - *A.3. – Each plan shall include written agreements referring to the concept of operations developed between Federal, State, and local agencies and other support organizations having an emergency response role within the Emergency Planning Zones. The agreements shall identify the emergency measures to be provided and the mutually acceptable criteria for their implementation, and specify the arrangements for exchange of information. These agreements may be provided in an appendix to the plan or the plan itself may contain descriptions of these matters and a signature page in the plan may serve to verify the agreements. The signature page format is appropriate for organizations where response functions are covered by laws, regulations or executive orders where separate written agreements are not necessary.*
- *B. On-shift facility licensee responsivities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available, and the interfaces among various onsite response activities and offsite support response activities are specified.*
    - *B.8. – Each licensee shall specify the contractor and private organizations who may be requested to provide technical assistance to and augmentation of the emergency organization.*
    - *B.9. – Each licensee shall identify the services to be provided by local agencies for handling emergencies, e.g., Police, Ambulance, Medical, Hospital, and fire-fighting organizations shall be specified. The licensee shall provide for transportation and treatment of injured personnel who may also be contaminated. Copies of the arrangements and agreements reached with contractor, private, and local support agencies shall delineate the authorities, responsibilities, and limits on the actions of the contractor, private organization, and local services support groups.*
- *C. Arrangements for requesting and effectively using assistance resources have been made, arrangements to accommodate State and Local Staff at the licensee's near-site Emergency Operations Facility have been made, and other organizations capable of augmenting the planned response have been identified.*

- *C.4. – Each organization shall identify nuclear and other facilities, organizations or individuals which can be relied upon in an emergency to provide assistance. Such assistance shall be identified and supported by appropriate letters of agreement.*

SSES remains in compliance with this requirement for heavy equipement support and maintaining a letter of agreement with this company and the other three for the reasons stated above.

Applicable sections of the Emergency Plan associated with NUREG-0654 Section II. A, B and C Program Elements:

1.	A.1.a	Chapter 6, Section 6.0, Appendix A
2.	A.3.	Appendix A
3.	B.8.	Chapter 6, Appendix A
4.	B.9.	Chapter 6, Appendix A
5.	C.4.	Appendix A
6.		Chapter 6, Sections 6.3.3 & 6.3.4 Appendix A

There are no additional changes needed to the Emergency Plan sections listed above other than the change to Appendix A.

Part IV. Evaluation of the Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions and Commitments:

There is no negative impact of the proposed change on the effectiveness of the Emergency Plan Functions for the reasons stated above. There is no negative impact of the proposed change to commitments for the following reasons:

- SSES will maintain compliance with the applicable regulatory requirements.
- Don E. Bower, Inc. is a viable alternative service to provide heavy equipment support since there are currently three (3) other heavy equipment companies (in addition to Don E. Bower, Inc.) that have signed the 2018 letters of Agreement and continue to provide heavy equipement support to SSES.
- PPL Electric Utilities. is based approximately 25 miles south of the plant and Don E. Bower, Inc. is based approximately 7 miles west of the plant

Reg. Guide 1.219 Revision 1 section 4.12 was reviewed for examples of changes that could require prior NRC approval and none were found to be applicable.

Per the guidance in EP-102 Attachments F and G, this change does not constitute a scheme change.

The proposed change is not a reduction in effectiveness of the Emergency Plan and therefore does not require prior NRC approval.

Attachment B, 10CFR50.54q Evaluation Checklist

Evaluation Number: E2018-10-29-02	Screen Number: S2018-10-25-01

Part I. Description of Proposed Change (Copy applicable information from 50.54(q) screen form Part I or attach a mark-up of the existing text with the proposed change can be used as an alternative):
Per CR-2018-12173, Shickshinny Volunteer Fire Department is no longer providing offsite fire response support to SSES. Summerhill Fire Company has signed the 2018 Letter of Agreement with SSES to provide fire fighting support in replacement of the Shickshinny Volunteer Fire Department.

Part II. Evaluation of the Proposed Change for Compliance with the requirements of 10 CFR 50.47(b) and 10 CFR 50 Appendix E:
See Attachment 1.

