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September 23, 2013

Ms. Cindy K. Bladey
Chief
Rules, Announcements, and Directives Branch (RADB)
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Comments on Emergency Preparedness Frequently Asked Question (EPFAQ) No. 2013-004, 2013-006, and 2013-007 (*Federal Register Vol. 78, 52570*, dated August 23, 2013; Docket ID NRC-2013-0197)

Project Number: 689

Dear Ms. Bladey:

On behalf of the nuclear energy industry, the Nuclear Energy Institute (NEI)¹ appreciates the opportunity to provide comments on draft NRC responses EPFAQ numbers 2013-004 (ML13226A313) and 2013-006 (ML13226A316) published in the subject Federal Register notice. NEI has no comments on 2013-007 (ML13226A319).

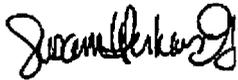
Attached is a proposed mark-up of specific sections of the draft NRC FAQ responses with supporting basis for industry's comments. NEI requests a public meeting with NRC staff to discuss the attached mark-up and specifically, to further explain the industry's position.

¹ NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

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Thank you in advance for your consideration of these comments. If you have any questions or require additional information, please contact Martin Hug at (202) 739-8129; mth@nei.org.

Sincerely,



Susan Perkins-Grew

Attachments

c: Mr. Joseph D. Anderson, NSIR/DPR/DDEP/ORLOB, NRC
Mr. Scott A. Morris, NSIR/DPR, NRC
Mr. Robert J. Lewis, NSIR/DPR, NRC
NRC Document Control Desk

NRC EPFAQ 2013-004 Response

Markup of NRC Draft Response Question 1

The following text was excerpted from NRC EPFAQ 2013-004 Response, Rev 1, dated 8.14.2013 (ML13226A313), Question 1, NRC Response, starting with paragraph one. NEI provides a strike-out of text it would like removed from the NRC response. A basis for the change is explained below.

~~The proposed response does not address the issue fully. Emergency director judgment is important in this rapid, but unlikely scenario. However, the staff understands the need to formalize criteria to the extent practical. The following criteria would be appropriate as supplemented by hostile action considerations:~~

A rapidly progressing severe accident may be defined as:

1. This protective action recommendation is the first after a General Emergency has been declared

AND

2. Greater than or equal to Containment High Range Area Radiation Monitor Potential Loss EAL Threshold (20% Clad Damage)

AND

3. There is loss of the containment barrier per the Emergency Action Levels

OR

- ~~1. Control of the site has been lost to hostile action and the containment barrier is compromised¹~~

OR

- ~~2. Emergency Director Judgment that a significant radiological release will occur within an hour²~~

As noted in Supplement 3, if these conditions cannot be determined, the Emergency Director should assume they are not taking place.

The guidance for protective action strategy is applicable to conditions directly after a General Emergency is declared. ~~However, the declaration and the large early release could take place after the Technical Support Center (TSC) or Emergency Operations Facility is activated and the criteria would be applicable.³~~

Basis for Proposed Change to NRC Response 1

Per the above markup, NEI requests NRC remove from the NRC response the following language and related supporting statements.

1. Control of the site has been lost to hostile action and the containment barrier is compromised

2. Emergency Director Judgment that a significant radiological release will occur within an hour
3. However, the declaration and the large early release could take place after the Technical Support Center (TSC) or Emergency Operations Facility is activated and the criteria would be applicable.

The Basis for the three requested changes is as follows:

Definition of a Rapidly Progress Severe Accident

To support discussion of NEI's proposed removal of the three statements from the FAQ, NEI cites the definition of a Rapidly Progressing Scenario as described in Supplement 3, Guidance for Protective Action Strategies (Supplement 3) to NUREG-0654-FEMA-REP1, Rev. 1, Criteria for the Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Note 1 on page A-3:

"... a General Emergency with a rapid loss of containment integrity (emergency action levels indicate containment barrier loss) and loss of the ability to cool the core. This path is used for scenarios in which containment integrity can be determined as bypassed or immediately lost during a GE with core damage."

