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Review of NUREG-0654, Supplement 3, "Criteria for Protective Action Recommendations for Severe Accidents"

Technical Basis for Protective Action Strategies

Office of Nuclear Security and Incident Response

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Technical Basis for Protective Action Strategies

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Prepared by
R. Sullivan, J. Jones[1], F.J. Schelling[1]
N. Bixler[1], and F. Walton[1]

[1]Sandia National Laboratories
P.O. Box 5800
Albuquerque, NM 87185

R. Sullivan, NRC Technical Lead

NRC Job Code R3144

Office of Nuclear Security and Incident Response

ABSTRACT

Volume 3 of NUREG/CR-6953, "Review of NUREG-0654, Supplement 3, 'Criteria for Protective Action Recommendations for Severe Accidents,'" is the final volume of the Protective Action Recommendation (PAR) Study. This analysis provides a technical basis for decision criteria that can be used by licensees and offsite response organizations to enhance protective action strategy for nuclear power plant accidents that progress rapidly. The analysis integrated advances in the knowledge of potential accident sequences, protective action strategies, and consequence modeling. The emergency preparedness planning basis includes the potential for very unlikely but credible rapidly progressing accidents, and this analysis was performed to specifically identify PAR strategies for rapidly progressing accidents to support the PAR logic diagram developed for an update to Supplement 3 to NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for Protective Action Recommendations for Severe Accidents." The updated PAR logic diagram will include a path for General Emergencies and another decision path for accidents defined as rapidly progressing. The technical basis developed may assist licensees and offsite response organizations in tailoring protective action strategies using site specific evacuation time information. It is expected that application of the this technical basis may improve the efficacy of protective actions for a rapidly progressing accident. The analyses performed herein are only applicable to the rapidly progressing accident.

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Contents

ABSTRACT ..... **iii**

EXECUTIVE SUMMARY ..... **vii**

1 INTRODUCTION **1**

1.1 Objective 1

1.2 Scope 1

1.3 Background 1

2 METHODOLOGY **5**

2.1 Source Term Selection 5

2.2 Site Characteristics 5

2.3 Scenario Development 6

3 CONSEQUENCE MODELING **7**

3.1 WinMACCS 7

3.2 Evacuation Speed Parameter 8

3.3 Scenario Timing 10

3.4 WinMACCS Exceptions 12

4 PROTECTIVE ACTION ANALYSIS **13**

4.1 Discussion of Results 13

4.2 Summary of Results 15

5 CONCLUSIONS **17**

6 REFERENCES **19**

APPENDIX

A. Normalized Results A-1

FIGURES

Figure 1 Evacuation Tail 10

TABLES

Table 1 Source Term Information 5
Table 2 Protective Action Scenarios 6
Table 3 Shielding Factors 8
Table 4 Evacuation Speeds and Corresponding Travel Time 8
Table 5 Protective Action Timing (hours) 11
Table 6 Section of Site 2, Source Term B—Early (from Appendix A) 14
Table 7 ETE at which Evacuation is More Protective than Sheltering 15

Executive Summary

Volume 3 of NUREG/CR-6953, "Review of NUREG-0654, Supplement 3, 'Criteria for Protective Action Recommendations for Severe Accidents,'" is the final volume of the Protective Action Recommendation (PAR) Study. This analysis provides a technical basis for decision criteria that can be used by licensees and offsite response organizations to enhance protective action strategy for nuclear power plant accidents that progress rapidly. The analysis integrated advances in the knowledge of potential accident sequences, protective action strategies, and consequence modeling. The technical basis developed may assist licensees and offsite response organizations in tailoring protective action strategies using site specific evacuation time information. It is expected that application of this technical basis can improve the efficacy of protective actions for a rapidly progressing accident.

The emergency preparedness planning basis includes the potential for very unlikely but credible accidents which progress rapidly. The analyses documented herein were performed to specifically identify PAR strategies for rapidly progressing accidents to support the PAR logic diagram developed for the update to Supplement 3 to NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for Protective Action Recommendations for Severe Accidents." The updated PAR logic diagram will include a path for General Emergencies and another decision path for accidents defined as rapidly progressing. The analyses performed herein are only applicable to the rapidly progressing accident. Volume 1 of the PAR Study identified a protective strategy for General Emergencies that are not rapidly progressing. Although not quantified in this study, rapidly progressing accidents are considered to have a much lower frequency than other potential accident conditions.

The analysts identified accident sequences, developed protective action strategies, and performed consequence modeling. The results were used to establish decision criteria to guide the development of site-specific protective action strategies for rapidly progressing accidents. The analysts strongly considered the relative probability of the rapidly progressing accident sequences used in the analysis. Such accidents are in themselves only remotely likely to occur. Although the emergency preparedness planning basis includes these accidents, their remote probability tempered the protective action criteria selected.

The results of the consequence analysis show that shelter-in-place is more protective when evacuation cannot be accomplished within predetermined timeframes. Licensees developing site-specific protective action strategies for rapidly progressing accidents should consider that evacuation protects public health and safety more than sheltering-in-place when it can be completed within the following timeframes.

- **For the 0 to 2 mile area around a nuclear power plant:** Evacuation is more protective when the evacuation time estimate (ETE) is less than 2 hours.

- **For the 2 to 5-mile area:** Evacuation is more protective when the ETE is less than 3 hours.

- **For the 5 to 10-mile area:** Shelter-in-place would likely be the initial protective action to allow a staged evacuation to proceed. If evacuation is the initial

protective action for this area, it is more protective than shelter-in-place when the ETE is less than 3.2 hours.

Results also show that the implementation of staged evacuation between the 0-2, 2-5, and 5-10 mile areas reduces risk when compared to immediate evacuation of the entire 0-10 mile area, or shelter-in-place followed by evacuation for the 0-10 mile area. Site-specific characteristics and population distribution must always be considered when determining whether evacuation is the most appropriate protective action. Population densities, which are typically low within 5 miles of nuclear power plants, and the geographic dimensions of emergency response planning areas can influence protective action decisions. Therefore, an understanding of the plume exposure pathway emergency planning zone must be factored into the development of site-specific protective action strategies for rapidly progressing nuclear power plant accidents.

1 INTRODUCTION

Volume 3 of NUREG/CR-6953, "Review of NUREG-0654, Supplement 3, 'Criteria for Protective Action Recommendations for Severe Accidents,'" is the final volume of the Protective Action Recommendation (PAR) Study. It supplies the technical basis for licensee development of a site-specific protective action strategy for nuclear power plant accidents that progress rapidly. Volume 1 of the PAR Study included a comprehensive evaluation of existing NRC PAR guidance for protective actions and concluded that shelter-in-place and staged evacuation strategies may be more protective for a rapidly progressing accident (NRC, 2007). Volume 1 also concluded that Supplement 3 to NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for Protective Action Recommendations for Severe Accidents," (NRC, 1996) should be updated. Volume 2 identified the importance of communication with the public during an emergency and concluded that the public would likely comply with alternative protective actions, such as a staged evacuation (NRC, 2008). Volume 3 builds upon the results and insights gained from Volumes 1 and 2 to develop a technical basis that may assist licensees and offsite response organizations in the tailoring of protective action strategies using site specific evacuation time information.

The emergency preparedness planning basis includes the potential for very unlikely but credible rapidly progressing accidents. The analyses documented herein were performed to specifically identify PAR strategies for rapidly progressing accidents to support the PAR logic diagram developed for the update to Supplement 3. The PAR logic diagram includes a path for General Emergencies and another decision path for accidents defined as rapidly progressing. The analyses performed herein are only applicable to the rapidly progressing accident. Volume 1 of the PAR Study identified a protective strategy for General Emergencies that are not rapidly progressing. Although not quantified in this study, rapidly progressing accidents are considered to have a much lower frequency than other potential accident conditions.

1.1 Objective

The objective of the Volume 3 analysis was to establish a technical basis for developing PAR guidance for rapidly progressing accidents and to establish criteria for determining the most appropriate protective action recommendations and decisions for these events.

1.2 Scope

The scope of the analysis included consequence analyses of rapidly progressing accidents to identify the evacuation speed at which immediate evacuation is more protective than shelter-in-place. The analysts identified accident sequences, developed protective action strategies, and performed consequence modeling. The analysis integrated advances in the knowledge of potential accident sequences, protective action strategies, and consequence modeling.

1.3 Background

NUREG-0396/EPA 520/1-78-016, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water

Nuclear Power Plants," (NRC, 1978) recommended a distance of about 10 miles for the plume exposure pathway emergency planning zone (EPZ). The distance was not precise because political boundaries and geographical features must be considered when establishing an EPZ. Supplement 3 to NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for Protective Action Recommendations for Severe Accidents," (NRC, 1996), published in July 1996 as a draft report for interim use and comment, provides guidance that, in the event of a severe accident, licensees recommend evacuation of a keyhole area that includes a 3.2-kilometer (km) (2 mile) radius and 8 km (5 miles) downwind of the plant. Supplement 3 considers shelter-in-place for unique instances, such as severe weather. The approach described in Supplement 3 has resulted in licensees emphasizing evacuation as an initial protective action, with sheltering considered only when impediments to evacuation may exist.

The PAR Study (NRC, 2007) assessed the efficacy of alternative protective actions. Volume 1 of the PAR study evaluated existing NRC PAR guidance contained in Supplement 3 (NRC, 1996) and assessed whether implementation of alternative protective actions could reduce potential health effects in the event of a nuclear power plant accident. A detailed review of core melt accidents described in NUREG-1150, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants, Final Summary Report," (NRC, 1990), was conducted for Volume 1 of the PAR Study to find appropriate accident sequences for use in the analysis. Based on the NUREG-1150 accident review, the analysts, together with NRC, staff selected a series of source terms for use in Volume 1 and evaluated the potential consequences to the public under various protective action strategies. Volume 1 of the PAR study included a rapidly progressing accident, a progressive accident, and a no-loss-of-containment accident and evaluated the following protective action strategies:

- immediate radial evacuation (current strategy)
- lateral evacuation (evacuation perpendicular to the plume)
- staged evacuation (close-in population evacuates first, others shelter in place and then evacuate)
- shelter-in-place followed by radial evacuation
- shelter-in-place followed by lateral evacuation
- preferential sheltering in large public structures, followed by radial evacuation
- preferential sheltering followed by lateral evacuation

The relative benefit of alternative protective action strategies was compared to the immediate radial evacuation strategy. Volume 1 concluded that shelter-in-place may be more protective for rapidly progressing accidents and supported a decision to revise NUREG-0654, Supplement 3 (NRC, 2007).