Part III. Evaluation of Emergency Planning Functions, Elements, and Commitments affected by the Proposed Change and the Licensing Basis for those Functions, Elements, and Commitments:
See Attachment 1.

Part IV. Evaluation of the Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions:
See Attachment 1.

Part V. Evaluation Conclusion
Answer the following questions about the proposed change.

1. Does the proposed change comply with 10 CFR 50.47(b) and 10 CFR 50 Appendix E?	☒ YES ☐ NO
2. Does the proposed change maintain the effectiveness of the Emergency Plan (i.e., no reduction in effectiveness)?	☒ YES ☐ NO
3. Does the proposed change constitute an emergency action level scheme change?	☐ YES ☒ NO

If questions 1 or 2 are answered NO, or question 3 answered YES, obtain prior NRC approval under provisions of 10 CFR 50.90. If questions 1 and 2 are answered YES, and question 3 answered NO, implement applicable change process(es).

Part VI. Signatures:

Megean M. Brown	Megean M. Brown	10/29/18
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
Ronald P. Remsky Jr	R P Remsky	10/30/18
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

E2018-10-29-02 Attachment 1

Background and Scope:

Per CR-2018-12173, Shickshinny Volunteer Fire Department is no longer providing offsite fire response support to SSES. Summerhill Fire Company has signed the 2018 Letter of Agreement with SSES to provide fire fighting support in replacement of the Shickshinny Volunteer Fire Department.

The new letter of agreement with Summerhill Fire Company is virtually identical to the agreement that had existed with the Shickshinny Fire Department. PLE-0026081 states in part "Summerhill Fire Company agrees to provide firefighting assistance, including personnel and equipment, at the Susquehanna Steam Electric Station as may be required".

There are currently four (4) other Fire Companies (in addition to the Summerhill Fire Company) that have signed the 2018 letters of Agreement and continue to provide fire fighting support services to SSES.

Shickshinny Fire Company is based approximately 5 miles east of the plant and Summerhill Fire Company is based approximately 9 miles north of the plant.

Part II. Evaluation of the Proposed Change for Compliance with the requirements of 10 CFR 50.47(b) and 10 CFR 50 Appendix E:

Evaluation of 10CFR50.47(b) requirements associated with ***Emergency Planning Standard [1] & [3]:***

- *10 CFR 50.47(b)(1) - Primary responsibilities for emergency response by the nuclear facility licensee and by State and local organizations within the Emergency Planning Zones have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis.*

- *10 CFR 50.47(b)(3)* - Arrangements for requesting and effectively using assistance resources have been made, arrangements to accommodate State and local staff at the licensee's Emergency Operations Facility have been made, and other organizations capable of augmenting the planned response have been identified.

SSES remains in compliance with this requirement since there were five (5) fire companies available to support SSES before and after this change.

Evaluation of Sections IV.A.6 of 10CFR50 Appendix E requirements associated with ***Emergency Planning Standard [1] & [3]:***

IV.A.6

A description of the local offsite services to be provided in support of the licensee's emergency organization.

SSES remains in compliance with these requirements since the new letter of agreement with Summerhill Fire Company. is virtually identical to the agreement that had existed with the Shickshinny Fire Department. PLE-0026081 states in part "Summerhill Fire Company agrees to provide firefighting assistance, including personnel and equipment, at the Susquehanna Steam Electric Station as may be required".

Part III. Evaluation of Emergency Planning Functions, Elements, and Commitments affected by the Proposed Change and the Licensing Basis for those Functions, Elements, and Commitments:

Emergency Planning Standard [1] & [3]: *from 10CFR50.54(q) Screening Form:*

- *Arrangements for requesting and using off site assistance have been made.*
- *Adequate equipment is maintained to support emergency response.*

SSES remains in compliance with this requirement since the total number of Fire Companies available to support SSES before and after this change there will remain the same.

