NEI 12-10 [Revision 0]

Guideline for Developing a Licensee Protective Action Recommendation Procedure Using NUREG-0654 Supplement 3

October 2012

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Nuclear Energy Institute

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October 2012

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ACKNOWLEDGMENTS

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NOTICE

EXECUTIVE SUMMARY

In November 2011, the Nuclear Regulatory Commission (NRC) published NUREG-0654/FEMA-REP-1, Rev. 1, Supplement 3, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Guidance for Protective Action Strategies. This guidance provides a Protective Action Recommendation (PAR) strategy development tool for use by licensees, in collaboration with Offsite Response Organizations (OROs) that assists in development of a site-specific PAR procedure using the guidance in Supplement 3.

This NEI document establishes a consistent methodology for nuclear power industry licensees to utilize the Supplement 3 guidance for site-specific PAR development.

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TABLE OF CONTENTS

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GUIDELINE FOR DEVELOPING A LICENSEE PROTECTIVE ACTION RECOMMENDATION PROCEDURE USING NUREG-0654 SUPPLEMENT 3

1 PURPOSE

NOTE

Review and understand the following industry documents before utilizing this guideline:

- **10CFR50.47(b)(10)**
- **10CFR50, Appendix E.IV, paragraph 3**
- **NUREG-0654 Supplement 3**
- **Site-specific ETE**
- **Existing site-specific PAR strategy**

The purpose of this guideline is to:

■ Provide guidance for developing site-specific Protective Action Recommendation (PAR) procedures using NUREG-0654/FEMA-REP-1 Rev 1, Supplement 3.

■ Facilitate discussion between licensees and Offsite Response Organizations (OROs) on protective action recommendation decision-making and site-specific PAR procedures.

■ Provide a consistent method for licensees to document their discussions with OROs and their basis for site-specific PAR strategies implemented in PAR procedures .

2 BACKGROUND

In 1996, the Federal Emergency Management Agency (FEMA) and the NRC issued Supplement 3 to NUREG-0654/FEMA-REP-1, Rev. 1, as draft guidance for developing PARs in response to "severe accidents," which were equated with General Emergency situations.

In 2004, the NRC initiated a study comparing effectiveness of alternative protective action strategies in reducing the public impact from a spectrum of possible nuclear power plant core melt accidents. The study is documented in NUREG/CR-6953, "Review of NUREG-0654, Supplement 3, Criteria for Protective Action Recommendations for Severe Accidents", Volumes 1, 2 and 3 (the PAR Study). The PAR Study is the technical basis for the current version of Supplement 3.

The current version of Supplement 3 was published in November 2011 and:

- Makes a distinction between severe accidents and other General Emergency conditions.
- Defines a "rapidly progressing severe accident," as a General Emergency with rapid loss of containment integrity and loss of ability to cool the core. The November 2011 Supplement 3 guidance directs licensees' PAR development tools to distinguish between a rapidly progressing severe accident and other General Emergency conditions.
- Provides methods for licensees to make greater use of evacuation time estimates (ETE) in their site-specific PAR decision making strategies.
- Specifies that licensees and OROs should factor shelter-in-place (SIP) and staged evacuation concepts into their PAR and Protective Action Decision (PAD) strategies.
- Contains guidance for implementation of new requirements of 10 CFR 50 Appendix E, Section IV, paragraph 3, that states in part, "nuclear power reactor licensees shall use NRC approved evacuation time estimates (ETEs) and updates to ETEs in the formulation of protective action recommendations…." The November 2011 Supplement 3 also includes guidance on the formulation of PARs under 10CFR50.47(b)(10). Planning standard 10 of 10CFR50.47(b) states in part, "Guidelines for the choice of protective actions during an emergency consistent with Federal guidance, are developed and in place…."

Licensees may identify alternative methods of compliance with the requirements detailed in the November 2011 NUREG 0654 Supplement 3 (here-in referred to as Supplement 3) on the condition that they provide sufficient justification to the NRC staff that the proposed alternatives demonstrate compliance with applicable NRC regulations.

NOTE

This guidance document is based on the assumption that licensee EPZs are set up in the standard 0-2 mile radius and 22.5 degree compass sector downwind sectors with or without corresponding emergency response planning areas. Any site using different standards will need to tailor the guidance in this document for its specific application.

1. This guidance document is intended to assist emergency preparedness staff (developer) in creating a protective action strategy compliant with 10CFR50.47(b)(10) and 10CFR50 Appendix E.IV, paragraph 3 and Supplement 3.

2. The developer is defined as the emergency preparedness staff member who completes Appendix A, PAR Strategy Development/Evaluation and then prepares the site-specific PAR procedure. Specific guidance for these personnel is provided in double lined "Developer Instruction" text boxes throughout Appendix A.

3. Portions of Supplement 3 are referenced throughout this document to provide additional detail and guidance in developing the site-specific evaluation/documentation tool and the site-specific PAR strategy for final implementation.

3 METHODOLOGY

NOTE

This document does not provide guidance on dissemination of public information (Section 3 of Supplement 3).

NOTE

Developers may wish to consult NUREG-2112, "Public Comment Analysis and Adjudication: Supplement 3 to NUREG-0654/FEMA-REP-1, 'Guidance for Protective Action Strategies'" for additional reference.

3.1 GENERAL INFORMATION

The following should be considered before employing the site-specific PAR strategy development/evaluation tool:

- Refer to Supplement 3 Section 1.2 for a discussion of the document's intended use as guidance, its voluntary use and any continued use of guidance NRC has found acceptable.
    - The licensee uses the guidance in this document with Supplement 3 to develop an acceptable PAR strategy

      OR

    - Licensees must have an acceptable alternate means to implement 10CFR50.47(b)(10) and 10CFR50 Appendix E Section IV, paragraph 3 if Supplement 3 is not used. Licensees electing to do this should not proceed further in this guidance document.
- Refer to Supplement 3 Section 1.4, page 5 for information on the relation of Supplement 3 to previous regulatory guidance.
- Licensees may use this guidance document and Supplement 3 to develop customized protective action strategies appropriate for their sites. Supplement 3 and this guidance document use a decision logic diagram that does not contain site-specific information. Also, the use of logic diagrams by licensees to depict or implement a protective action strategy is not considered mandatory.