Volume 2 of the PAR Study included data gathering to understand public perceptions of how they might respond to an accident at a nuclear power plant. The study conducted focus groups and a telephone survey with residents of EPZs. Residents of EPZs receive annual information about emergency planning within the EPZ and were expected to be educated and aware of the emergency planning expectations. Information obtained from the general public focus groups was used to develop a telephone survey questionnaire designed to support more detailed data collection. The study also conducted separate focus groups with emergency responder personnel to gain the insight of their experiences dealing with the public during emergencies.

Volume 2 documented the insights gained from the focus groups and presented results of the national telephone survey of EPZ residents. The results were analyzed at the national level and NRC regional level, but they were not compiled for use at the State or reactor site level (NRC, 2008). Results showed that the public would tend to comply with protective action direction, and that the level of compliance may be improved through effective communication during the emergency.

2 METHODOLOGY

To develop protective action strategy criteria for rapidly progressing accidents, the analysis integrated advances in knowledge of potential accident sequences, protective action strategies, and consequence modeling. The approach included the following activities:

- select source terms
- establish site characteristics
- develop protective action scenarios
- conduct consequence modeling
- analyze results

2.1 Source Term Selection

Selecting appropriate source terms for use in the analysis required review of existing accident sequences identified in previous and current NRC work. The NUREG-1150 accidents were not appropriate for use because more current information that considered advances in the understanding of accident progression was available. Analysts reviewed but did not use the NUREG/CR-6953 Volume 1 source terms because these also did not consider advances in the understanding of accident progression. Accident sequences from ongoing NRC projects were reviewed but not useful for this study because the studies reviewed did not find any credible rapidly progressing accidents. The two source terms ultimately selected for this analysis were obtained from recent NRC accident studies that included rapidly progressing releases that began in less than 1 hour, as shown in Table 1, "Source Term Information." The duration values in Table 1 are approximate, because each source term had multiple overlapping plume segments of varying duration.

Table 1 Source Term Information

Source Term	Major Plume Delay (hours)	Major Plume Duration (hours)
A	0.5	2.8
B	0.7	1.6

2.2 Site Characteristics

Population is an important factor in determining protective actions as described in NUREG 0396/EPA 520/1-78-016 (NRC, 1978). Consistent with the NUREG-0396 approach, two sites were selected for this analysis. Site 1 was a high population density site with more than 200,000 residents within the EPZ, and Site 2 was a medium population density site with about 50,000 residents within the EPZ. Medium and high population density sites have longer evacuation time estimates (ETEs) and correspondingly slower evacuation travel speeds than low population density sites and were expected to provide more practical information for the study than a low population density site. The study used actual meteorological data from Site 1 and Site 2. Although medium and high population density sites were used in the analysis, the results are applicable to all nuclear power plant sites.

2.3 Scenario Development

Scenarios were used to define bounding conditions for the analysis. Six scenarios shown in Table 2, "Protective Action Scenarios," were defined and used multiple evacuation speeds for the 0-2 mile, 2-5 mile, and 5-10 mile areas around a nuclear power plant. Each of these scenarios included varied durations for shelter-in-place to help define the time at which evacuation was more beneficial than shelter-in-place.

Table 2 Protective Action Scenarios

Scenarios	0-2 miles	2-5 miles	5-10 miles
A	Immediate evacuation	SIP then evacuate	SIP then evacuate at 8 hours
B	SIP then evacuate	Immediate evacuation	SIP then evacuate at 8 hours
C	Immediate evacuation	Immediate evacuation	SIP then evacuate at 8 hours
D	SIP then evacuate	SIP then evacuate	Immediate evacuation
E	SIP then evacuate	SIP then evacuate	SIP then evacuate
F	Immediate evacuation	Immediate evacuation	Immediate evacuation

All scenarios began at time zero, or T=0. In this study, T=0 represented the time at which plant operators become aware that a General Emergency condition exists. However, it is likely that operators would be aware of precursor events that create the potential for a rapidly progressing accident before this hypothetical T=0 and would make a notification to local authorities. Licensees are required to notify the State within 15 minutes of becoming aware that a General Emergency condition exists and provide a protective action recommendation. The analysis expects that for a rapidly progressing accident, local authorities would activate sirens and Emergency Alert System messages within about 15 minutes from the time they were notified. Completion of these two activities could take 30 minutes between T=0 and the time that the public is notified. It would be expected that the population responds promptly to the sounding of sirens and official notification. The protective actions shown in Table 2 are defined as follows:

- **Immediate Evacuation**—Residents evacuate the affected area beginning 30 minutes after the start of the accident.

- **Shelter in Place then Evacuate**—Residents within the affected area begin sheltering 30 minutes after the start of the accident. In the scenarios, shelter periods were incrementally increased at 30-minute intervals up to 5 hours.

- **Shelter in Place then Evacuate at 8 Hours**—Residents within the 5–10 mile area begin sheltering 30 minutes after the start of the accident and stay in the shelter for 8 hours, then evacuate.

In Scenarios A, B, and C, residents of the 5–10 mile area are assumed to shelter until the plume has passed. The analysis assumed that this would occur about 8 hours after the start of the event providing time for the plume to pass or field teams to provide monitoring information. In Scenarios D and F, a more immediate evacuation was modeled for this area, and in Scenario E, shelter-in-place durations were incrementally increased at 30-minute intervals up to 5 hours.

3 CONSEQUENCE MODELING

The MELCOR Accident Consequence Code System Version 2 (MACCS2) was developed at Sandia National Laboratories for the NRC for use in probabilistic risk assessments for commercial nuclear reactors to simulate the impact of accidental atmospheric releases of radiological materials on the surrounding environment. The principal phenomena considered in MACCS2 are atmospheric transport using a Gaussian plume model, short-term and long-term dose accumulation through several pathways (including cloudshine, groundshine, inhalation, deposition onto the skin, and food and water ingestion), mitigative actions based on dose projection, early and latent health effects, and economic costs. The following phenomena can be incorporated within a single calculation:

- Release characteristics;
- Meteorological sampling;
- Atmospheric dispersion and deposition considerations;
- Exposure pathways and duration;
- Protective actions and dose mitigation;
- Movement of population as cohorts;
- Individual and population doses; and
- Health and economic consequences.

Standard MACCS2 modeling for NRC assessments uses the parameters in Sample Problem A which is discussed in the MACCS2 user's manual (NRC, 1998).

3.1 WinMACCS

This project utilized the most recent version of the MACCS2 analysis codes, called WinMACCS. In general, WinMACCS employs code enhancements that primarily simplify user input, improve code performance, and enhance existing functionality. They do not represent a major phenomenological model development effort.

This parametric study used WinMACCS Version 3.4.3 as the consequence model. The WinMACCS code integrates four modules that include ATMOS, EARLY, CHRONC, and COMIDA (NRC, 1998). For this analysis, only the ATMOS and EARLY modules of WinMACCS were used. ATMOS was used for atmospheric transport and deposition, and EARLY was used to perform the emergency phase calculations. CHRONC is used for intermediate to long phase calculations, which were not needed to support early and near field effects (NRC, 1998). COMIDA is the ingestion pathway model, also not needed to support early and near field effects. The early phase calculations assumed an emergency phase duration of 1 week, which gave sufficient time for the plume to exit the problem domain. Normalized mean consequence results were produced and used to support the study conclusions.

Consequence modeling typically begins with the use of parameters in Sample Problem A described in the MACCS2 user's manual (NRC, 1998). Many of the parameters used in this analysis were consistent with Sample Problem A. Some of the parameters were consistent with the current and ongoing NRC projects, and some parameters were specific to this project, such as evacuation speed. The approach to selected WinMACCS parameters is described below.

- The analysis did not use the potassium iodide prophylaxis model to support the risk-based conclusions because the effect would be uniform.

- Hotspot and Normal Relocation occur outside the EPZ, so these parameters were not a factor in this analysis.

- The analysis selected the weather-binning option for meteorological sampling. For this option, hourly weather data were binned in up to 40 bins that differentiate wind speed, atmospheric stability class, and precipitation rate.

- The analysis used the Linear No Threshold dose-health effects model and Federal Guidance Report FGR-13 dose conversion factors (EPA, 1999).

The analysis used the WinMACCS radial evacuation application. Evacuation was modeled to the EPZ boundary, which was assumed to be 10 miles from the plant. Consistent with WinMACCS applications, beyond 16 miles the evacuating population received no further dose. The analysis used a 30-minute delay to give time for an emergency action level declaration and for offsite response organizations to sound sirens and alert the public via EAS messages.

One of the parameters varied in this study was the duration of shelter-in-place. The duration was incrementally increased to aid in bounding when shelter-in-place is more protective. Varying the shelter-in-place also represented a longer mobilization time. Shielding values for shelter-in-place were applied for the duration that residents were sheltered (see Table 3, "Shielding Factors").

Table 3 Shielding Factors**

Factor	Cloudshine	Groundshine	Inhalation	Skin
Evacuation	1.00	0.50	0.98	0.98
Normal	0.75	0.33	0.41	0.41
Sheltering	0.60	0.20	0.33	0.33

**A value of 0 indicates complete shielding, and a value of 1 indicates no shielding.

3.2 Evacuation Speed Parameter

Use of the ETE to develop travel speeds required consideration of the mobilization time, loading of the transportation network, distance, and speed (NRC, 2005). An initial representative speed was derived from review of ETE studies. Iterative calculations identified bounding speeds at which evacuation was shown to be more beneficial than sheltering. Table 4, "Evacuation Speeds and Corresponding Travel Time," identifies the speeds used in the analysis.

Table 4 Evacuation Speeds and Corresponding Travel Time

Speed (mph)	0 to 2 miles (hours)	2 to 5 miles (hours)	5 to10 miles (hours)
1	2	3	5
2	1	1.5	2.5
3	0.7	1	1.7

To model evacuation in WinMACCS, evacuees were loaded onto the roadway network at a specified time, and a single speed was used. However, evacuations typically occur as a distribution in which the percent of public evacuating the area increases over time until all members of the public have evacuated. As evidenced in existing evacuations, travelers who depart the area first experience shorter delays because the traffic volume and corresponding congestion is generally lower. Evacuees who depart during the middle portion of the evacuation, when the greatest numbers of people are seeking to leave, generally experience the highest congestion because the demand on the roadway network is at its greatest, exceeding the available capacity in many areas. Evacuees who depart later, although potentially putting themselves at greater risk, enter the network after a large percentage of evacuees has left and the roadways again can meet the volume. This later group is generally able to avoid the delays associated with the peak evacuation demand period; however, they take the longest time to complete the evacuation.