NUREG-0654 Section II.A, B and C Program Elements associated with the ***Emergency Planning Standard [1] & [3]:***

- *A. Primary responsibilities for emergency response by the nuclear facility, licensee, and by State and Local organizations within the Emergency Planning Zones have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continues basis.*
    - *A.1.a – Each plan shall identify the State, local, Federal and private escort organizations (including utilities), that are intended to be part of the overall response organization for Emergency Planning Zones.*
    - *A.3. – Each plan shall include written agreements referring to the concept of operations developed between Federal, State, and local agencies and other support organizations having an emergency response role within the Emergency Planning Zones. The agreements shall identify the emergency measures to be provided and the mutually acceptable criteria for their implementation, and specify the arrangements for exchange of information. These agreements may be provided in an appendix to the plan or the plan itself may contain descriptions of these matters and a signature page in the plan may serve to verify the agreements. The signature page format is appropriate for organizations where response functions are covered by laws, regulations or executive orders where separate written agreements are not necessary.*
- *B. On-shift facility licensee responsivities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available, and the interfaces among various onsite response activities and offsite support response activities are specified.*
    - *B.8. – Each licensee shall specify the contractor and private organizations who may be requested to provide technical assistance to and augmentation of the emergency organization.*
    - *B.9. – Each licensee shall identify the services to be provided by local agencies for handling emergencies, e.g., Police, Ambulance, Medical, Hospital, and fire-fighting organizations shall be specified. The licensee shall provide for transportation and treatment of injured personnel who may also be contaminated. Copies of the arrangements and agreements reached with contractor, private, and local support agencies shall delineate the authorities, responsibilities, and limits on the actions of the contractor, private organization, and local services support groups.*
- *C. Arrangements for requesting and effectively using assistance resources have been made, arrangements to accommodate State and Local Staff at the licensee's near-site Emergency Operations Facility have been made, and other organizations capable of augmenting the planned response have been identified.*

- *C.4. – Each organization shall identify nuclear and other facilities, organizations or individuals which can be relied upon in an emergency to provide assistance. Such assistance shall be identified and supported by appropriate letters of agreement.*

SSES remains in compliance with this requirement for fire fighting support and maintaining a letter of agreement with Summerhill Fire Company and the other four (4) for the reasons stated above.

Applicable sections of the Emergency Plan associated with NUREG-0654 Section II. A, B and C Program Elements:

1.	A.1.a	Chapter 6, Section 6.0, Appendix A
2.	A.3.	Appendix A
3.	B.8.	Chapter 6, Appendix A
4.	B.9.	Chapter 6, Appendix A
5.	C.4.	Appendix A
6.		Chapter 6, Sections 6.3.3 & 6.3.4 Appendix A

There are no additional changes needed to the Emergency Plan sections listed above other than the change to Appendix A.

Part IV. Evaluation of the Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions and Commitments:

There is no negative impact of the proposed change on the effectiveness of the Emergency Plan Functions for the reasons stated above. There is no negative impact of the proposed change to commitments for the following reasons:

- The new letter of agreement with Summerhill Fire Company. is virtually identical to the agreement that had existed with the Shickshinny Fire Department. PLE-0026081 states in part "Summerhill Fire Company agrees to provide firefighting assistance, including personnel and equipment, at the Susquehanna Steam Electric Station as may be required".
- There are currently four (4) other Fire Companies (in addition to the Summerhill Fire Company) that have signed the 2018 letters of Agreement and continue to provide fire fighting support services to SSES.
- Shickshinny Fire Company is based approximately 5 miles east of the plant and Summerhill Fire Company is based approximately 9 miles north of the plant.

Reg. Guide 1.219 Revision 1 section 4.12 was reviewed for examples of changes that could require prior NRC approval and none were found to be applicable.

Per the guidance in EP-102 Attachments F and G, this change does not constitute a scheme change.

The proposed change is not a reduction in effectiveness of the Emergency Plan and therefore does not require prior NRC approval.