- Licensees may develop procedural guidance that differs for the control room and augmented emergency response organization (ERO) staff.

- For consistency, the term "monitor and prepare" or equivalent phrasing, should be used in the licensee and ORO plans, procedures, public information bulletins and materials for offsite areas in the 10-mile EPZ where the PAR determination is to neither evacuate nor shelter in place.

- Once the PAR strategy is developed, licensees should review Section 1.2 of Supplement 3 and their licensing basis to determine whether a license amendment under 10CFR50.90 is required or whether the changes can be made under 10CFR50.54(q).

3.2 PAR STRATEGY DEVELOPMENT/EVALUATION/DOCUMENTATION

NOTE

Appendix B, Modification of Initial PARS, addresses Supplement 3 Section 2.6, expansion of initial PARs.

- Licensees and OROs will use the guidance in this document and Supplement 3 to coordinate the formulation of a PAR strategy.

    - This coordination effort should result in a PAR strategy for inclusion in licensee site-specific PAR procedures. The evaluation/documentation tool in Appendix A provides for documentation of this developmental coordination effort between the licensee and OROs.

    - Coordination may not result in agreement in every case. Licensees are expected to provide a PAR based on technical information during an event. Site-specific conditions may prompt OROs to implement a different PAD.

    - Refer to Supplement 3, Section 2.1 for cases where a responsible ORO may choose not to participate in the development of a site-specific PAR strategy. The documentation of the PAR development strategy should still be performed using the evaluation/documentation tool in Appendix A using existing ORO plans and procedures.

- Appendix A provides a PAR strategy development/evaluation tool. The licensee may use this tool to:

    - Guide the decision-making internal to the site required to develop PAR strategies,

    - Guide the discussions and decision-making with ORO required to develop PAR strategies,

- Document all analysis and development discussions and decisions.

- Licensees are encouraged to document their ORO discussions and final decisions in each applicable section in Appendix A.

- Appendix A uses Supplement 3 Sections 2.1 through 2.7 and the Supplement 3 PAR strategy logic diagram – along with associated notes (pages A-2 through A-6 of Supplement 3) -- to facilatate a question and answer evaluation format. For ease of reference, each element (diamond, square, rectangle, etc.) in the Supplement 3 logic diagram is given a corresponding reference letter in Appendix C.

3.2.1 Appendix A Instructions

- Appendix A is a two-column table referencing applicable Supplement 3 sections along with the logic diagram and notes located in Appendix C.
  - The Appendix A items correspond to the same order as Supplement 3 Sections 2.1 to 2.7.
    - Answer each question presented in the "General Response Questions" column and document the answer and decisions in the "Licensee and ORO Response".
    - Consult with the ORO during the completion of Appendix A. For instance, you should have your off-site agencies provide feedback on Sections 2.4, Precautionary Protective Actions at Site Area Emergency and 2.5, Wind Persistence Issues and Size of the Response Areas. Document feedback from offsite agencies in the Licensee and ORO Response column.
  - The order of Appendix A items for the logic diagram and notes correspond to the lettered elements in the logic diagram in Appendix C (from Supplement 3).
    - Answer each question presented in the "Questions Regarding Supplement 3 Protective Action Strategy Development Tool and Notes" column and document the answer and decisions in the "Licensee and ORO Response."
    - Consult with the ORO where required.
    - In cases where the decision informs PAR logic, incorporate the PAR logic in the site-specific PAR procedure.
- Some Appendix A items may be developed and/or completed by the licensee alone (such as rapidly progressing severe accident technical definition) and then reviewed with OROs as a completed item.

- Provide sufficient documentation for the basis of your site-specific PAR strategy in the Licensee and ORO Response column..

3.2.2 Appendices B and C

- Appendix B provides guidance on how initial PARs may be modified.

- Appendix C is included as reference material.

4 REFERENCES

1. NUREG-0654/FEMA-REP-1, Rev. 1, Supplement 3, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"

2. RIS 2005-08, Endorsement of Nuclear Energy Institute (NEI) Guidance "Range of Protective Actions for Nuclear Power Plant Incidents"

3. EPA 400, "Manual of Protective Action Guides and Protective Actions for Nuclear Plants"

4. NUREG/CR-6864, "Identification and Analysis of Factors Affecting Emergency Evacuations"

5 APPENDICES

- Appendix A – PAR Strategy Development/Evaluation
- Appendix B – Modification of Initial PARS
- Appendix C – Supplement 3 Logic Diagram (Letters Added for Reference)

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APPENDIX A – PAR STRATEGY DEVELOPMENT/EVALUATION

(Site)

(Date)

Developer Instruction
This page provides a template for an approval chain process. Licensees may use another established approval processes for this document, including those used for procedures or emergency plan review and approval.

Approved: _____ **(Site EP Manager)**

Approved: _____ **(ORO)**

Approved: _____ **(ORO)**

Approved: _____ **(ORO)**

Developer Instruction
For the General Response Questions, the left column corresponds to Supplement 3 sections 2.1-2.7. The remainders of the questions refer to the logic diagram from Supplement 3 that is reproduced as Appendix C of this document. The right hand column of the table is for ORO/licensee use in developing the final site-specific PAR procedure requirements.