Evacuations are typically represented as a curve that is relatively steep at the beginning and tends to flatten as the last members of the public exit the area (see Figure 1, "Evacuation Tail"). This distribution curve is relatively steep for shorter duration evacuations from areas the size of an EPZ, and the distribution curve is less steep for longer duration evacuations typical of those for hurricane which may begin days in advance of landfall. The point at which the curve tends to flatten occurs when approximately 90 percent of the population has evacuated. The last 10 percent of the population is called the evacuation tail (Wolshon, 2010). When making protective action decisions and recommendations, use of the 90 percent ETE value is appropriate because it ensures that the vast majority of the public have been considered, and that the time is not skewed by the few percent that take an extraordinarily long time to evacuate.

As an example, Figure 1 shows a 90 percent ETE at approximately 5.25 hours and a 100 percent ETE at approximately 9 hours. Similar curves have been observed in review of more than 20 nuclear power plant ETEs. Using Figure 1 as an example, if decision-makers believe that a release would start in about 6 hours, they may decide that because the 100 percent ETE is 9 hours, shelter-in-place is more protective. However, in this example, the vast majority of the population would be evacuated before the release. The evacuation tail is both observed in actual evacuations (Wolshon, 2010) and is evident in ETE modeling. The evacuation tail was investigated in the PAR Study Volume 2 telephone survey, and data showed that use of a 10 percent assumption for the evacuation tail was appropriate (NRC, 2008). It is important that the tail be understood and considered when making protective action decisions and recommendations, and the 90 percent ETE value should be used for these decisions.

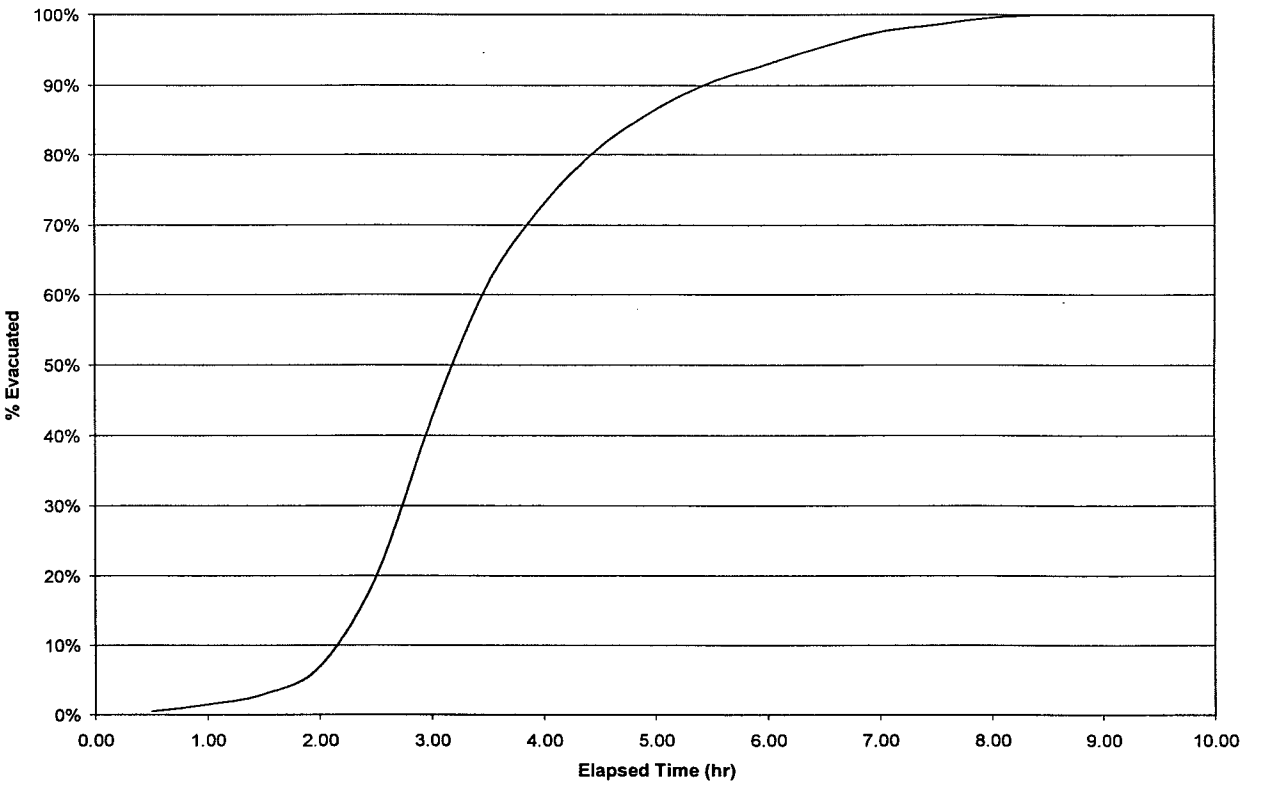

Figure 1 Evacuation Tail

3.3 Scenario Timing

The analysts developed timing for each of the scenario activities identified in Table 2, "Protective Action Scenarios," to supply a spectrum of conditions for analysis. Table 6, "Protective Action Timing," shows the detailed timing for each of the protective action scenarios outlined in Table 2. For all scenarios, the 30-minute (0.5 hours) delay before the public implements any protective action is included in the Delay to Shelter column. Table 5 provides the timing for the protective action scenarios, and the table headings are defined below.

- **Delay to Shelter** is the delay from the time of the start of the accident until the public enters the shelter.
- **Delay to Evac** is the length of the sheltering period from the time the public enters the shelter until the point at which they begin to evacuate.
- **Depart** is the sum of the Delay to Shelter and Delay to Evac and represents the time evacuees entered the roadway network.

As an example of how to apply the values in Table 5, consider Scenario B, Row 2 (highlighted in gray). For the 0–2 mile area, the Delay to Shelter is 30 minutes (0.5 hours), and the normal activity shielding factors are applied during this period. Delay to Evacuation is also 30 minutes for the 0–2 mile area, and the shielding factors for sheltering are applied during this period. These values indicate that it takes

30 minutes for residents to receive the warning, and then they shelter for 30 minutes before evacuating. Evacuees from the 0-2 mile area depart at 1 hour, which is the sum of the Delay to Shelter and Delay to Evacuation times and the shielding factors for evacuation are then applied.

For the 2–5 mile area, the Delay to Shelter is 30 minutes, but the Delay to Evacuation is 0 minutes, indicating that the evacuees from within the 2-5 mile area depart at 30 minutes without sheltering. For the 5–10 mile area, the public is sheltered at 30 minutes for a duration of 8 hours and departs at 8.5 hours.

Table 5 Protective Action Timing (hours)

	0-2 Miles			2-5 Miles			5-10 Miles		
Scenario	Delay to Shelter	Delay to Evac	Depart	Delay to Shelter	Delay to Evac	Depart	Delay to Shelter	Delay to Evac	Depart
A	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5
	0.5	0.0	0.5	0.5	0.5	1.0	0.5	8.0	8.5
	0.5	0.0	0.5	0.5	1.0	1.5	0.5	8.0	8.5
	0.5	0.0	0.5	0.5	1.5	2.0	0.5	8.0	8.5
	0.5	0.0	0.5	0.5	2.0	2.5	0.5	8.0	8.5
	0.5	0.0	0.5	0.5	2.5	3.0	0.5	8.0	8.5
	0.5	0.0	0.5	0.5	3.0	3.5	0.5	8.0	8.5
	0.5	0.0	0.5	0.5	3.5	4.0	0.5	8.0	8.5
	0.5	0.0	0.5	0.5	4.0	4.5	0.5	8.0	8.5
	0.5	0.0	0.5	0.5	4.5	5.0	0.5	8.0	8.5
	0.5	0.0	0.5	0.5	5.0	5.5	0.5	8.0	8.5
B	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5
	0.5	0.5	1.0	0.5	0.0	0.5	0.5	8.0	8.5
	0.5	1.0	1.5	0.5	0.0	0.5	0.5	8.0	8.5
	0.5	1.5	2.0	0.5	0.0	0.5	0.5	8.0	8.5
	0.5	2.0	2.5	0.5	0.0	0.5	0.5	8.0	8.5
	0.5	2.5	3.0	0.5	0.0	0.5	0.5	8.0	8.5
	0.5	3.0	3.5	0.5	0.0	0.5	0.5	8.0	8.5
	0.5	3.5	4.0	0.5	0.0	0.5	0.5	8.0	8.5
	0.5	4.0	4.5	0.5	0.0	0.5	0.5	8.0	8.5
	0.5	4.5	5.0	0.5	0.0	0.5	0.5	8.0	8.5
	0.5	5.0	5.5	0.5	0.0	0.5	0.5	8.0	8.5
C	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5

	0-2 Miles			2-5 Miles			5-10 Miles		
Scenario	Delay to Shelter	Delay to Evac	Depart	Delay to Shelter	Delay to Evac	Depart	Delay to Shelter	Delay to Evac	Depart
D	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.0	0.5
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	0.0	0.5
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	0.0	0.5
	0.5	2.0	2.5	0.5	2.0	2.5	0.5	0.0	0.5
	0.5	2.5	3.0	0.5	2.5	3.0	0.5	0.0	0.5
	0.5	3.0	3.5	0.5	3.0	3.5	0.5	0.0	0.5
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	0.0	0.5
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	0.0	0.5
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	0.0	0.5
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	0.0	0.5
E	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5	1.0
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	1.0	1.5
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	1.5	2.0
	0.5	2.0	2.5	0.5	2.0	2.5	0.5	2.0	2.5
	0.5	2.5	3.0	0.5	2.5	3.0	0.5	2.5	3.0
	0.5	3.0	3.5	0.5	3.0	3.5	0.5	3.0	3.5
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	3.5	4.0
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	4.0	4.5
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	4.5	5.0
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	5.0	5.5
F	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5

3.4 WinMACCS Exceptions

WinMACCS does not fully represent the emergency phase in two areas. First, WinMACCS does not facilitate input of a roadway loading function for evacuation to realistically represent how vehicles enter the roadway network. When the evacuation mode is used in WinMACCS, the model loads all vehicles onto the roadway at a single specified time, identified as 'Depart' in Table 5. Second, WinMACCS does not account for air changes per hour within shelters. The air change per hour rate influences how quickly contamination enters the structure. The contaminant concentration inside may eventually equilibrate with the concentration outside, causing the benefit of sheltering to diminish with time (EPA, 1992). Therefore, although longer shelter-in-place durations may in some instances show greater benefit, the results would be affected if infiltration were considered.

To address these parameters, the study varied shelter-in-place duration and established evacuation speeds as a linear value of distance divided by the ETE. The distance-over-ETE ratio resulted in slower speed values than would be expected in an actual evacuation. The lower shielding value of the vehicles traveling for longer periods offsets, to some extent, the effect of infiltration that was not considered in the sheltering model.

4 Protective Action Analysis

The objectives of this analysis were to establish a technical basis for developing PAR guidance for rapidly progressing accidents and to find criteria for choosing protective action recommendations for these events. Establishing the technical basis required an analysis of protective actions to determine when immediate evacuation was more protective than shelter-in-place for the rapidly progressing accident.