Attachment A, 10CFR50.54q Screening Form

Screening Number: S2018-10-29-01	

Part I. Description of Activity Being Reviewed (event or action, or series of actions that may result in a change to the Emergency Plan or affect the implementation of the Emergency Plan). Provide the existing text and the revised text (attaching a mark-up of the existing text with proposed change can be used as an alternative):

Deleted reference to supplemental meteorological tower from section 7.1.1.1 in the SSES Emergency Plan rev 61 per AR-2017-17969

Part II. Activity a Change per Section 3.1.3?	☒ YES	☐ NO
Does the activity constitute a change per definition 3.1.3 - An action that results in modification or addition to, or removal from the SSES Emergency Plan, **OR** the resources, capabilities and methods identified in the plan? Justification:	Continue to next part	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.

Part III. Activity Previously Reviewed?	☐ YES	☒ NO
Is this activity fully bounded by an NRC approved 10 CFR 50.90 submittal or Alert and Notification System Design Report (44 CFR 350.14)? If YES, identify bounding source document number/approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below: Justification: ☐ Bounding document attached (optional)	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	Continue to next part

Part IV. Editorial Change	☐ YES	☒ NO
Is this activity an editorial or typographical change such as formatting, paragraph numbering, spelling, or punctuation that does not change intent per definition 3.1.4? Justification:	10 CFR 50.54(q) Evaluation is NOT required. Enter justification and complete Part VI.	Continue to next part

Part V. Emergency Planning Element/Function Screen (Associated 10 CFR 50.47(b) planning standard function identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.

1.	Responsibility for emergency response is assigned. [1]	☐
2.	The response organization has the staff to respond and to augment staff on a continuing basis (24/7 staffing) in accordance with the Emergency Plan. [1]	☐
3.	The process ensures that on shift emergency response responsibilities are staffed and assigned. [2]	☐
4.	The process for timely augmentation of on-shift staff is established and maintained. [2]	☐
5.	Arrangements for requesting and using off site assistance have been made. [3]	☐
6.	State and local staff can be accommodated at the EOF in accordance with the Emergency Plan. [3]	☐
7.	A standard scheme of emergency classification and action levels is in use. [4] (RSPS)	☐
8.	Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications. [5] (RSPS)	☐

Attachment A, 10CFR50.54q Screening Form, Continued

Part V. Emergency Planning Element/Function Screen (cont.) (Associated 10 CFR 50.47(b) planning standard identified in brackets.) If this activity affects any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II, then place a check in the appropriate box.	
9. Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway. [5] (RSPS)	☐
10. The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter. [5] (RSPS)	☐
11. Systems are established for prompt communication among principal emergency response organizations. [6]	☐
12. Systems are established for prompt communication to emergency response personnel. [6]	☐
13. Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway Emergency Planning Zone (EPZ). [7]	☐
14. Coordinated dissemination of public information during emergencies is established. [7]	☐
15. Adequate facilities are maintained to support emergency response. [8]	☐
16. Adequate equipment is maintained to support emergency response. [8]	☒
17. Methods, systems, and equipment for assessment of radioactive releases are in use. [9] (RSPS)	☒
18. A range of public PARs is available for implementation during emergencies. [10] (RSPS)	☐
19. Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities. [10] (RSPS)	☐
20. KI is available for implementation as a protective action recommendation in those jurisdictions that chose to provide KI to the public [10]	☐
21. A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]	☐
22. The resources for controlling radiological exposures for emergency workers are established. [11]	☐
23. Arrangements are made for medical services for contaminated, injured individuals. [12]	☐
24. Plans for recovery and reentry are developed. [13]	☐
25. A drill and exercise program (including radiological, medical, health physics and other program areas) is established. [14]	☐
26. Drills, exercises, & training evolutions that provide performance opportunities to develop, maintain, & demonstrate key skills are assessed via a formal critique process in order to identify weaknesses. [14]	☐
27. Identified weaknesses are corrected. [14]	☐
28. Training is provided to emergency responders. [15]	☐
29. Responsibility for Emergency Plan development and review is established. [16]	☐
30. Planners responsible for Emergency Plan development and maintenance are properly trained. [16]	☐

APPLICABILITY CONCLUSION

☐ If no Part V criteria are checked, a 10 CFR 50.54(q) Evaluation is NOT required; complete Part VI.
☒ If any Part V criteria are checked, complete Part VI and perform a 10 CFR 50.54(q) Evaluation.