Basis for Removal of the Three Statements

The three criteria in question for declaring a Rapidly Progressing Scenario do not concur with the above definition:

1. Control of the site has been lost to hostile action and the containment barrier is compromised.

Though a hostile action is a serious event at any nuclear facility, it does not mean that core damage is inevitable regardless of the state of the containment. Significant core damage is the result of a loss of the ability to cool the core and time associated with the heating of the fuel clad to the point of its failure. Though it is possible for hostile actions to initiate the chain of events leading up to these conditions, this is unlikely to occur prior to the declaration of a General Emergency for other reasons (i.e., Hostile Action resulting in loss of physical control of the facility) which in themselves do not constitute a Rapidly Progressing Severe Accident. Further, NRC does not define what is meant by a "compromised containment". The guidance is very clear on containment status in that "containment integrity is bypassed or immediately lost" in order to meet the criteria for a rapidly progressing severe accident. Therefore, since the purpose of the Rapidly Progressing Severe Accident is to protect the public from a "significant radioactive release", and since there is no direct correlation between a hostile event and loss of containment or an inability to cool the core, the criteria should be removed from the list of definitions.

Failure to remove the criterion could also cause confusion in the form of conflicting PARs. PARs for a hostile action based event are determined with input from the ORO in Supplement 3, on page A-2, Protective action strategy development tool, decision point, "Do impediments to evacuation exist (2)" and on page A-3, Note 2. Conflicting PARs could arise when considering a rapidly progressing severe accident and the impediment section in the center section of the Supplement 3 flow chart.

2. Emergency Director Judgment that a significant radiological release will occur within an hour.

Though they may be useful in making decisions, individual judgments can be unreliable and inconsistent resulting in an inappropriately conservative decision. To expect the Emergency Director to determine if a significant radiological release will occur within an hour is unrealistic and is not consistent with the Supplement 3 Note 1 definition. This expectation is also contrary to the note within Supplement 3 that states "If this scenario cannot be immediately confirmed, assume it is not taking place and answer no to this decision."

The decision to declare a Rapidly Progressing Severe Accident already has sufficient technical criteria (> 20% clad damage and loss of the containment per the EALs) to ensure consistent declarations. Therefore the additional "Emergency Director Judgment" criteria should be removed from the list of definitions.

3. However, the declaration and the large early release could take place after the Technical Support Center (TSC) or Emergency Operations Facility is activated and the criteria would be applicable.

The TSC and Emergency Operations Facility activation statements should be removed from the NRC FAQ response. Supplement 3, Section 2.7, Strategy for Rapidly Progressing Scenarios, states:

"The emergency preparedness planning basis includes rapidly progressing scenarios that have a significant radioactive release in about 1 hour. Historically, emergency preparedness regulations and guidance have been based on a spectrum of accidents. NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light-Water Nuclear Power Plants," issued November 1978, embodies this concept in the specification of the EPZ (NRC, 1978)."

NUREG-0396, on page 20, Table 2 - Guidance on Initiation and Duration of Release, states that the time from the initiating event to start of atmospheric release is 0.5 hours to one day. An initiating event with a release within 0.5 hours occurs during the time period when the control room is in command and control, therefore supporting the assumption that a Rapidly Progressing Severe Accident applies only to the control room.

In addition, the requirement is contrary to the safer to do so concept since safer to do so is implemented when the OROs and supplement ERO staff are staffed and prepared to start an evacuation. Keeping the TSC or Emergency Operations Facility activation statements would result in confusion: If a Rapidly Progressing Severe Accident can apply several hours into an event then what PAR does the utility issue? Is an evacuation PAR issued despite the ETE value because it is immediately safer to do so or does the licensee immediately issue a PAR to shelter then discuss the need to evacuate with the ORO? These are among the reasons why TSC and Emergency Operations Facility activation statements should be removed from the NRC FAQ response.