4.1 Discussion of Results

The analysis of protective actions included consequence modeling of two sites, two source terms, three speeds, and six scenarios, which resulted in 48 WinMACCS output files. Each output file had 11 durations representing a range of departure times, from 0.5 to 5.5 hours at 30-minute increments. In total, 4,752 consequence results were generated for evaluation.

The large quantity of data produced in this complex analysis required in-depth analysis and some interpretation. To facilitate data interpretation, the data output was normalized to present a common platform for review of the risk of early fatalities and the risk of latent cancer fatalities. Normalizing the results required dividing all early fatality values for both sites and both source terms by the maximum early fatality consequence value. Likewise, all latent cancer fatality values for both sites and both source terms were divided by the maximum latent cancer consequence value. This process produced a set of normalized risk values which range from 0.00 to 1.00 and are presented in Appendix A, "Normalized Results."

The normalized risk values provide the percent of maximum early or latent risk. The process allowed for the comparison of early risk among the scenarios, source terms, and sites and latent risk among the scenarios, source terms, and sites. However, the early risk values have no relation to the latent risk values and cannot be compared with any meaning.

The analysts considered uncertainty related to shelter-in-place when reviewing the risk results for the shelter-in-place protective action. Uncertainties exist about whether residents will enter a shelter before plume arrival and shelter for the required duration, and whether communications will be available to instruct residents to stay sheltered and leave at the optimal time to minimize exposure. Uncertainty about the protection afforded by the specific shelter is also a factor. These uncertainties do not diminish shelter-in-place as a protective action when it is appropriate, but they did influence the review of the data when determining the point at which evacuation is more protective than shelter-in-place. In general, when results showed evacuation benefit was close to the shelter-in-place benefit, the analysts selected evacuation even if the risk was marginally higher than sheltering.

The following examples, which reference values in Table 6, "Section of Site 2, Source Term B—Early, from Appendix A," describe the data interpretation process:

- Scenario A identifies risk with respect to shelter for the 2-5 mile area, and Table 6 shows that at 1 mile per hour (mph), the normalized risk of an early fatality peaks at 0.05. The risk values are highest from 2.5 hours to 3.5 hours which indicates that

residents who shelter-in-place and then depart between 2.5 and 3.5 hours would travel under the plume and receive a greater dose than those who evacuate earlier or stay sheltered longer and then evacuate. The review of this scenario identified the 0.02 risk value (highlighted in the 2-5 column of Table 6) as the threshold point at which evacuation was more protective than shelter-in-place. The 0.02 risk value corresponds to a departure time of 2 hours (highlighted in the 2-5 column of Table 6). The 2 hour departure time was added to a 3 hour travel time, which is the time required to travel 1 mph for the 2-5 mile distance (1 mph x 3 miles = 3 hours), for a total of 5 hours. The example shows that if the ETE is 5 hours or less for the 2-5 mile area, evacuation is more protective for Site 2, Source Term B, Early. This result appears in Table 7, "ETE at which Evacuation is More Protective than Sheltering."

- Scenario B identifies risk with respect to shelter for the 0-2 mile area. Scenario B shows that at 1 mph, the lowest normalized risk of an early fatality is 0.02 and peaks at 0.08. At 2 mph, the lowest normalized risk is 0.00, but review of the raw data confirmed that the normalized risk of 0.01 was appropriate for use. The review of this scenario identified the 0.01 risk value (highlighted in the 0-2 column of Table 6) as the threshold point at which evacuation was more protective than shelter-in-place and corresponds to a departure time of 1 hour (highlighted in the 0-2 column of Table 6). The 1 hour departure time was added to a 1 hour travel time, which is the time required to travel 2 mph for the 0-2 mile distance (2 mph x 2 miles = 1 hour), for a total of 2 hours. This example shows that if the ETE is 2 hours or less for the 0-2 mile area, evacuation is more protective for Site 2, Source Term B, Early. This result also appears in Table 7.

Table 6 Section of Site 2, Source Term B – Early (from Appendix A)

	0-2 Miles			2-5 Miles			1mph		2mph
Scenario	**DLTSHL**	**DLTEVA**	**DEPART**	**DLTSHL**	**DLTEVA**	**DEPART**	**0-2 Miles**	**2-5 Miles**	**0-2 Miles**
Scenario A	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00
	0.5	0.0	0.5	0.5	0.5	1.0	0.02	0.00	0.00
	0.5	0.0	0.5	0.5	1.0	1.5	0.02	0.01	0.00
	0.5	0.0	0.5	0.5	1.5	**2.0**	0.02	**0.02**	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	2.0	2.5	0.02	0.04	0.00
2-5 mi: SHELTER	0.5	0.0	0.5	0.5	2.5	3.0	0.02	0.05	0.00
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	3.0	3.5	0.02	0.04	0.00
	0.5	0.0	0.5	0.5	3.5	4.0	0.02	0.02	0.00
	0.5	0.0	0.5	0.5	4.0	4.5	0.02	0.01	0.00
	0.5	0.0	0.5	0.5	4.5	5.0	0.02	0.00	0.00
	0.5	0.0	0.5	0.5	5.0	5.5	0.02	0.00	0.00
Scenario B	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00
	0.5	0.5	**1.0**	0.5	0.0	0.5	0.07	0.00	**0.01**
	0.5	1.0	1.5	0.5	0.0	0.5	0.08	0.00	0.03
	0.5	1.5	2.0	0.5	0.0	0.5	0.08	0.00	0.05
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	0.0	0.5	0.05	0.00	0.05
2-5 mi: EVAC	0.5	2.5	3.0	0.5	0.0	0.5	0.02	0.00	0.04
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	0.0	0.5	0.00	0.00	0.03
	0.5	3.5	4.0	0.5	0.0	0.5	0.00	0.00	0.01
	0.5	4.0	4.5	0.5	0.0	0.5	0.00	0.00	0.00
	0.5	4.5	5.0	0.5	0.0	0.5	0.00	0.00	0.00
	0.5	5.0	5.5	0.5	0.0	0.5	0.00	0.00	0.00

The above description was typical of the data review, where one protective action was shown to have a higher or lower risk over a given time period. The data review

completed a similar comparison for all scenarios to find the threshold travel speed and associated departure time. Using this information, the analysis calculated the ETE to find the time at which evacuation was more protective than sheltering. Table 7 presents these results.

Table 7 ETE at which Evacuation is More Protective than Sheltering

Site	Consequences	Area	Source Term A Evacuate when ETE is:	Source Term B Evacuate when ETE is:
1	Early Risk	0-2	< 1.5 hours	< 2 hours
		2-5	< 2.5 hours	< 4 hours
		5-10	< 5 hours**	< 5 hours**
	Latent Risk	0-2	< 1.2 hours	< 1.2 hours
		2-5	< 1.5 hours	< 1.5 hours
		5-10	< 2.2 hours	< 3.2 hours
2	Early Risk	0-2	< 2 hours	< 2 hours
		2-5	< 3 hours	< 5 hours
		5-10	< 5 hours**	< 5 hours**
	Latent Risk	0-2	< 5 hours**	< 5 hours**
		2-5	< 2 hours	< 2.5 hours
		5-10	< 2.7 hours	< 3.2 hours

**Results show essentially no consequences at any ETE.

4.2 Summary of Results

This analysis strongly considered the relative probability of rapidly progressing source terms. The accidents used in this analysis are in themselves only remotely likely to occur. Accidents in this probability range are sometimes referred to as "speculative," and analyses confirm that they are very unlikely. Although the emergency preparedness planning basis includes such accidents, their remote probability tempered the protective action criteria selected. To this end, the analysis closely studied the normalized risk values and raw output to determine the most appropriate ETE value for each area and each source term. The normalized risk values provide the percent of maximum early or latent risk and range from 0.00 to 1.00. Professional judgment was used in determining the criteria most appropriate for general guidance at nuclear power plants nationwide.

Consistent with the guidance of NUREG-0396/EPA 520/1-78-016 (NRC, 1978), the early fatality risk had greater weight in the decision process than latent cancer risk. Because the vast majority of sites within the reactor fleet are either medium or low population density, the recommended ETE values were more closely aligned with the Site 2, medium population density results.

The conclusions derived from Table 7 are presented below in terms of radial distance from the plant. The licensee's site-specific strategies would be developed following the criteria identified in this report and would be contained in emergency plan implementing procedures:

- **0–2 mile area:** If the ETE is less than 2 hours, evacuation is more protective.

- **2–5 mile area:** If the ETE is less than 3 hours, evacuation is more protective.

- **5– 10 mile area:** If the ETE is less than 3.2 hours, evacuation is more protective. However, within the area from 5 to 10 miles around a nuclear power plant, shelter-in-place would likely be the initial protective action to allow a staged evacuation to proceed. If evacuation is the initial protective action for this area, it is most protective when the ETE is less than 3.2 hours.

If evacuation cannot be accomplished within the specified timeframes, shelter-in-place would be the most appropriate protective action, followed by evacuation when it is safe to do so. Evacuation, if needed after shelter-in-place, would be based on accident conditions, field measurements, and other information obtained throughout the incident.

Scenario F, which was immediate evacuation of the full EPZ, was compared to the staged evacuation of the 0-2, 2-5, and 5-10 mile areas. Results also show that the implementation of staged evacuation of the 0-2, 2-5, and 5-10 mile areas reduces risk when compared to immediate evacuation of the entire 0-10 mile area, or shelter-in-place followed by evacuation for the 0-10 mile area.

5 CONCLUSIONS

The analysis to develop PAR guidance for rapidly progressing accidents considered a spectrum of accidents and varied protective actions and timing to calculate when evacuation is more protective than sheltering. Evacuation is always more protective than sheltering when it can be completed before arrival of the plume; however, rapidly progressing accidents limit opportunities to complete evacuation prior to plume arrival.

The results of this analysis demonstrate that source term and evacuation speed affect the efficacy of the protective action. Evacuation speeds were established for the analyses and then converted into ETEs for application in emergency planning. Because the vast majority of sites within the reactor fleet are either medium or low population density, the recommended ETE values were more closely aligned with the Site 2 results. This approach supplied results that are applicable at the reactor fleet level. The conclusions of this report suggest that licensees use the following ETE values for a rapidly progressing accident when developing a site-specific protective action logic diagram:

- **0 to 2-mile area around a nuclear power plant:** If the ETE is less than 2 hours, evacuation is more protective.
- **2 to 5-mile area:** If the ETE is less than 3 hours, evacuation is more protective.
- **5 to 10-mile area:** Shelter-in-place would likely be the initial protective action to allow a staged evacuation to proceed. If evacuation is the initial protective action for this area, it is most protective when the ETE is less than 3.2 hours.