Part VI. Signatures:

Adrian Miron		10/29/18
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
JOE MEYER		11/2/18
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date

Evaluation Number: E2018-10-29-03	Screen Number: S2018-10-29-01

Part I. Description of Proposed Change (Copy applicable information from 50.54(q) screen form Part I or attach a mark-up of the existing text with the proposed change can be used as an alternative):

Deleted reference to supplemental meteorological tower in Nescopeck from section 7.1.1.1 in the SSES Emergency Plan rev 61 per AR-2017-17969 and all applicable EP implementing procedures (ex. EP-PS-001)

S2018-10-29-01 identified 2 Emergency Planning Elements/Functions potentially associated to this change:

- 16. Adequate equipment is maintained to support emergency response. [8]
- 17. Methods, systems, and equipment for assessment of radioactive releases are in use. [9] (RSPS)

These are associated with 10CFR50.47.b(8) and 10CFR50.47.b(9) requirements, respectively.

Background information on the change:

- The description of 2 supplemental towers, one towards Shickshinny (upriver) and one in Nescopeck (downriver) was introduced in Section 7.1.1.1 of the SSES Emergency Plan Rev 25 (E-Plan) issued on 2/7/97 without NRC approval. The description of the change was: "*This section was changed to describe the current site meteorological tower assignments and provide historical perspective.*" Other reasons for implementing the change are described in the E-Plan itself, as follows: the "*supplemental towers were installed in the river valley near the station to more accurately model the effects of surrounding terrain on atmospheric dispersion and transport*", "*Meteorological validation of the Upriver supplemental tower data was terminated in October 1, 1994 due to excessive trend and vegetation growth impacting the wind speed and wind direction sensors*", and the "*Downriver tower is used **only to support assessment and restoration efforts** in the event there is an accidental release of radioactive material.*"
- SSES Emergency Plan Rev 39 (E-Plan) issued on 11/20/2001 removed description for the Shickshinny (upriver) that was terminated in 1994. The change was processed without NRC approval.
- The current description of the Nescopeck (downriver) supplemental tower remained unchanged in Section 7.1.1.1 in all E-Plan revisions up to current rev 61.
- No NRC SERs were sought on Section 7.1.1.1 from rev 24 and the original NRC SER did not include description of the supplemental towers.

Part II. Evaluation of the Proposed Change for Compliance with the requirements of 10 CFR 50.47(b) and 10 CFR 50 Appendix E:

10 CFR 50.47(b)(8) - Adequate emergency facilities and equipment to support the emergency response are provided and maintained.

By implementing the change described in Part 1, SSES continue to meet 10 CFR 50.47(b)(8) requirements since the requirement of maintaining a principal and backup tower at the site is not altered in the E-Plan and its implementing procedures. Note that that data from principal or backup site towers are used for dose assessment and those towers are included in the EITER procedure EP-115. Per current dose assessment EP procedures (EP-PS-001-41) data from the Nescopeck tower are used only if the primary and backup site met towers data is not available. As shown in the E-Plan, "*Downriver tower is used **only to support assessment and restoration efforts** in the event there is an accidental release of radioactive material*" and was not meant for supporting the dose assessment function but rather the restoration efforts. Therefore, by maintaining a primary and a backup tower at the SSES site, SSES is in full compliance with this requirement and continue to adequately maintain equipment to support the emergency response. The restoration effort will be discussed in the next section.

No applicable Sections IV.E.1–4, IV.E.8, and IV.G of 10CFR50 Appendix E requirements associated with the change described in Part 1 on Emergency Planning Standard [8] were found.