GENERAL RESPONSE QUESTIONS	LICENSEE AND ORO RESPONSE
2.1: Development of Site-Specific Protective Action Recommendation and Decision Logic Question #1	
Are OROs participating in the development of the protective action recommendations based on Supplement 3? **If yes**, list participating OROs. Also include ORO approval signatures on the cover sheet when this Appendix is completed. **If no**, then list documents obtained from non-participating OROs used to develop the site-specific guidance.	**Developer Instruction** Answer yes or no. List participating OROs, or when OROs are not participating in the PAR strategy development process, list documents obtained to develop the site-specific guidance. Date of Response:_____
2.1: Development of Site-Specific Protective Action Recommendation and Decision Logic Question #2	
Will separate guidance be developed for on-shift and augmented ERO? **If yes**, describe the differences.	**Developer Instruction** Answer yes or no. "N/A" may be used if appropriate. If separate guidance for control room and augmented ERO are provided, then list the differences (e.g., "control room not required to implement second stage of staged evacuation," etc.) and incorporate as applicable in the site-specific PAR procedure. Date of Response:_____

GENERAL RESPONSE QUESTIONS	LICENSEE AND ORO RESPONSE
2.2: Notification of Protective Action Recommendations at a General Emergency	
Read and understand the element in Supplement 3 – no new action is needed.	N/A
2.3: Termination of Protective Actions	
Read and understand the element in Supplement 3 – no new action is needed.	N/A
2.4: Precautionary Protective Actions at Site Area Emergency	
Do precautionary PARs prior to declaration of a General Emergency currently exist in the licensee's Emergency Plan? If yes, describe how they will be addressed in the site-specific PAR procedure. If the answer is yes, incorporate appropriate entry point(s) in the site-specific protective action strategy development tool for these precautionary PARs. **If no**, no additional action is needed.	**Developer Instruction** Answer yes or no. If PARs prior to the General Emergency (e.g., recommendations to be provided at a Site Area Emergency) are currently used, describe how they will be addressed in the protective action strategy (e.g., retained or not retained, etc.) and how they will be incorporated into the protective action strategy as applicable (e.g., procedure note at SAE, logic diagram entry point, etc.). "N/A" may be used where there are no precautionary PARs prior to the General Emergency. Incorporate appropriate information in the site-specific PAR procedure. Date of Response:_____

GENERAL RESPONSE QUESTIONS	LICENSEE AND ORO RESPONSE
2.5: Wind Persistence Issues	
Developer Instruction This question is related to Note 4 of the Supplement 3 Appendix (Note also provided in Appendix C). Does typical site meteorology include wind direction shifts on a time scale that is shorter than the (longest) ETE for downwind 2-5 mile sectors? A wind direction shift as used here is defined as a shift that would impact another compass sector or emergency response planning area. **If yes**, consider a wind persistence study.	**Developer Instruction** Provide answer. Provide reference to wind persistence study as applicable. Wind persistence studies are not required to implement Supplement 3. Developers may simply include reference to UFSAR information, review of historical National Weather Service (NWS) information or discussions with NWS representatives. Incorporate appropriate information in the site-specific PAR procedure. Date of Response:_____
2.5: Size of Emergency Response Areas	
Developer Instruction This question is related to Note 4 of the Supplement 3 Appendix (Note also provided in Appendix C). Should an expanded description of "downwind" be used (e.g., greater than 3 or 4 22.5 degree compass sectors, including all of the impacted emergency response planning areas)? **If yes**, provide justification. **If no**, no additional action is needed.	**Developer Instruction** Provide answer. Provide technical justification if an area larger than the 3 to 4 22.5 degree compass sectors will be used to define the term "downwind." If a wind persistence study or some other method was used to determine the size of the downwind area, reference it in this column. The use of entire radii, such as "5 mile radius" or "10 mile radius" to define "downwind" is not acceptable. "N/A" may be used when the site-specific use of "downwind" is the same as that found in Supplement 3. Incorporate appropriate information in the site-specific PAR procedure. Date of Response:_____

GENERAL RESPONSE QUESTIONS	LICENSEE AND ORO RESPONSE
2.6: Expansion of Initial Protective Action Recommendations	
Developer Instruction This item is related to Note 11 of the Supplement 3 Appendix (Note also provided in Appendix C). Read and understand the element in Supplement 3 and Appendix B of this document – no new action is needed.	N/A

GENERAL RESPONSE QUESTIONS	LICENSEE AND ORO RESPONSE
2.7: Strategy for Rapidly Progressing Scenarios	
Developer Instruction This item informs on Block B of Appendix C and Note 9 of the Supplement 3 Appendix (Note also provided in Appendix C). Define a rapidly progressing severe accident for your site. Refer to Supplement 3 Attachment, Note 1 (Note also provided in Appendix C). **Developer Instruction** The questions below assist with determining the site-specific definition of a rapidly progressing severe accident. Is linkage to the site-specific Severe Accident Management Guidelines (SAGs or SAMGs) the appropriate threshold for deciding whether a beyond design basis rapidly progressing severe accident has occurred or is in progress? **Developer Instruction** Extreme weather conditions or other impediments to evacuation do not need to be considered for development of the licensee's PAR strategy for rapidly progressing severe accidents.[1] [1] The NEI task force reviewed the information provided in the technical NUREG/CRs and did not find information to support consideration of extreme weather conditions or other impediments to evacuation for PAR modification in a rapidly progressing severe accident.	**Developer Instruction** Provide the site-specific definition for a rapidly progressing severe accident and the basis for this definition. Incorporate appropriate information in the site-specific PAR procedure. The licensee-specific definition may be used to replace the term "rapidly progressing severe accident" as it is used in Supplement 3. Date of Response:_____

Developer Instruction
Refer to the logic diagram in Appendix C to address the rest of the questions in this Appendix.

QUESTIONS REGARDING SUPPLEMENT 3 PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL AND NOTES	LICENSEE AND ORO RESPONSE
BLOCK A. General Emergency Declared	
Read and understand related element in Supplement 3 – no new action is needed unless modification of entry conditions are required based on the response to previous question for Supplement 3 Section 2.4.	N/A
BLOCK B. Rapidly Progressing Severe Accident	
Refer to General Response Question 2.7, Strategy for Rapidly Progressing Scenario. Use the definition provided in the right hand column of Section 2.7 to replace the term "rapidly progressing severe accident" when the site-specific PAR procedure is developed.	N/A
BLOCK C. Continue Assessment	
As long as the impediment remains in place, new plant or dose assessment conditions would not result in a different PAR unless EPA PAGs are exceeded for any areas that are not already under a PAR.	N/A