Markup of NRC Draft Response Question 2

The following text was excerpted from NRC EPFAQ 2013-004 Response, Rev 1, dated 8.14.2013 (ML13226A313), Question 2, NRC Response, starting with paragraph one. NEI provides a strike-out of text it would like removed from the NRC response. A basis for the change is explained below.

~~The proposed response does not fully address the issue. Supplement 3 updates the information in RIS 2005-08. The NEI guidance referenced in the RIS provides useful background on Environmental Protection Agency (EPA) guidance that is not changed nor impacted by Supplement 3. Supplement 3 provides guidance on the use of Shelter in Place (SIP) as a protective action for impediments, hostile action and when evacuation support is necessary but necessary traffic controls are not yet in place. Other appropriate uses of SIP are for special needs and transport dependant populations. Guidance on this issue is provided in Supplement 3, Section 3.2, "Emergency Messaging," and may be incorporated into augmented Emergency Response Operations (ERO) protective action strategy procedures, but would not be appropriate for the Control Room procedure.¹~~

Controlled venting could affect an area beyond initial evacuation orders, e.g., five to ten miles downwind. It is difficult to identify scenarios, other than controlled venting, that would include a short term release of known duration. ~~In any case, augmented ERO radiological staff and decision makers should be aware of the possibility and have evacuation times available for various emergency response planning areas within the emergency planning zone.²~~ A decision could be made in such cases to SIP for a short duration release, but such considerations would not be appropriate for control room guidance.

Basis for the Proposed Change to NRC Response 2

NEI requests NRC remove the following from the NRC response:

1. The special needs and transport-dependent population statement

The FAQ sought guidance for a short term release, not guidance for special needs and transport of dependent populations.

2. The evacuation times statement.

Augmented ERO radiological staff should not base PARs on evacuation time. Planners use evacuation times to develop PAR procedures for a short duration release. These decisions should be made as part of the planning process during development of the PAR procedures.

Markup of NRC Draft Response Question 4

The following text was excerpted from NRC EPFAQ 2013-004 Response, Rev 1, dated 8.14.2013 (ML13226A313), Question 4, NRC Response, starting with paragraph four. NEI provides additional underlined text it would like added to the NRC response. A basis for the change is explained below.

However, the studies conducted by the NRC (NUREG/CR-6953, Vol. 1, "Review of NUREG-0654, Supplement 3, 'Criteria for Protective Action Recommendations for Severe Accidents,'" ADAMS Accession No. ML080360602) to support Supplement 3 used national level parameters for analyses. Licensees may compare the evacuation time estimate results for a keyhole evacuation verses a staged evacuation and in some cases perform a site-specific dose-based analysis to show the efficacy of alternate protective action strategies. The techniques in the NUREG/CR-6953 may be instructive in the conduct of such analyses and the results should be provided to NRC staff for review.

Basis for the Proposed Change to NRC Response 4

NEI requests NRC add the comparison statement to the NRC response. Based on assumptions from NUREG/CR-6953, a comparison of Evacuation Time Estimate (ETE) results can be used to determine the efficacy of alternate protective action strategies. NEI provides an example methodology in Attachment 2. This methodology integrates principles conveyed at the Advisory Committee on Reactor Safeguards (ACRS) – 544th Meeting conducted on Thursday, July 12, 2007 (ACRSR-2263), including a need for strategies that are simple and that consider unique site characteristics.

As background, participants at the July 12, 2007 ACRS meeting heard arguments from the NRC staff on the need to revise NUREG-0654 Supplement 3 based on the efficacy of protective action strategies identified in NUREG/CR 6953, "Review of NUREG-0654, Supplement 3, 'Criteria for Protective Action Recommendations for Severe Accidents'". ACRS recommended that updates to Supplement 3 to NUREG-0654/FEMA-REP-1, Revision 1 should take into consideration NUREG/CR 6953 model uncertainties, complexity of decision-making and related industry work.