10 CFR 50.47(b)(9) - Adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use.

Section IV.E.2 of in 10CFR50 Appendix E requirements was found to be applicable to the change described in Part I: *Adequate provisions shall be made and described for emergency facilities and equipment, including equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment.*

By implementing the change described in Part 1, SSES continue to meet 10 CFR 50.47(b)(9) and Section IV.E.2 of in 10CFR50 Appendix E requirements since the requirement for maintaining a principal and backup tower at the site is not altered in the E-Plan and its implementing procedures. Note that that data from principal or backup site towers is used for dose assessment and those towers are included in the EITER procedure EP-115. Per current dose assessment EP procedures (EP-PS-001-41) data from the Nescopeck tower are used only if the primary and backup site met towers data is not available. As shown in the E-Plan "*Downriver tower is used **only to support assessment and restoration efforts** in the event there is an accidental release of radioactive material*" and was not meant for supporting the dose assessment function but rather the restoration efforts. Therefore, by maintaining a primary and a backup tower at the SSES site, SSES is in full compliance with these requirements and adequately maintains methods and equipment for assessing potential offsite consequences of a radiological emergency condition and determining the magnitude of and continuously assessing the impact of the release of radioactive materials to the environment. The restoration effort will be discussed in the next section.

Therefore, deleting reference to supplemental meteorological tower in Nescopeck from section 7.1.1.1 from E-Plan and all applicable EP implementing procedures does not affect the requirements in 10CFR50.47(b) and Appendix E to 10CFR Part 50.

Part III. Evaluation of Emergency Planning Functions, Elements, and Commitments affected by the Proposed Change and the Licensing Basis for those Functions, Elements, and Commitments:
Emergency Planning Standards (Function) for 10 CFR 50.47(b)(8) that is applicable to the change described in Part I is: *Adequate equipment is maintained to support emergency response*

By implementing the change described in Part 1, SSES continue to meet this Planning Standard (PS) requirement since SSES will continue to maintain a principal and backup tower at the site as shown in the E-Plan and its implementing procedures. Note that that data from principal or backup tower are used for dose assessment from the site and those towers are included in the EITER procedure EP-115. Per current dose assessment EP procedures (EP-PS-001-41) data from the Nescopeck tower are used only if the primary and backup met towers data at the site is not available. As shown in the E-Plan, "*Downriver tower is used **only to support assessment and restoration efforts** in the event there is an accidental release of radioactive material*" and was not meant for supporting the dose assessment function but rather the restoration efforts. Therefore, by maintaining a primary and a backup tower at the SSES site, SSES is in full compliance with this requirement and continue to adequately maintain equipment to support the emergency response.

Applicable Program Elements from NUREG-0654 Sections II.H associated with the Emergency Planning Function [8] are:

- *Each licensee shall identify and establish **onsite** monitoring systems that are to be used to initiate emergency measures in accordance with Appendix 1, as well as those to be used for conducting assessment. The equipment shall include:*
  *a. geophysical phenomena monitors, (e.g., **meteorological**, hydrologic, seismic);*
- ***Each licensee shall provide meteorological instrumentation and procedures which satisfy the criteria in Appendix 2, and provisions to obtain representative current meteorological information from other sources.***

Applicable Program Elements from NUREG-0654 Appendix 2, Meteorological Criteria For Emergency Preparedness At Operating Nuclear Power Plants, associated with change described in Part I are:

10 CFR Part 50.47 requires that the Emergency Plan shall provide " (A)dequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition ... "
The basic functions needed to comply with the meteorological aspects of these requirements are:
1. A capability for making meteorological measurements.
2. A capability for making near real-time predictions of the atmospheric effluent transport and diffusion.
3. A capability for remote interrogation of the atmospheric measurements and predictions by appropriate organizations.
Meteorological Measurements
*The emergency facilities and equipment as stated in Appendix E to 10 CFR Part 50 shall include "(E)quipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment." To address this requirement, in part, the nuclear power plant operator **shall have meteorological measurements from primary and backup systems.***
Each site with an operating nuclear power plant shall have a primary meteorological measurements system. The primary system shall produce current and record historical local meteorological data. These data will provide a means to estimate the dispersion of radioactive material due to accidental radioactive releases to the atmosphere by the plant. ....
Each site with an operating nuclear power plant shall have a viable backup meteorological measurements system. The backup system shall provide meteorological information when the primary system is out of service and, thus, assurance that basic meteorological information is available during and immediately following an accidental airborne radioactivity release.