QUESTIONS REGARDING SUPPLEMENT 3 PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL AND NOTES	LICENSEE AND ORO RESPONSE
BLOCKS D, E, and F. Impediments Question #1 (Evacuation Support)	
Developer Instruction Evacuation support not yet in place - For example, the GE is the initial notification to offsite response organizations or if there is a previous emergency classification notification, the GE notification occurs before preparations to support evacuation can be completed. Many sites have a low population density within 2 miles and evacuation support readiness may not be considered an impediment. Is "evacuation support in place" considered an impediment to evacuation for your site? Is such support needed for the 2 mile radius, 5 mile downwind sectors and 10 mile downwind sectors? How long should this impediment last? **If all answers are no**, no additional action is needed. **If yes**, OROs define the duration of the "evacuation support in place" impediment and the emergency classification when mobilization of evacuation support (and the clock) would start. Provide the information obtained from OROs in the right hand column.	**Developer Instruction** Answer yes or no. If any answers are yes, list the time required to provide the evacuation support resources (time period for the impediment) and the "clock start" for this activity (NOUE, Alert, etc.) and incorporate in the site-specific PAR procedure. **Developer Instruction** If the ORO identified time for evacuation support preparations has elapsed because the site was in prior declaration before the GE, an initial GE declaration is not required to consider the impediment. Incorporate this information as applicable in the site-specific PAR procedure. Describe impediment (Block D): Describe PAR (Block E): Describe duration of the impediment (Block F): Date of Response:_____

QUESTIONS REGARDING SUPPLEMENT 3 PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL AND NOTES	LICENSEE AND ORO RESPONSE
BLOCKS D, E, and F. Impediments Question #2 (Hostile Action)	
What is the best protective action recommendation when a declared hostile action is occurring or has occurred? Do OROs want the licensee to recommend SIP or evacuation for a hostile action event? How long should this impediment last? If evacuation is required by the ORO, then specify in the Licensee and ORO Response column "Evacuation is the required PAR – SIP will not be incorporated into the site specific PAR procedure."	**Developer Instruction** Provide answers: • SIP or evacuation • Duration of impediment (e.g., consult with your ORO or Law Enforcement Agency (LEA) on what should be included in the site specific PAR procedure that informs when to no longer SIP). If SIP will be used, developers may wish to consider a significant radiological release or the potential for a significant radiological release as criteria for the duration (e.g., transitioning from SIP to evacuation). Incorporate in the site-specific PAR procedure. Describe hostile action as an impediment in the site-specific PAR procedure (Block D): Describe PAR (Block E): Describe duration of the impediment (Block F): Date of Response:_____

QUESTIONS REGARDING SUPPLEMENT 3 PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL AND NOTES	LICENSEE AND ORO RESPONSE
BLOCKS D, E, and F. Impediments Question #3 (Other)	
Developer Instruction "Other" impediments for licensee consideration should be limited as much as possible. Consideration should be limited to weather-related impediments. What weather-related or additional impediments to evacuation should be considered by the licensee and the ORO? How long should this impediment last? If other impediments are to be considered, define the conditions in the right hand column. If no "other" impediments are to be considered, no additional action is needed. *Note:* *Impediments are intended to represent the inability to evacuate a large portion of the population of a given area vs. an individual road blockage.*	**Developer Instruction** Provide answers. Define all the conditions that apply, the required PAR and describe the duration of the impediment. Incorporate information as applicable in the site-specific PAR procedure. If no "other" impediments are to be considered, "N/A" may be placed in this column. Describe impediment (Block D): Describe PAR (Block E): Describe duration of the impediment (Block F): Date of Response:_____

QUESTIONS REGARDING SUPPLEMENT 3 PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL AND NOTES	LICENSEE AND ORO RESPONSE
BLOCKS D, E, and F. Impediments Question #4 (Short Term Release)	
RIS 2005-08, Endorsement of Nuclear Emergency Institute (NEI) Guidance "Range of Protective Actions for Nuclear Power Plant Incidents" recommends SIP for a release of short duration. A release of short duration will therefore be treated as an impediment to evacuation. NOTE**:** Short term releases are not considered in Supplement 3 but should be included in the development of a PAR strategy tool.	**Developer Instruction** Define likely sources of short term releases. It is recommended that at a minimum controlled venting from containment be identified as a short term release if it is considered a mitigative strategy for your reactor type. A PAR of SIP 2-mile radius and 5 miles downwind, all others monitor and prepare should be recommended for the of short term releases. Describe impediment (Block D): Describe PAR (Block E): Describe duration of the impediment (Block F): Date of Response:_____

QUESTIONS REGARDING SUPPLEMENT 3 PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL AND NOTES	LICENSEE AND ORO RESPONSE
BLOCK G. Rapidly Progressing Severe Accident PARs Question #1 (0-2 mile radius PAR)	
Will the PARs for a rapidly progressing severe accident be different than those identified in Supplement 3 Attachment Note 9 (Note also provided in Appendix C)? If yes, provide justification. Use the worksheet below to determine PAR: **Supplement 3 Process Worksheet:** **0-2 miles** Using the ETE for the site, determine the 90 percent ETE value for the 0-2 mile area. When considering day and night, select the largest value (V) in each time slot. Consider the weekday and weekend values together. Select the largest of the day and night values. 0-2 miles: Day_____ Night_____ Is V <= 2 hours? • If yes, evacuate immediately. Is V > 2 hours? • If yes, SIP then evacuate when "safer to do so". (Refer to BLOCK J)	**Developer Instruction** Provide answer with justification as necessary and incorporate appropriate information in the site-specific PAR procedure. Specify the 0-2 mile PAR: Date of Response:_____

QUESTIONS REGARDING SUPPLEMENT 3 PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL AND NOTES	LICENSEE AND ORO RESPONSE
BLOCK G. Rapidly Progressing Severe Accident PARs Question #2 (2-5 miles downwind PAR)	
Will the PARs for a rapidly progressing severe accident be different than those identified in Supplement 3 Attachment Note 9 (Notes also provided in Appendix C)? If yes, provide justification. If no, use the worksheet below: **Supplement 3 Process Worksheet:** **2-5 miles** Using the ETE for the site, determine the 90 percent ETE value for the 2 -5 mile sectors. Day and night values are not considered separately in this region. Consider the weekday and weekend values together. Review the ETE for every sector analyzed and select the largest value (V). 2-5 miles: _____ Is V <=3 hours? • If yes, evacuate immediately Is V > 3 hours? • If yes, SIP then evacuate when "safer to do so" (Refer to BLOCK J)	**Developer Instruction** Provide answer with justification as necessary. Specify the 2 – 5 mile down wind PAR: Date of Response:_____