If evacuation of this area cannot be accomplished within the specified timeframes, shelter-in-place would be the most appropriate protective action, followed by evacuation when it is safe to do so. Evacuation, if needed after shelter-in-place, would be based on accident conditions, field measurements, and other information obtained throughout the incident.

Immediate evacuation of the full EPZ was compared to the staged evacuation. Results also show that the implementation of staged evacuation of the 0-2, 2-5, and 5-10 mile areas reduces risk when compared to immediate evacuation of the entire 0-10 mile area, or shelter-in-place followed by evacuation for the 0-10 mile area. This result is consistent with the findings in Volume 1 of the PAR Study (NRC, 2007), which also showed that staged evacuation was more generally beneficial than evacuation of the full EPZ.

To best achieve the goal of protecting the public health and safety, it is appropriate to use the 90 percent ETE value when determining whether evacuation is the most appropriate protective action.

Limitations: The analyses performed herein are only applicable to the rapidly progressing accident. Although not quantified, this type of accident is generally considered to have a lower frequency than other potential accident conditions.

Site-specific characteristics and population distribution must always be considered when applying these criteria and deciding whether evacuation is the most appropriate protective action. Population densities are typically low within 5 miles of most nuclear power plants, and emergency response planning areas seldom conveniently end at the precise 2 or 5 mile boundaries. Some sites have emergency response planning areas that extend from within the 1 to 2 mile area out to 3 or 4 miles. This full distance would be evacuated along with the 0 to 2 mile evacuation. An in-depth understanding of the EPZ characteristics must be factored into the development of site-specific protective action strategies for rapidly progressing nuclear power plant accidents.

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Appendix A

Normalized Results

SITE 1																		
Early Consequences										**SourceTerm A**								
			0-2 Miles			**2-5 Miles**			**5-10 Miles**	**1 mph**			**2mph**			**3mph**		
Scenario	**DLTSHL**	**DLTEVA**	**DEPART**	**DLTSHL**	**DLTEVA**	**DEPART**	**DLTSHL**	**DLTEVA**	**DEPART**	**0-2**	**2-5**	**5-10**	**0-2**	**2-5**	**5-10**	**0-2**	**2-5**	**5-10**
A	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.5	1.0	0.5	8.0	8.5	0.13	0.10	0.00	0.01	0.01	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	1.0	1.5	0.5	8.0	8.5	0.13	0.20	0.00	0.01	0.23	0.00	0.00	0.01	0.00
	0.5	0.0	0.5	0.5	1.5	2.0	0.5	8.0	8.5	0.13	0.23	0.00	0.01	0.49	0.00	0.00	0.05	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	2.0	2.5	0.5	8.0	8.5	0.13	0.22	0.00	0.01	0.76	0.00	0.00	0.10	0.00
2-5 mi: SHELTER	0.5	0.0	0.5	0.5	2.5	3.0	0.5	8.0	8.5	0.13	0.12	0.00	0.01	0.79	0.00	0.00	0.07	0.00
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	3.0	3.5	0.5	8.0	8.5	0.13	0.03	0.00	0.01	0.52	0.00	0.00	0.07	0.00
	0.5	0.0	0.5	0.5	3.5	4.0	0.5	8.0	8.5	0.13	0.00	0.00	0.01	0.25	0.00	0.00	0.02	0.00
	0.5	0.0	0.5	0.5	4.0	4.5	0.5	8.0	8.5	0.13	0.00	0.00	0.01	0.02	0.00	0.00	0.02	0.00
	0.5	0.0	0.5	0.5	4.5	5.0	0.5	8.0	8.5	0.13	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	5.0	5.5	0.5	8.0	8.5	0.13	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
B	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.0	0.5	0.5	8.0	8.5	0.47	0.04	0.00	0.15	0.00	0.00	0.01	0.00	0.00
	0.5	1.0	1.5	0.5	0.0	0.5	0.5	8.0	8.5	0.68	0.04	0.00	0.79	0.00	0.00	0.07	0.00	0.00
	0.5	1.5	2.0	0.5	0.0	0.5	0.5	8.0	8.5	0.35	0.04	0.00	1.00	0.00	0.00	0.27	0.00	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.04	0.00	0.65	0.00	0.00	0.39	0.00	0.00
2-5 mi: EVAC	0.5	2.5	3.0	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.04	0.00	0.11	0.00	0.00	0.17	0.00	0.00
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.04	0.00	0.02	0.00	0.00	0.06	0.00	0.00
	0.5	3.5	4.0	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.04	0.00	0.00	0.00	0.00	0.02	0.00	0.00
	0.5	4.0	4.5	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.04	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	0.5	4.5	5.0	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.04	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	0.5	5.0	5.5	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00

SITE 1																		
Early Consequences										**SourceTerm A**								
			0-2 Miles			**2-5 Miles**			**5-10 Miles**	**1 mph**			**2mph**			**3mph**		
Scenario	**DLTSHL**	**DLTEVA**	**DEPART**	**DLTSHL**	**DLTEVA**	**DEPART**	**DLTSHL**	**DLTEVA**	**DEPART**	**0-2**	**2-5**	**5-10**	**0-2**	**2-5**	**5-10**	**0-2**	**2-5**	**5-10**
D	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.0	0.5	0.47	0.10	0.00	0.15	0.01	0.00	0.01	0.00	0.00
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	0.0	0.5	0.68	0.20	0.00	0.79	0.23	0.00	0.07	0.01	0.00
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	0.0	0.5	0.35	0.23	0.00	1.00	0.49	0.00	0.27	0.05	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	0.0	0.5	0.05	0.22	0.00	0.65	0.76	0.00	0.39	0.10	0.00
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	0.0	0.5	0.01	0.12	0.00	0.11	0.79	0.00	0.17	0.07	0.00
5-10 mi: EVAC	0.5	3.0	3.5	0.5	3.0	3.5	0.5	0.0	0.5	0.01	0.03	0.00	0.02	0.52	0.00	0.06	0.07	0.00
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	0.0	0.5	0.01	0.00	0.00	0.00	0.25	0.00	0.02	0.02	0.00
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	0.0	0.5	0.01	0.00	0.00	0.00	0.02	0.00	0.01	0.02	0.00
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	0.0	0.5	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	0.0	0.5	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.47	0.10	0.00	0.15	0.01	0.00	0.01	0.00	0.00
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	1.0	1.5	0.68	0.20	0.00	0.79	0.23	0.00	0.07	0.01	0.00
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	1.5	2.0	0.35	0.23	0.00	1.00	0.49	0.00	0.27	0.05	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	2.0	2.5	0.05	0.22	0.00	0.65	0.76	0.00	0.39	0.10	0.00
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	2.5	3.0	0.01	0.12	0.02	0.11	0.79	0.01	0.17	0.07	0.00
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	3.0	3.5	0.5	3.0	3.5	0.01	0.03	0.02	0.02	0.52	0.03	0.06	0.07	0.00
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	3.5	4.0	0.01	0.00	0.01	0.00	0.25	0.01	0.02	0.02	0.00
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	4.0	4.5	0.01	0.00	0.00	0.00	0.02	0.02	0.01	0.02	0.00
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	4.5	5.0	0.01	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.00
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	5.0	5.5	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
F	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
5-10 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.13	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00

SITE 1																		
Early Consequences										SourceTerm B								
			0-2 Miles			2-5 Miles			5-10 Miles	1mph			2mph			3mph		
Scenario	**DLTSHL**	**DLTEVA**	**DEPART**	**DLTSHL**	**DLTEVA**	**DEPART**	**DLTSHL**	**DLTEVA**	**DEPART**	**0-2**	**2-5**	**5-10**	**0-2**	**2-5**	**5-10**	**0-2**	**2-5**	**5-10**
A	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.5	1.0	0.5	8.0	8.5	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	1.0	1.5	0.5	8.0	8.5	0.04	0.05	0.00	0.00	0.02	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	1.5	2.0	0.5	8.0	8.5	0.04	0.07	0.00	0.00	0.05	0.00	0.00	0.00	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	2.0	2.5	0.5	8.0	8.5	0.04	0.06	0.00	0.00	0.08	0.00	0.00	0.01	0.00
2-5 mi: SHELTER	0.5	0.0	0.5	0.5	2.5	3.0	0.5	8.0	8.5	0.04	0.02	0.00	0.00	0.10	0.00	0.00	0.01	0.00
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	3.0	3.5	0.5	8.0	8.5	0.04	0.00	0.00	0.00	0.07	0.00	0.00	0.01	0.00
	0.5	0.0	0.5	0.5	3.5	4.0	0.5	8.0	8.5	0.04	0.00	0.00	0.00	0.03	0.00	0.00	0.01	0.00
	0.5	0.0	0.5	0.5	4.0	4.5	0.5	8.0	8.5	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	4.5	5.0	0.5	8.0	8.5	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	5.0	5.5	0.5	8.0	8.5	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.0	0.5	0.5	8.0	8.5	0.21	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00
	0.5	1.0	1.5	0.5	0.0	0.5	0.5	8.0	8.5	0.43	0.01	0.00	0.19	0.00	0.00	0.01	0.00	0.00
	0.5	1.5	2.0	0.5	0.0	0.5	0.5	8.0	8.5	0.27	0.01	0.00	0.38	0.00	0.00	0.04	0.00	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	0.0	0.5	0.5	8.0	8.5	0.09	0.01	0.00	0.40	0.00	0.00	0.11	0.00	0.00
2-5 mi: EVAC	0.5	2.5	3.0	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.01	0.00	0.17	0.00	0.00	0.10	0.00	0.00
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.01	0.00	0.01	0.00	0.00	0.05	0.00	0.00
	0.5	3.5	4.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	0.5	4.0	4.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	4.5	5.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	5.0	5.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SITE 1																		
Early Consequences										SourceTerm B								
			0-2 Miles			2-5 Miles			5-10 Miles	1mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
D	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.0	0.5	0.21	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	0.0	0.5	0.43	0.05	0.00	0.19	0.02	0.00	0.01	0.00	0.00
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	0.0	0.5	0.27	0.07	0.00	0.38	0.05	0.00	0.04	0.00	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	0.0	0.5	0.09	0.06	0.00	0.40	0.08	0.00	0.11	0.01	0.00
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	0.0	0.5	0.01	0.02	0.00	0.17	0.10	0.00	0.10	0.01	0.00
5-10 mi: EVAC	0.5	3.0	3.5	0.5	3.0	3.5	0.5	0.0	0.5	0.00	0.00	0.00	0.01	0.07	0.00	0.05	0.01	0.00
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	0.0	0.5	0.00	0.00	0.00	0.00	0.03	0.00	0.01	0.01	0.00
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	0.0	0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	0.0	0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	0.0	0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.21	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	1.0	1.5	0.43	0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	1.5	2.0	0.27	0.07	0.00	0.02	0.00	0.00	0.04	0.00	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	2.0	2.5	0.09	0.06	0.00	0.06	0.00	0.00	0.11	0.01	0.00
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	2.5	3.0	0.01	0.02	0.00	0.04	0.00	0.00	0.10	0.01	0.00
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	3.0	3.5	0.5	3.0	3.5	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.01	0.00
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	3.5	4.0	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	4.0	4.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	4.5	5.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	5.0	5.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5-10 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SITE 1
Latent Consequences