By implementing the change described in Part 1, SSES continue to meet this guidance since SSES will continue to maintain a principal and backup tower at the site as shown in the E-Plan and its implementing procedures. Note that that data from principal or backup site met towers is used for dose assessment and those towers are included in the EITER procedure EP-115. Per current dose assessment EP procedures (EP-PS-001-41) data from the Nescopeck tower are used only if the primary and backup met towers data at the site is not available. As shown in the E-Plan "*Downriver tower is used **only to support assessment and restoration efforts** in the event there is an accidental release of radioactive material*" and was not meant for supporting the dose assessment function but rather the restoration efforts. Therefore, by maintaining a primary and a backup tower at the SSES site, SSES is in full compliance with this guidance and continue to adequately maintain equipment to support the emergency response.

In addition, provisions to "***obtain representative current meteorological information from other sources***" are described in Section B of EP-PS-001-41 form by contacting National Weather Service (NWS) Emergency Meteorological Support Office, using www.weather.com or ABS Consulting (during working hours). Therefore, by implementing this change, this criterion is also met.

Emergency Planning Standards (Function) for 10 CFR 50.47(b)(9) that is applicable to the change described in Part I is: *Methods, systems, and equipment for assessment of radioactive releases are in use.*

By implementing the change described in Part 1, SSES continue to meet this PS requirement since SSES will continue to maintain a principal and backup tower at the site as shown in the E-Plan and its implementing procedures. Note that that data from principal or backup site met towers is used for dose assessment and those towers are included in the EITER procedure EP-115. Per current dose assessment EP procedures (EP-PS-001-41) data from the Nescopeck tower are used only if the primary and backup met towers data at the site is not available. As shown in the E-Plan, "*Downriver tower is used **only to support assessment and restoration efforts** in the event there is an accidental release of radioactive material*" and was not meant for supporting the dose assessment function but rather the restoration efforts. Therefore, by maintaining a primary and a backup tower at the SSES site, SSES is in full compliance with this requirement and continue to adequately maintain methods and equipment to support the assessment of radioactive releases.

Applicable Program Elements from NUREG-0654 Sections II.I associated with the Emergency Planning Function [9] are:

- *Each licensee shall have the capability of acquiring and evaluating meteorological information sufficient to meet the criteria of Appendix 2. There shall be provisions for access to meteorological information by at least the near site Emergency Operations Facility, the Technical Support Center, the Control Room and an offsite NRC center. ....*

As discussed above, SSES was found in compliance with guidance from Appendix 2 of NUREG 0654.

By implementing the change described in Part 1, SSES continue to meet this guidance since SSES will continue to maintain a principal and backup tower at the site as shown in the E-Plan and its implementing procedures. Note that that data from principal or backup site met tower is used for dose assessment and those towers are included in the EITER procedure EP-115. The primary and backup met tower data continue to be available in the CR, TSC, Alt TSC and EOF via the plant computer system. Per current dose assessment EP procedures (EP-PS-001-41) data from the Nescopeck tower are used only if the primary and backup met towers data at the site is not available. As shown in the E-Plan, "*Downriver tower is used **only to support assessment and restoration efforts** in the event there is an accidental release of radioactive material*" and was not meant for supporting the dose assessment function but rather the restoration efforts. Therefore, by maintaining a primary and a backup tower at the SSES site, SSES is in full compliance with this guidance and continue to adequately maintain methods and equipment to support the assessment of radioactive releases.

Restoration efforts are described in Section 4.2.3, 6.0 (Phase IV), 6.5 and Figure 6.6. In addition, EP-00-003, Termination and Restoration, and EP-PS-248, EOF Environmental Sampling Director, are used in restoration efforts. The Nescopeck meteorological tower is not mentioned in any of these sections in the E-Plan and implementing procedures.