QUESTIONS REGARDING SUPPLEMENT 3 PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL AND NOTES	LICENSEE AND ORO RESPONSE
BLOCK G. Rapidly Progressing Severe Accident PAR Question #3 (5-10 miles downwind PAR)	
Developer Instruction For a rapidly progressing severe accident Supplement 3 Attachment Note 9 (Note also provided in Appendix C) requires a PAR of SIP for the 5-10 downwind sectors.	**Developer Instruction** Incorporate a SIP PAR for the 5-10 mile sectors for a rapidly progressing severe accident in the site-specific PAR procedure. Date of Response:_____

QUESTIONS REGARDING SUPPLEMENT 3 PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL AND NOTES	LICENSEE AND ORO RESPONSE
BLOCK G. Rapidly Progressing Severe Accident PARs Question #4 (Impediments)	
Developer Instruction Read and understand Supplement 3 Attachment Note 9 (Note also provided in Appendix C) for a discussion of impediments (extreme weather conditions, paragraph 8) during a rapidly progressing severe accident. Will impediments be considered? **If yes**, describe the impediments and their durations in right hand column. **If no**, no additional action is needed.	**Developer Instruction** Answer yes or no. List the impediments and durations as necessary. No justification is necessary when determining that impediments will not be considered for rapidly progressing severe accidents. Extreme weather conditions can change the efficacy of SIP (Supplement 3 Attachment Note 9 – Note also provided in Appendix C). For a site that experiences extreme weather conditions, if the PAR for Block G Question #1 or #2 was determined to be SIP, should an evacuation PAR be considered instead? Incorporate appropriate information in the site-specific PAR procedure. Impediments to be considered: Modified 0 – 2 mile PAR: Modified 2 - 5 mile downwind PAR: Date of Response:_____

QUESTIONS REGARDING SUPPLEMENT 3 PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL AND NOTES	LICENSEE AND ORO RESPONSE
BLOCKS H and M PARs	
Developer Instruction Read and understand ETEs for 0-2 mile radius and 2-5 mile area radius and discuss with OROs. Is staged evacuation – 2 mile radius first – then 5 miles downwind appropriate for this site? **If yes**, use the Supplement 3 staged evacuation process described in Appendix C BLOCKs H, K and M. **If no**, determine the appropriate PAR, justify and document in the right hand column (e.g., assumption boundaries differ significantly from the assumptions used in the PAR study, NUREG/CR-6864).	**Developer Instruction** Provide answers and justification for using/not using staged evacuation. If the staged evacuation process as described in Supplement 3 will be used, provide the staged evacuation process in the site-specific PAR procedure. If staged evacuation will not be used, provide the appropriate PARs in the site specific PAR procedure. Date of Response:_____
BLOCKS I and K. GE Conditions Remain	
Developer Instruction Read and understand Supplement 3 Attachment Note 6 (Note also provided in Appendix C). This note refers to completion of the initial staged evacuation. This means completion of the first phase of the staged evacuation of the 2-mile radius.	**Developer Instruction** Using the considerations contained in Supplement 3 Attachment Note 6 (Note also provided in Appendix C), provide site-specific information to explain the term "GE conditions remain" and incorporate in the site-specific PAR procedure. If not using staged evacuation (refer to questions for BLOCKs H and M), the term "GE Conditions remain" is not required to be used. This block is not applicable and "N/A" may be placed in this column. Date of Response:_____

QUESTIONS REGARDING SUPPLEMENT 3 PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL AND NOTES	LICENSEE AND ORO RESPONSE
BLOCK J. When "Safer to do so"	
Developer Instruction 1. If using separate site-specific PAR logic for the control room (e.g., a procedure or flow chart) the PAR procedure for the control room ends at Block G. 2. "Safer to do so" is defined as when the augmented ERO is staffed for both the licensee and OROs. No further protective actions would be initiated until the augmented ERO is present to evaluate conditions and perform assessments.	**Developer Instruction** If the 0-2 mile radius PAR in Block G, Question 1 was determined to be SIP, and the augmented ERO is staffed, the ERO needs to: • Assess the radiological conditions within the 0-2 mile radius, • Determine if the 0-2 mile radius should remain SIP or, • Determine if it is more appropriate to begin staged evacuation. Develop guidance to aid the assessment of radiological conditions for the site and provide the guidance in the Licensee and ORO Response column. Incorporate the guidance in the site-specific PAR procedure. Date of Response:_____
BLOCK L. Expand PAR Only to Areas Where PAGs Could be Exceeded	
Read and understand the element in Supplement 3 and the guidance in Appendix B of this document.	**Developer Instruction** Incorporate appropriate information in the site-specific PAR procedure.
BLOCK N. Continue Assessment	
Read and understand the element in Supplement 3, Attachment Note 11 and the guidance in Appendix B of this document.	**Developer Instruction** Incorporate appropriate information in the site-specific PAR procedure.

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APPENDIX B – MODIFICATION OF INITIAL PARS

1 DISCUSSION

The purpose of this Appendix is to provide a process to ensure that radiological assessment information is properly weighed with plant conditions when modifying protective action recommendations. The Appendix provides a range of factors that should be considered when modifying an initial PAR.

A balance between assessing potential radiation exposure to the public and the risks of evacuation may be achieved by considering this range of factors.

2 CONSIDERATIONS FOR INITIAL PAR MODIFICATION

2.1 CONTROL ROOM PAR MODIFICATIONS

The control room should modify the initial PAR if:

- A change in meteorological or external condition occur affecting a new 2 to 5 mile downwind sector.
  - It is acceptable for this subsequent PAR to be based on plant conditions and to be an extension of the initial PAR. The instructions in Section 2.2 below need not apply to the control room.
- Radiological assessment shall be used as the basis for a subsequent PAR when EPA PAGs will be exceeded in an area:
  - Wider than the 2 to 5 miles downwind 22.5-degree compass sector(s) and adjacent sectors.