										SourceTerm A								
			0-2 Miles			2-5 Miles			5-10 Miles	1mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
A	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
	0.5	0.0	0.5	0.5	0.5	1.0	0.5	8.0	8.5	0.08	0.62	0.41	0.06	0.46	0.29	0.04	0.23	0.25
	0.5	0.0	0.5	0.5	1.0	1.5	0.5	8.0	8.5	0.08	0.62	0.41	0.06	0.53	0.29	0.04	0.36	0.25
	0.5	0.0	0.5	0.5	1.5	2.0	0.5	8.0	8.5	0.08	0.56	0.41	0.06	0.53	0.29	0.04	0.44	0.25
0-2 mi: EVAC	0.5	0.0	0.5	0.5	2.0	2.5	0.5	8.0	8.5	0.08	0.46	0.41	0.06	0.45	0.29	0.04	0.43	0.25
2-5 mi: SHELTER	0.5	0.0	0.5	0.5	2.5	3.0	0.5	8.0	8.5	0.08	0.37	0.41	0.06	0.36	0.29	0.04	0.37	0.25
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	3.0	3.5	0.5	8.0	8.5	0.08	0.32	0.41	0.06	0.29	0.29	0.04	0.32	0.25
	0.5	0.0	0.5	0.5	3.5	4.0	0.5	8.0	8.5	0.08	0.28	0.41	0.06	0.23	0.29	0.04	0.27	0.25
	0.5	0.0	0.5	0.5	4.0	4.5	0.5	8.0	8.5	0.08	0.27	0.41	0.06	0.21	0.29	0.04	0.23	0.25
	0.5	0.0	0.5	0.5	4.5	5.0	0.5	8.0	8.5	0.08	0.27	0.41	0.06	0.20	0.29	0.04	0.21	0.25
	0.5	0.0	0.5	0.5	5.0	5.5	0.5	8.0	8.5	0.08	0.27	0.41	0.06	0.20	0.29	0.04	0.19	0.25
B	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
	0.5	0.5	1.0	0.5	0.0	0.5	0.5	8.0	8.5	0.09	0.58	0.41	0.08	0.35	0.29	0.06	0.13	0.25
	0.5	1.0	1.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.08	0.35	0.29	0.07	0.13	0.25
	0.5	1.5	2.0	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.58	0.41	0.06	0.35	0.29	0.07	0.13	0.25
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.58	0.41	0.04	0.35	0.29	0.05	0.13	0.25
2-5 mi: EVAC	0.5	2.5	3.0	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.58	0.41	0.04	0.35	0.29	0.05	0.13	0.25
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.58	0.41	0.04	0.35	0.29	0.04	0.13	0.25
	0.5	3.5	4.0	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.58	0.41	0.04	0.35	0.29	0.04	0.13	0.25
	0.5	4.0	4.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.58	0.41	0.04	0.35	0.29	0.04	0.13	0.25
	0.5	4.5	5.0	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.58	0.41	0.04	0.35	0.29	0.04	0.13	0.25
	0.5	5.0	5.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.58	0.41	0.04	0.35	0.29	0.04	0.13	0.25
C	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.58	0.41	0.06	0.35	0.29	0.04	0.13	0.25

SITE 1																		
Latent Consequences										SourceTerm A								
			0-2 Miles			2-5 Miles			5-10 Miles	1mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
D	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.0	0.5	0.09	0.62	0.86	0.08	0.46	0.28	0.06	0.23	0.06
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	0.0	0.5	0.08	0.62	0.86	0.08	0.53	0.28	0.07	0.36	0.06
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	0.0	0.5	0.06	0.56	0.86	0.06	0.53	0.28	0.07	0.44	0.06
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	0.0	0.5	0.05	0.46	0.86	0.04	0.45	0.28	0.05	0.43	0.06
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	0.0	0.5	0.05	0.37	0.86	0.04	0.36	0.28	0.05	0.37	0.06
5-10 mi: EVAC	0.5	3.0	3.5	0.5	3.0	3.5	0.5	0.0	0.5	0.05	0.32	0.86	0.04	0.29	0.28	0.04	0.32	0.06
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	0.0	0.5	0.05	0.28	0.86	0.04	0.23	0.28	0.04	0.27	0.06
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	0.0	0.5	0.05	0.27	0.86	0.04	0.21	0.28	0.04	0.23	0.06
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	0.0	0.5	0.05	0.27	0.86	0.04	0.20	0.28	0.04	0.21	0.06
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	0.0	0.5	0.05	0.27	0.86	0.04	0.20	0.28	0.04	0.19	0.06
E	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.09	0.62	0.93	0.08	0.46	0.41	0.06	0.23	0.14
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	1.0	1.5	0.08	0.62	0.98	0.08	0.53	0.54	0.07	0.36	0.27
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	1.5	2.0	0.06	0.56	1.00	0.06	0.53	0.66	0.07	0.44	0.41
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	2.0	2.5	0.05	0.46	0.96	0.04	0.45	0.71	0.05	0.43	0.50
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	2.5	3.0	0.05	0.37	0.87	0.04	0.36	0.69	0.05	0.37	0.52
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	3.0	3.5	0.5	3.0	3.5	0.05	0.32	0.78	0.04	0.29	0.66	0.04	0.32	0.52
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	3.5	4.0	0.05	0.28	0.69	0.04	0.23	0.60	0.04	0.27	0.51
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	4.0	4.5	0.05	0.27	0.60	0.04	0.21	0.52	0.04	0.23	0.48
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	4.5	5.0	0.05	0.27	0.53	0.04	0.20	0.46	0.04	0.21	0.43
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	5.0	5.5	0.05	0.27	0.47	0.04	0.20	0.39	0.04	0.19	0.38
F	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
5-10 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.08	0.58	0.86	0.06	0.35	0.28	0.04	0.13	0.06

SITE 1																		
Latent Consequences										SourceTerm B								
			0-2 Miles			2-5 Miles			5-10 Miles	1 mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
A	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
	0.5	0.0	0.5	0.5	0.5	1.0	0.5	8.0	8.5	0.05	0.38	0.27	0.04	0.25	0.18	0.02	0.11	0.15
	0.5	0.0	0.5	0.5	1.0	1.5	0.5	8.0	8.5	0.05	0.39	0.27	0.04	0.30	0.18	0.02	0.18	0.15
	0.5	0.0	0.5	0.5	1.5	2.0	0.5	8.0	8.5	0.05	0.37	0.27	0.04	0.33	0.18	0.02	0.23	0.15
0-2 mi: EVAC	0.5	0.0	0.5	0.5	2.0	2.5	0.5	8.0	8.5	0.05	0.33	0.27	0.04	0.31	0.18	0.02	0.26	0.15
2-5 mi: SHELTER	0.5	0.0	0.5	0.5	2.5	3.0	0.5	8.0	8.5	0.05	0.27	0.27	0.04	0.27	0.18	0.02	0.24	0.15
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	3.0	3.5	0.5	8.0	8.5	0.05	0.23	0.27	0.04	0.22	0.18	0.02	0.21	0.15
	0.5	0.0	0.5	0.5	3.5	4.0	0.5	8.0	8.5	0.05	0.20	0.27	0.04	0.17	0.18	0.02	0.18	0.15
	0.5	0.0	0.5	0.5	4.0	4.5	0.5	8.0	8.5	0.05	0.19	0.27	0.04	0.14	0.18	0.02	0.15	0.15
	0.5	0.0	0.5	0.5	4.5	5.0	0.5	8.0	8.5	0.05	0.19	0.27	0.04	0.13	0.18	0.02	0.13	0.15
	0.5	0.0	0.5	0.5	5.0	5.5	0.5	8.0	8.5	0.05	0.19	0.27	0.04	0.13	0.18	0.02	0.12	0.15
B	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
	0.5	0.5	1.0	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.05	0.18	0.18	0.03	0.06	0.15
	0.5	1.0	1.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.05	0.18	0.18	0.04	0.06	0.15
	0.5	1.5	2.0	0.5	0.0	0.5	0.5	8.0	8.5	0.04	0.36	0.27	0.04	0.18	0.18	0.04	0.06	0.15
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	0.0	0.5	0.5	8.0	8.5	0.03	0.36	0.27	0.03	0.18	0.18	0.04	0.06	0.15
2-5 mi: EVAC	0.5	2.5	3.0	0.5	0.0	0.5	0.5	8.0	8.5	0.03	0.36	0.27	0.03	0.18	0.18	0.03	0.06	0.15
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	0.0	0.5	0.5	8.0	8.5	0.03	0.36	0.27	0.02	0.18	0.18	0.03	0.06	0.15
	0.5	3.5	4.0	0.5	0.0	0.5	0.5	8.0	8.5	0.03	0.36	0.27	0.02	0.18	0.18	0.02	0.06	0.15
	0.5	4.0	4.5	0.5	0.0	0.5	0.5	8.0	8.5	0.03	0.36	0.27	0.02	0.18	0.18	0.02	0.06	0.15
	0.5	4.5	5.0	0.5	0.0	0.5	0.5	8.0	8.5	0.03	0.36	0.27	0.02	0.18	0.18	0.02	0.06	0.15
	0.5	5.0	5.5	0.5	0.0	0.5	0.5	8.0	8.5	0.03	0.36	0.27	0.02	0.18	0.18	0.02	0.06	0.15
C	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.36	0.27	0.04	0.18	0.18	0.02	0.06	0.15