In addition, it is not clear how additional met data in Nescopeck would be used to support assessment and restoration efforts. As specified in Section 6.4.3 of the E-Plan, "*If the situation necessitates additional technical assistance, DOE can set up and staff a Federal Radiological Monitoring and Assessment Center (FRMAC) in the vicinity of SSES. A FRMAC, which draws DOE resources and personnel from its Nevada Operations Office, can be operational within about 24 hours. The location of such a center would be selected based on actual radiological deposition patterns. The Federal FRMAC team is initially managed by DOE, with personnel also provided by NRC, EPA, USDA, HHS, and other agencies. The State and Susquehanna would assign personnel to the FRMAC to coordinate monitoring activity.*"

Once set up, FRMAC's mission will be to help decision makers in the Intermediary Phase of the accident, i.e., once the releases are under control and different Protective Action Guidance are applicable in accordance with EPA 400 guidance. As specified in Section 1.1 in DOE/NV/25946-980, FRMAC Operations Manual, "*FRMAC is responsible for coordinating all environmental radiological monitoring, sampling and assessment activities for the response*" and thus, regardless of the wind direction at the site or elsewhere, FRMAC will produce an "*assessment of the affected areas*" around SSES.

Therefore, the Nescopeck met tower data can be easily disregarded by real data measured after the release is under control, in accordance with SSES E-Plan and implementing procedures, as well as by taking advantage of modern resources and capabilities of the Federal Government.

Applicable guidance for the change described in Part from Reg. Guide 1.219 Revision 1 sections 4.8 and 4.9 are:
4.8.c(1)(a) - *a reduction in the existing reliability or redundancy of data acquisition, display, and analysis equipment provided in the ERFs*; and
4.9.c(1)(a) - *a change that reduces the availability of meteorological data in ERFs where dose assessments are performed and PAR decisions are made*

None of this guidance are applicable to the change described in Part I because the SSES will continue to maintain 2 met towers onsite and dose assessment is based on these readings in each ERF. Thus, the redundancy and availability of data needed for dose assessment is satisfied. In addition, as discussed below the supplemental met tower data is not redundant to the onsite met towers. Therefore, both criteria above continue to be satisfied by implementing the change described in Part 1.

As discussed in Part I, Background Information section, the descriptions of the upriver and down river supplemental met towers were included in the E-Plan Rev 25 without NRC approval. Subsequently, the upriver met tower description was removed without NRC approval in Rev 39 of the E-Plan. No NRC SER addressed section 7.1.1.1 from rev 25 to rev 61 and the original NRC SER did not include description of the supplemental meteorological towers. Therefore, removing the description of the downriver met tower does not constitute a licensing or commitment violation.

It can be concluded that, removing Nescopeck met tower from the E-Plan and all applicable EP implementing procedures does not affect SSES Emergency Planning Functions, Elements, Commitments and Licensing Basis.

Part IV. Evaluation of the Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions:

As observed several times, Nescopeck met tower readings (wind speed and direction) do not always coincide with the primary and backup meteorological towers located on site. This is because the Nescopeck met tower is located 3.6 miles away from the site and because of complex river basin effects. Therefore, using this data instead of the primary or backup met towers during the dose assessment process in the initial phase of an accident would be less than desirable and a factor of confusion for ERO. Therefore, eliminating the Nescopeck tower from the dose assessment procedures could only increase the effectiveness of the E-Plan.

Part V. Evaluation Conclusion Answer the following questions about the proposed change.	
1. Does the proposed change comply with 10 CFR 50.47(b) and 10 CFR 50 Appendix E?	☒ YES ☐ NO
2. Does the proposed change maintain the effectiveness of the Emergency Plan (i.e., no reduction in effectiveness)?	☒ YES ☐ NO
3. Does the proposed change constitute an emergency action level scheme change?	☐ YES ☒ NO
If questions 1 or 2 are answered NO, or question 3 answered YES, obtain prior NRC approval under provisions of 10 CFR 50.90. If questions 1 and 2 are answered YES, and question 3 answered NO, implement applicable change process(es).	

Part VI. Signatures:		
Adrian Miron		10/29/18
Preparer Name (Print) (JFG EP109)	Preparer Signature	Date
JOE METER		11/2/18
Reviewer Name (Print) (JFG EP109)	Reviewer Signature	Date