  OR

  - 5 to 10 miles downwind.

  The subsequent PAR should be evacuate or SIP if using the staged evacuation process (i.e., SIP may be the appropriate PAR)

2.2 AUGMENTED EMERGENCY RESPONSE ORGANIZATION PAR MODIFICATIONS

The augmented ERO should modify the initial PAR if conditions within Sections 2.2.1, 2.2.2 or 2.2.3 exist.

2.2.1 Screening criteria for expanding the PAR based on radiological assessment

Radiological assessment shall be used as the basis for a subsequent PAR when EPA PAGs will be exceeded in an area:

- Wider than the 2 to 5 miles downwind 22.5-degree compass sector(s) and adjacent sectors.

OR

- 5 to 10 miles downwind.

The subsequent PAR should be evacuate or SIP if using the staged evacuation process (i.e., SIP may be the appropriate PAR).

2.2.2 Screening criteria for extending the PAR to a new affected area based plant conditions due to a change in meteorological or external conditions

IF criteria 1 through 4 below are not fully understood or not all answered yes,

THEN provide a PAR to evacuate or SIP if using staged evacuation process the new affected sectors (i.e., SIP may be the appropriate PAR)

1. Are plant conditions that could impact or cause additional core damage understood (e.g., stable and/or magnitude of source term, core recovered, coolable geometry)?

2. Is the radiological release pathway understood (e.g., filtered, non-filtered, monitored, unmonitored with little or no potential for release rate to increase, little or no potential for RCS leak to increase)?

3. Are current and forecasted meteorological conditions known and their impact on dose assessment understood?

4. If available, does off-site radiological data support the protective action recommendation methodology based on dose assessment?

2.2.3 Screening criteria for extending the PAR to a new affected area based radiological assessment due to a change in meteorological or external conditions

IF criteria A or B below are met**,**

THEN provide a PAR to evacuate or SIP if using staged evacuation process (i.e., SIP may be the appropriate PAR)

A. Radiological assessment shows EPA PAGs will be exceeded in the new sector based on an actual release.

B. Containment is challenged, and containment source term available for release indicates EPA PAGs could be exceeded in the new sector if a release were to start (see section 2.3 on use of containment source term).

2.3 USE OF CONTAINMENT SOURCE TERM

The developer may define the value that corresponds to a significant containment source term (e.g., containment source term available for release indicates EPA PAGs could be exceeded if a release were to start).

When a release from containment is not occurring, then containment source term available for release may be used in determining subsequent protective actions. The licensee may use a reading on the containment high-range radiation monitor in this instance. Such values should only be used as the sole determinant of subsequent

protective action recommendations when they represent significant fuel damage, such as the value used in NEI 99-01, Methodology for Development of Emergency Action Levels, equivalent to a release of 20 percent gap activity and representing a potential loss of the containment barrier. Licensees may use different values for the radiation monitor based on containment spray availability, as this system reduces iodine source term when it is in service.

2.4 USE OF RADIOLOGICAL ASSESSMENT RESULTS

It is anticipated that a discrete amount of time will pass from the declaration of a general emergency (and issuance of initial PARs) to the point where all criteria are met for basing a subsequent PAR on radiological assessment information alone. Off-site dose calculations will be performed multiple times in this period and may not provide a basis for subsequent protective actions. However, once conditions change that may cause a new off-site dose calculation to be performed, the process of performing this calculation will take a certain amount of time to complete.

Care must be exercised when performing dose assessments to ensure release durations are representative of the conditions present. While using durations that are too short can underestimate exposure, using excessively long durations may force unnecessary evacuations of members of the public. Licensees should evaluate release durations for given situations in advance to provide reasonable default durations for use when the release duration is unknown.

NOTE: The following positions are predicated on the fact that the conditions described in Section 2.2 have been met for basing subsequent PARs on dose assessment.

The following guidance may be used when determining subsequent PARs when no release is in progress:

> When a release from containment is not occurring and the containment source term is below the threshold as defined in Section 2.2.2 above, then the PAR should not be expanded to new areas.

Subsequent PARs for the initiation of a release:

> It is understood that the initiation of a release may result in uncertainties that would negate the use of radiological assessment methodology and result in using plant conditions for a subsequent PAR basis when a release begins. However, if the screening conditions are met, then these subsequent PARs should be based on dose assessment results. PARs should only be expanded to additional areas if the EPA PAGs have been exceeded for those additional areas.

Subsequent PARs for ongoing release in progress:

> When a release is in progress, subsequent PARs should be based on radiological assessment results and only expanded if the EPA PAGs have been exceeded in

the new areas. The new PAR should be based on the current dose assessment results rather than delaying the PAR for the completion of a new dose calculation.

2.5 CHANGES IN CONTAINMENT BARRIER STATUS

Site-specific criteria for a general emergency are based in part on the failure or challenge of the containment fission product barrier. Initial PARs for a general emergency are based on these specific plant conditions.

The challenge or failure of the containment fission product barrier may not exist for subsequent PARs, given the progression of the event and mitigative actions taken by plant operators.

PARs for new areas should not be made when the challenge or failure of the containment fission product barrier no longer exists.