SITE 1
Latent Consequences

										SourceTerm B								
			0-2 Miles			2-5 Miles			5-10 Miles	1 mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
D	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.0	0.5	0.05	0.38	0.48	0.05	0.25	0.14	0.03	0.11	0.03
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	0.0	0.5	0.05	0.39	0.48	0.05	0.30	0.14	0.04	0.18	0.03
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	0.0	0.5	0.04	0.37	0.48	0.04	0.33	0.14	0.04	0.23	0.03
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	0.0	0.5	0.03	0.33	0.48	0.03	0.31	0.14	0.04	0.26	0.03
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	0.0	0.5	0.03	0.27	0.48	0.03	0.27	0.14	0.03	0.24	0.03
5-10 mi: EVAC	0.5	3.0	3.5	0.5	3.0	3.5	0.5	0.0	0.5	0.03	0.23	0.48	0.02	0.22	0.14	0.03	0.21	0.03
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	0.0	0.5	0.03	0.20	0.48	0.02	0.17	0.14	0.02	0.18	0.03
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	0.0	0.5	0.03	0.19	0.48	0.02	0.14	0.14	0.02	0.15	0.03
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	0.0	0.5	0.03	0.19	0.48	0.02	0.13	0.14	0.02	0.13	0.03
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	0.0	0.5	0.03	0.19	0.48	0.02	0.13	0.14	0.02	0.12	0.03
E	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.05	0.38	0.52	0.05	0.25	0.20	0.03	0.11	0.07
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	1.0	1.5	0.05	0.39	0.56	0.05	0.30	0.27	0.04	0.18	0.13
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	1.5	2.0	0.04	0.37	0.59	0.04	0.33	0.35	0.04	0.23	0.20
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	2.0	2.5	0.03	0.33	0.58	0.03	0.31	0.39	0.04	0.26	0.25
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	2.5	3.0	0.03	0.27	0.55	0.03	0.27	0.41	0.03	0.24	0.29
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	3.0	3.5	0.5	3.0	3.5	0.03	0.23	0.50	0.02	0.22	0.40	0.03	0.21	0.30
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	3.5	4.0	0.03	0.20	0.45	0.02	0.17	0.38	0.02	0.18	0.30
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	4.0	4.5	0.03	0.19	0.39	0.02	0.14	0.34	0.02	0.15	0.28
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	4.5	5.0	0.03	0.19	0.35	0.02	0.13	0.29	0.02	0.13	0.26
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	5.0	5.5	0.03	0.19	0.31	0.02	0.13	0.26	0.02	0.12	0.23
F	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
5-10 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.05	0.36	0.48	0.04	0.18	0.14	0.02	0.06	0.03

SITE 2																		
Early Consequences										SourceTerm A								
			0-2 Miles			2-5 Miles			5-10 Miles	1 mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
A	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.5	1.0	0.5	8.0	8.5	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	1.0	1.5	0.5	8.0	8.5	0.06	0.07	0.00	0.00	0.01	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	1.5	2.0	0.5	8.0	8.5	0.06	0.11	0.00	0.00	0.03	0.00	0.00	0.00	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	2.0	2.5	0.5	8.0	8.5	0.06	0.17	0.00	0.00	0.06	0.00	0.00	0.01	0.00
2-5 mi: SHELTER	0.5	0.0	0.5	0.5	2.5	3.0	0.5	8.0	8.5	0.06	0.20	0.00	0.00	0.07	0.00	0.00	0.02	0.00
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	3.0	3.5	0.5	8.0	8.5	0.06	0.18	0.00	0.00	0.07	0.00	0.00	0.01	0.00
	0.5	0.0	0.5	0.5	3.5	4.0	0.5	8.0	8.5	0.06	0.13	0.00	0.00	0.08	0.00	0.00	0.01	0.00
	0.5	0.0	0.5	0.5	4.0	4.5	0.5	8.0	8.5	0.06	0.03	0.00	0.00	0.06	0.00	0.00	0.01	0.00
	0.5	0.0	0.5	0.5	4.5	5.0	0.5	8.0	8.5	0.06	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	5.0	5.5	0.5	8.0	8.5	0.06	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
B	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.0	0.5	0.5	8.0	8.5	0.10	0.04	0.00	0.02	0.00	0.00	0.00	0.00	0.00
	0.5	1.0	1.5	0.5	0.0	0.5	0.5	8.0	8.5	0.10	0.04	0.00	0.06	0.00	0.00	0.01	0.00	0.00
	0.5	1.5	2.0	0.5	0.0	0.5	0.5	8.0	8.5	0.10	0.04	0.00	0.09	0.00	0.00	0.04	0.00	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.04	0.00	0.07	0.00	0.00	0.05	0.00	0.00
2-5 mi: EVAC	0.5	2.5	3.0	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.04	0.00	0.07	0.00	0.00	0.03	0.00	0.00
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.04	0.00	0.04	0.00	0.00	0.02	0.00	0.00
	0.5	3.5	4.0	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.04	0.00	0.02	0.00	0.00	0.01	0.00	0.00
	0.5	4.0	4.5	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.04	0.00	0.01	0.00	0.00	0.01	0.00	0.00
	0.5	4.5	5.0	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.04	0.00	0.01	0.00	0.00	0.01	0.00	0.00
	0.5	5.0	5.5	0.5	0.0	0.5	0.5	8.0	8.5	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SITE 2																		
Early Consequences										SourceTerm A								
			0-2 Miles			2-5 Miles			5-10 Miles	1 mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
D	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.0	0.5	0.10	0.05	0.00	0.02	0.00	0.00	0.00	0.00	0.00
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	0.0	0.5	0.10	0.07	0.00	0.06	0.01	0.00	0.01	0.00	0.00
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	0.0	0.5	0.10	0.11	0.00	0.09	0.03	0.00	0.04	0.00	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	0.0	0.5	0.05	0.17	0.00	0.07	0.06	0.00	0.05	0.01	0.00
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	0.0	0.5	0.02	0.20	0.00	0.07	0.07	0.00	0.03	0.02	0.00
5-10 mi: EVAC	0.5	3.0	3.5	0.5	3.0	3.5	0.5	0.0	0.5	0.01	0.18	0.00	0.04	0.07	0.00	0.02	0.01	0.00
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	0.0	0.5	0.01	0.13	0.00	0.02	0.08	0.00	0.01	0.01	0.00
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	0.0	0.5	0.01	0.03	0.00	0.01	0.06	0.00	0.01	0.01	0.00
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	0.0	0.5	0.01	0.00	0.00	0.01	0.05	0.00	0.01	0.00	0.00
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	0.0	0.5	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
E	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.10	0.05	0.00	0.02	0.00	0.00	0.00	0.00	0.00
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	1.0	1.5	0.10	0.07	0.02	0.06	0.01	0.00	0.01	0.00	0.00
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	1.5	2.0	0.10	0.11	0.04	0.09	0.03	0.00	0.04	0.00	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	2.0	2.5	0.05	0.17	0.04	0.07	0.06	0.00	0.05	0.01	0.00
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	2.5	3.0	0.02	0.20	0.02	0.07	0.07	0.00	0.03	0.02	0.00
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	3.0	3.5	0.5	3.0	3.5	0.01	0.18	0.02	0.04	0.07	0.00	0.02	0.01	0.00
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	3.5	4.0	0.01	0.13	0.02	0.02	0.08	0.00	0.01	0.01	0.00
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	4.0	4.5	0.01	0.03	0.03	0.01	0.06	0.00	0.01	0.01	0.00
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	4.5	5.0	0.01	0.00	0.03	0.01	0.05	0.00	0.01	0.00	0.00
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	5.0	5.5	0.01	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00
F	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5-10 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SITE 2																		
Early Consequences										SourceTerm B								
			0-2 Miles			2-5 Miles			5-10 Miles	1mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
A	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.5	1.0	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	1.0	1.5	0.5	8.0	8.5	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	1.5	2.0	0.5	8.0	8.5	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	2.0	2.5	0.5	8.0	8.5	0.02	0.04	0.00	0.00	0.01	0.00	0.00	0.00	0.00
2-5 mi: SHELTER	0.5	0.0	0.5	0.5	2.5	3.0	0.5	8.0	8.5	0.02	0.05	0.00	0.00	0.01	0.00	0.00	0.00	0.00
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	3.0	3.5	0.5	8.0	8.5	0.02	0.04	0.00	0.00	0.01	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	3.5	4.0	0.5	8.0	8.5	0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	4.0	4.5	0.5	8.0	8.5	0.02	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	4.5	5.0	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	5.0	5.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.0	0.5	0.5	8.0	8.5	0.07	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	1.0	1.5	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
	0.5	1.5	2.0	0.5	0.0	0.5	0.5	8.0	8.5	0.08	0.00	0.00	0.05	0.00	0.00	0.01	0.00	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	0.0	0.5	0.5	8.0	8.5	0.05	0.00	0.00	0.05	0.00	0.00	0.03	0.00	0.00
2-5 mi: EVAC	0.5	2.5	3.0	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.04	0.00	0.00	0.02	0.00	0.00
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.00	0.00	0.03	0.00	0.00	0.01	0.00	0.00
	0.5	3.5	4.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00
	0.5	4.0	4.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	4.5	5.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	5.0	5.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SITE 2																		
Early Consequences										SourceTerm B								
			0-2 Miles			2-5 Miles			5-10 Miles	1mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
D	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.0	0.5	0.07	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	0.0	0.5	0.08	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.00
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	0.0	0.5	0.08	0.02	0.00	0.05	0.00	0.00	0.01	0.00	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	0.0	0.5	0.05	0.04	0.00	0.05	0.01	0.00	0.03	0.00	0.00
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	0.0	0.5	0.02	0.05	0.00	0.04	0.01	0.00	0.02	0.00	0.00
5-10 mi: EVAC	0.5	3.0	3.5	0.5	3.0	3.5	0.5	0.0	0.5	0.00	0.04	0.00	0.03	0.01	0.00	0.01	0.00	0.00
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	0.0	0.5	0.00	0.02	0.00	0.01	0.01	0.00	0.01	0.00	0.00
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	0.0	0.5	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	0.0	0.5	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	0.0	0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.07	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	1.0	1.5	0.08	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.00
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	1.5	2.0	0.08	0.02	0.00	0.05	0.00	0.00	0.01	0.00	0.00
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	2.0	2.5	0.05	0.04	0.00	0.05	0.01	0.00	0.03	0.00	0.00
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	2.5	3.0	0.02	0.05	0.00	0.04	0.01	0.00	0.02	0.00	0.00
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	3.0	3.5	0.5	3.0	3.5	0.00	0.04	0.00	0.03	0.01	0.00	0.01	0.00	0.00
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	3.5	4.0	0.00	0.02	0.00	0.01	0.01	0.00	0.01	0.00	0.00
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	4.0	4.5	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	4.5	5.0	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	5.0	5.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5-10 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SITE 2

Latent Consequences

										SourceTerm A								
			0-2 Miles			2-5 Miles			5-10 Miles	1mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
A	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	0.0	0.5	0.5	0.5	1.0	0.5	8.0	8.5	0.00	0.06	0.08	0.00	0.04	0.06	0.00	0.02	0.05
	0.5	0.0	0.5	0.5	1.0	1.5	0.5	8.0	8.5	0.00	0.06	0.08	0.00	0.04	0.06	0.00	0.03	0.05
	0.5	0.0	0.5	0.5	1.5	2.0	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.04	0.06	0.00	0.03	0.05
0-2 mi: EVAC	0.5	0.0	0.5	0.5	2.0	2.5	0.5	8.0	8.5	0.00	0.04	0.08	0.00	0.04	0.06	0.00	0.03	0.05
2-5 mi: SHELTER	0.5	0.0	0.5	0.5	2.5	3.0	0.5	8.0	8.5	0.00	0.04	0.08	0.00	0.03	0.06	0.00	0.03	0.05
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	3.0	3.5	0.5	8.0	8.5	0.00	0.03	0.08	0.00	0.03	0.06	0.00	0.03	0.05
	0.5	0.0	0.5	0.5	3.5	4.0	0.5	8.0	8.5	0.00	0.03	0.08	0.00	0.03	0.06	0.00	0.02	0.05
	0.5	0.0	0.5	0.5	4.0	4.5	0.5	8.0	8.5	0.00	0.03	0.08	0.00	0.02	0.06	0.00	0.02	0.05
	0.5	0.0	0.5	0.5	4.5	5.0	0.5	8.0	8.5	0.00	0.03	0.08	0.00	0.02	0.06	0.00	0.02	0.05
	0.5	0.0	0.5	0.5	5.0	5.5	0.5	8.0	8.5	0.00	0.03	0.08	0.00	0.02	0.06	0.00	0.02	0.05
B	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	0.5	1.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	1.0	1.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	1.5	2.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
2-5 mi: EVAC	0.5	2.5	3.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	3.5	4.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	4.0	4.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	4.5	5.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	5.0	5.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
C	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.05	0.08	0.00	0.03	0.06	0.00	0.01	0.05

SITE 2																		
Latent Consequences										SourceTerm A								
			0-2 Miles			2-5 Miles			5-10 Miles	1mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
D	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.0	0.5	0.00	0.06	0.16	0.00	0.04	0.05	0.00	0.02	0.02
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	0.0	0.5	0.00	0.06	0.16	0.00	0.04	0.05	0.00	0.03	0.02
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.04	0.05	0.00	0.03	0.02
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	0.0	0.5	0.00	0.04	0.16	0.00	0.04	0.05	0.00	0.03	0.02
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	0.0	0.5	0.00	0.04	0.16	0.00	0.03	0.05	0.00	0.03	0.02
5-10 mi: EVAC	0.5	3.0	3.5	0.5	3.0	3.5	0.5	0.0	0.5	0.00	0.03	0.16	0.00	0.03	0.05	0.00	0.03	0.02
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	0.0	0.5	0.00	0.03	0.16	0.00	0.03	0.05	0.00	0.02	0.02
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	0.0	0.5	0.00	0.03	0.16	0.00	0.02	0.05	0.00	0.02	0.02
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	0.0	0.5	0.00	0.03	0.16	0.00	0.02	0.05	0.00	0.02	0.02
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	0.0	0.5	0.00	0.03	0.16	0.00	0.02	0.05	0.00	0.02	0.02
E	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.00	0.06	0.17	0.00	0.04	0.07	0.00	0.02	0.03
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	1.0	1.5	0.00	0.06	0.17	0.00	0.04	0.10	0.00	0.03	0.05
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	1.5	2.0	0.00	0.05	0.18	0.00	0.04	0.11	0.00	0.03	0.07
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	2.0	2.5	0.00	0.04	0.17	0.00	0.04	0.12	0.00	0.03	0.08
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	2.5	3.0	0.00	0.04	0.16	0.00	0.03	0.12	0.00	0.03	0.09
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	3.0	3.5	0.5	3.0	3.5	0.00	0.03	0.14	0.00	0.03	0.11	0.00	0.03	0.09
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	3.5	4.0	0.00	0.03	0.13	0.00	0.03	0.10	0.00	0.02	0.08
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	4.0	4.5	0.00	0.03	0.11	0.00	0.02	0.09	0.00	0.02	0.08
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	4.5	5.0	0.00	0.03	0.10	0.00	0.02	0.08	0.00	0.02	0.07
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	5.0	5.5	0.00	0.03	0.10	0.00	0.02	0.08	0.00	0.02	0.07
F	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
5-10 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.05	0.16	0.00	0.03	0.05	0.00	0.01	0.02

SITE 2																		
Latent Consequences										SourceTerm B								
			0-2 Miles			2-5 Miles			5-10 Miles	1 mph			2mph			3mph		
Scenario	**DLTSHL**	**DLTEVA**	**DEPART**	**DLTSHL**	**DLTEVA**	**DEPART**	**DLTSHL**	**DLTEVA**	**DEPART**	**0-2**	**2-5**	**5-10**	**0-2**	**2-5**	**5-10**	**0-2**	**2-5**	**5-10**
A	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	0.5	1.0	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.02	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	1.0	1.5	0.5	8.0	8.5	0.00	0.04	0.05	0.00	0.02	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	1.5	2.0	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.03	0.04	0.00	0.02	0.03
0-2 mi: EVAC	0.5	0.0	0.5	0.5	2.0	2.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.03	0.04	0.00	0.02	0.03
2-5 mi: SHELTER	0.5	0.0	0.5	0.5	2.5	3.0	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.02	0.04	0.00	0.02	0.03
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	3.0	3.5	0.5	8.0	8.5	0.00	0.02	0.05	0.00	0.02	0.04	0.00	0.02	0.03
	0.5	0.0	0.5	0.5	3.5	4.0	0.5	8.0	8.5	0.00	0.02	0.05	0.00	0.02	0.04	0.00	0.02	0.03
	0.5	0.0	0.5	0.5	4.0	4.5	0.5	8.0	8.5	0.00	0.02	0.05	0.00	0.02	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	4.5	5.0	0.5	8.0	8.5	0.00	0.02	0.05	0.00	0.02	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	5.0	5.5	0.5	8.0	8.5	0.00	0.02	0.05	0.00	0.01	0.04	0.00	0.01	0.03
B	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	0.5	1.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	1.0	1.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	1.5	2.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
2-5 mi: EVAC	0.5	2.5	3.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	3.5	4.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	4.0	4.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	4.5	5.0	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	5.0	5.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
C	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
5-10 mi: SHELTER	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	8.0	8.5	0.00	0.03	0.05	0.00	0.01	0.04	0.00	0.01	0.03

SITE 2																		
Latent Consequences										SourceTerm B								
			0-2 Miles			2-5 Miles			5-10 Miles	1 mph			2mph			3mph		
Scenario	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	DLTSHL	DLTEVA	DEPART	0-2	2-5	5-10	0-2	2-5	5-10	0-2	2-5	5-10
D	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.02	0.03	0.00	0.01	0.01
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	0.0	0.5	0.00	0.04	0.09	0.00	0.02	0.03	0.00	0.01	0.01
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.03	0.03	0.00	0.02	0.01
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.03	0.03	0.00	0.02	0.01
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.02	0.03	0.00	0.02	0.01
5-10 mi: EVAC	0.5	3.0	3.5	0.5	3.0	3.5	0.5	0.0	0.5	0.00	0.02	0.09	0.00	0.02	0.03	0.00	0.02	0.01
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	0.0	0.5	0.00	0.02	0.09	0.00	0.02	0.03	0.00	0.02	0.01
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	0.0	0.5	0.00	0.02	0.09	0.00	0.02	0.03	0.00	0.01	0.01
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	0.0	0.5	0.00	0.02	0.09	0.00	0.02	0.03	0.00	0.01	0.01
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	0.0	0.5	0.00	0.02	0.09	0.00	0.01	0.03	0.00	0.01	0.01
E	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.00	0.03	0.09	0.00	0.02	0.04	0.00	0.01	0.02
	0.5	1.0	1.5	0.5	1.0	1.5	0.5	1.0	1.5	0.00	0.04	0.10	0.00	0.02	0.05	0.00	0.01	0.03
	0.5	1.5	2.0	0.5	1.5	2.0	0.5	1.5	2.0	0.00	0.03	0.10	0.00	0.03	0.06	0.00	0.02	0.04
0-2 mi: SHELTER	0.5	2.0	2.5	0.5	2.0	2.5	0.5	2.0	2.5	0.00	0.03	0.10	0.00	0.03	0.06	0.00	0.02	0.04
2-5 mi: SHELTER	0.5	2.5	3.0	0.5	2.5	3.0	0.5	2.5	3.0	0.00	0.03	0.10	0.00	0.02	0.07	0.00	0.02	0.05
5-10 mi: SHELTER	0.5	3.0	3.5	0.5	3.0	3.5	0.5	3.0	3.5	0.00	0.02	0.09	0.00	0.02	0.07	0.00	0.02	0.05
	0.5	3.5	4.0	0.5	3.5	4.0	0.5	3.5	4.0	0.00	0.02	0.08	0.00	0.02	0.06	0.00	0.02	0.05
	0.5	4.0	4.5	0.5	4.0	4.5	0.5	4.0	4.5	0.00	0.02	0.08	0.00	0.02	0.06	0.00	0.01	0.05
	0.5	4.5	5.0	0.5	4.5	5.0	0.5	4.5	5.0	0.00	0.02	0.07	0.00	0.02	0.05	0.00	0.01	0.04
	0.5	5.0	5.5	0.5	5.0	5.5	0.5	5.0	5.5	0.00	0.02	0.06	0.00	0.01	0.05	0.00	0.01	0.04
F	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
0-2 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
2-5 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
5-10 mi: EVAC	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01
	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.00	0.03	0.09	0.00	0.01	0.03	0.00	0.01	0.01

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AUTHOR(S)

R. Sullivan, Nuclear Regulatory Commission
J. Jones, F. J. Schelling, N. Bixler, and F. Walton, Sandia National Laboratories

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R. Sullivan, Technical Lead

. ABSTRACT *(200 words or less)*

Volume 3 of NUREG/CR-6953, "Review of NUREG-0654, Supplement 3, Criteria for Protective Action Recommendations for Severe Accidents," is the final volume of the Protective Action Recommendation (PAR) Study. This analysis provides a technical basis for decision criteria that can be used by licensees and offsite response organizations to enhance protective action strategy for nuclear power plant accidents that progress rapidly. The analysis integrated advances in the knowledge of potential accident sequences, protective action strategies, and consequence modeling. The emergency preparedness planning basis includes the potential for very unlikely but credible rapidly progressing accidents, and this analysis was performed to specifically identify PAR strategies for rapidly progressing accidents to support the PAR logic diagram developed for an update to Supplement 3 to NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for Protective Action Recommendations for Severe Accidents." The updated PAR logic diagram will include a path for General Emergencies and another decision path for accidents defined as rapidly progressing. The technical basis developed may assist licensees and offsite response organizations in tailoring protective action strategies using site specific evacuation time information. It is expected that application of the this technical basis may improve the efficacy of protective actions for a rapidly progressing accident. The analyses performed herein are only applicable to the rapidly progressing accident.

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