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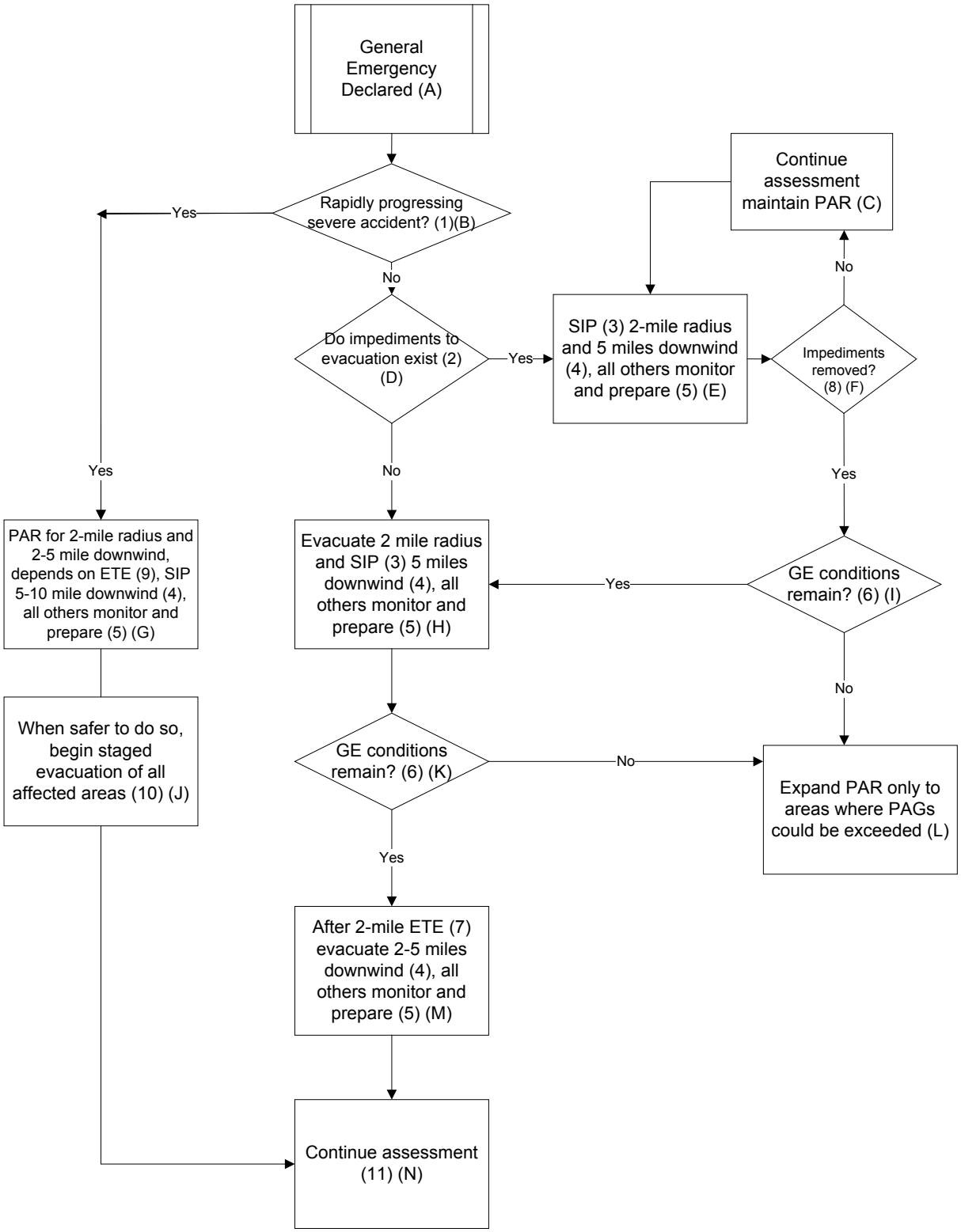
APPENDIX C – SUPPLEMENT 3 LOGIC DIAGRAM (LETTERS ADDED FOR REFERENCE)



PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL NOTES

It is not intended that licensees or offsite response organizations (OROs) have protective action implementing site-specific PAR procedures that are exactly the same as provided here. Licensees for each nuclear power plant should develop site-specific strategies and decision tools/procedures for the site using the guidance provided below in collaboration with OROs responsible for protective action decision making.

The information in these notes that should be considered in developing the strategy is labeled as "Note." Background information is labeled as "Background Note" and is meant to be helpful in development efforts.

Note 1: Rapidly Progressing Severe Incident

A rapidly progressing severe incident is a General Emergency (GE) with rapid loss of containment integrity (emergency action levels indicate containment barrier loss) and loss of ability to cool the core. This path is used for scenarios in which containment integrity can be determined as bypassed or immediately lost during a GE with core damage. If this scenario cannot be immediately confirmed, assume it is not taking place and answer "no" to this decision block.

Note 2: Impediments to Evacuation

Impediments to evacuation include the following:

- Evacuation support (e.g., traffic control) is not yet in place. In this situation, the GE is the initial notification, or if a previous notification was made, the GE notification occurs before preparations to support an evacuation are complete. Many sites have a low population density within 2 miles, and lack of traffic control may not be considered an impediment. The licensee and OROs should discuss this element and reach an agreement. The licensee and OROs should agree, in advance, on an expected time for evacuation support to be put in place after notification of an emergency classification.

  The site-specific protective action recommendation (PAR) procedure for those sites at which a delay of an initial staged evacuation is necessary, pending support setup, should include this time. The licensee would base procedures on the agreement and would not confer with OROs before making the initial PAR notification.

- In a hostile-action-based GE (armed attack), OROs may determine that an initial recommendation to shelter in place (SIP) rather than evacuation is the preferred path.

  The licensee would discuss this element with OROs and reach an agreement during the development process. The licensee would base procedures on the agreement and would not confer with OROs before making the initial PAR notification.

- In the event of adverse weather, licensees are not responsible for soliciting information or for making a determination that weather or other impediments (e.g., an earthquake or wildfire) for safe public evacuation exist at the time of the emergency. However, the licensee will consider an impediment to exist if OROs have previously notified it of such an impediment (e.g., roadways are closed because of deep snow). During the planning process, OROs may determine that the licensee does not need to consider adverse weather in its plant PAR procedures.

Note 3: Shelter in Place

SIP means that instructions are given to members of the public to remain indoors, turn off heating or air conditioning (as appropriate for the region and season), close windows, monitor communications channels, and prepare to evacuate. The instructions should specify that SIP is safer than evacuation at this time, or that, alternatively, SIP is being implemented in order to keep roadways clear to allow others to evacuate rapidly. The intent of SIP is for members of the public to remain where they currently are or to seek shelter close by, but they should not return home to shelter when more immediate options for sheltering are available.

Note 4: Downwind Sectors

Downwind sectors include a downwind 22.5-degree compass sector(s) and adjacent sectors.

Generally, the downwind sectors involve three or four sectors and include all the emergency response planning areas impacted in that area.

Background Note: Wind Persistence

Site-specific wind persistence information may indicate the need to include additional sectors with the initial recommendation. However, the licensee should discuss this element with responsible OROs to determine whether expanded initial protective actions are appropriate or desirable. The size of emergency response planning areas may determine whether there is a site-specific need for this contingency.

Note 5: Monitor and Prepare

The instruction to monitor and prepare is intended to engage the population within the plume exposure pathway emergency planning zone, inform them of the emergency, and advise them that they should monitor the situation and prepare for the possibility of evacuation, SIP, or other protective actions. If an evacuation is underway, officials should ask members of the public who are not directed to evacuate to remain off the roadways to allow the evacuation to proceed.

Background Note: Emergency Messaging

Effective emergency messaging requires clear and frequent communications with the public. If the public is not engaged (i.e., given instructions of some kind), a larger shadow evacuation could result. A large shadow evacuation could impede those closest to the plant and increase public exposure. Frequent communication may also reduce public inquiries to OROs for status and instructions.

Note 6: Consideration of Plant Conditions before the Evacuation of Downwind Sectors

If the plant has mitigated the conditions that caused the GE declaration (i.e., core cooling is restored), expanding the PAR to evacuate downwind sectors upon completion of the initial staged evacuation may not be necessary. However, if GE emergency action levels are still met, expansion of the PAR to the downwind sectors may be appropriate. If the plant restores core cooling, it must still perform a radiological assessment to identify the extent of contamination, if any. If surveys or dose projections reveal areas under no protective action direction where protective action guidelines (PAGs) could be exceeded, the members of the public in those areas should be evacuated or sheltered, as appropriate.

Note 7: Timing for Evacuation of Downwind Sectors

Implementation of this element should occur at the time of the site-specific 2-mile evacuation time estimate (ETE) for 90-percent evacuation (e.g., *T* hours (use site-specific time) after OROs were notified of the initial PAR to evacuate downwind sectors).

Background Note: *T* Values

The licensee will identify the value of *T* using the site-specific ETE and should consider *TD* for a daytime ETE and *TN* for a nighttime ETE. These values should be representative for the site and should not include special events (e.g., temporary offsite activities that draw into the emergency planning zone transient, nonresident individuals who may be present during an emergency). However, OROs should consider the effects of special events. If the shift staff is responsible for making this PAR, it should do so without conferring with OROs and in accordance with procedures, based on the ETE value alone. The verification of the evacuation progress is not expected. However, if the augmenting emergency response organization (ERO) has been activated, sufficient resources may be available for the licensee to confer with OROs more fully before expanding the PAR to downwind sectors.

Note 8: Removal of Evacuation Impediments

Removal of evacuation impediments involves the following:

- Evacuation Support. If the OROs identified this contingency as necessary during the planning effort, the licensee should notify OROs with an evacuation PAR when the agreed upon time (e.g., 1 hour from the GE notification) has elapsed. The licensee shift staff is not expected to confer with OROs before changing the PAR, but if the augmenting ERO is activated they may do so.

- Hostile Action (Armed Attack). OROs may identify this contingency as necessary during the planning effort. It may be appropriate to set up a timeframe for the licensee to notify OROs with an evacuation PAR. The licensee shift staff is not expected to confer with OROs before changing the PAR, but if the augmenting ERO is activated they may do so.

- Adverse Weather. If weather or some other roadway disruption caused the impediment, OROs will determine when it is appropriate to change the protective action. Licensees have no responsibility for PAR modification unless a PAR change is necessary because of plant

conditions or radiological assessment. OROs determine when it is safe for the public to evacuate.

Note 9: SIP versus Evacuation PAR for Rapidly Progressing Scenarios

The licensee should issue an evacuation PAR in scenarios for which the time to evacuate 90 percent of the population within a 2-mile radius is 2 hours or less. If the ETE is longer, the licensee should recommend SIP. The licensee should consider *TD* for a daytime ETE and *TN* for a nighttime ETE.

The licensee should issue an evacuation PAR in scenarios for which the 2- to 5-mile downwind sector evacuation time for 90-percent completion is 3 hours or less. If the ETE is longer, the licensee should recommend SIP.

For all cases, the licensee should recommend SIP for the 5- to 10-mile downwind sectors.

To the extent practical and recognizing the urgency of the incident, impediments may be considered. The existence of impediments could change the most effective PAR from evacuation to SIP.

Background Note: Rapidly Progressing Scenario

The ETE values should be representative for the site and should not include special events.

The rapidly progressing incident is more severe than other GEs, and different protective actions are appropriate for all sites.

Extreme weather conditions, such as inversion, significant precipitation, or no wind, can change the efficacy of SIP and make evacuation the preferred protective action.

Licensees may perform an analysis to determine site-specific ETE criteria instead of using this generic guidance.

Note 10: Evacuation Timing for Rapidly Progressing Scenarios

Evacuation after the SIP period is critical for reducing public exposure. Licensees should discuss the evacuation of the sheltered population with OROs.

Background Note: Evacuation Timing for Rapidly Progressing Scenarios

The evacuation should proceed from the areas that are most at risk. The evacuation may involve a 2-mile radius unless field monitoring data show otherwise (e.g., at a site with an elevated release point where contamination may begin beyond 2 miles). Lateral evacuation (e.g., travel perpendicular to the direction of the plume) may be considered where the roadway network is conducive, as it may reduce public exposure. However, preplanning for lateral evacuation is not expected. In any case, the determination of evacuation routes and timing should be based on release information, field monitoring data, and ORO resources.

Note 11: Continue Assessments

Radiological and meteorological assessments should be continued and evacuation considered for any areas where dose projections or field measurements indicate that PAGs may be exceeded.

Background Note: Continue Assessments

Communications with the public should be maintained while protective actions are in effect.