ACRS letter ACDRSR-2263, states "For more slowly progressing source terms, radial evacuation generally performed well, and therefore should remain a major element of protective strategies as recommended in Supplement 3." The letter further states, "The results show that the effectiveness of a strategy is sensitive to the value of ETE..., but do agree with the staff that credible ETEs are important to sound decision-making on PARs. The staff should consider uncertainties in ETEs and other uncertainties such as uniformity of population density (as assumed in the study) may affect the ranking of PAR strategies."

NEI's methodology is sensitive to the value of the ETEs and allows licensees the flexibility to select appropriate protective actions based on their unique site characteristics. This includes the option to refrain from staged evacuations in cases where such a strategy would not substantively benefit

evacuation times for populations closer to the plant site and would complicate the decision-making process.

Because they reflect the non-uniformity of populations in and around nuclear sites, ETE's should be used in ranking the effectiveness of SIP (as used for determining appropriateness of SIP for a Rapidly Progressing Severe Accident), keyhole evacuation, staged evacuation and other PAR strategies at a particular site.

The example methodology in Attachment 2 is in line with the principles discussed in the ACRS meeting and the goal of ensuring that PAR strategies resulting from the implementation of Supplement 3 do not overly complicate the decision making process.

Markup of NRC Draft Response Question 5

The following text was excerpted from NRC EPFAQ 2013-004 Response, Rev 1, date 8.14.2013 (ML13226A313), Question 5, NRC Response, starting with fourth sentence in the paragraph. NEI provides a strike-out of text they would like removed from the NRC response. A basis for the change is explained below.

The implementation of evacuation after SIP due to a rapidly progressing severe accident will rely upon the judgment of decision makers within the licensee and ORO organizations. The goal of the evacuation is to reduce public exposure and would be based upon ~~ground deposition dose rates~~, ETEs for the sheltered areas and current radiological release rate.

Basis for the Proposed Change to NRC Response 5

NEI requests NRC remove the ground deposition reference from the NRC response.

Although it is accounted for in dose models and remains an issue during the relocation phase, ground deposition is not a predominant consideration in the early phase of an accident. If consideration for ground deposition remains in the FAQ, licensees may infer that NRC's intent is to require post plume ground deposition surveys prior to making an evacuation decision.

Markup of NRC Draft Response Question 6

The following text was excerpted from NRC EPFAQ 2013-004 Response, Rev 1, dated 8.14.2013 (ML13226A313), Question 6, NRC Response, starting with paragraph three. NEI provides additional underlined text it would like added to the NRC response. A basis for the change is explained below.

Supplement 3, Section 2.6 addresses the issue of expansion of PARs after keyhole evacuation has been accomplished. The intent of guidance in Supplement 3, Section 2.6 is to eliminate unnecessary protective actions. As noted above with inappropriate SIP recommendations, evacuation of the public not at risk of exceeding radiological protective action guides is counterproductive. However, if the licensee believes that containment may fail due to continuing degraded or unknown adverse plant conditions and determines there is a risk of exceeding radiological protective guidelines, it should pursue the expansion of PARs. In addition to the disruption of the public and health risk from evacuation, unnecessary evacuation can create a shadow evacuation that could delay the movement of populations most at risk. Unnecessary evacuation also places demand on ORO resources that would be better used to address the evacuation of those at risk.

Basis for the Proposed Change to NRC Response 6

NEI requests NRC add guidance to the NRC response that addresses plant conditional expansion of PARs for a wind shift.

- The NRC response does not answer the question, "what specific guidance applies to plant condition expansion of PARs for a wind shift" and Supplement 3 does not adequately address the situation. NEI believes that the following paragraph from Supplement 3 Section 2.6 supports the logic of the above addition:

"Additionally, changes in wind direction may indicate that if a release begins, it would affect different downwind sectors. If the licensee believes that containment may fail, it should pursue the expansion of PARs. Finally, if a radiological assessment shows that an ongoing release or containment source term is not sufficient to cause exposures in excess of EPA protective action guidelines, licensees should not expand PARs based only on changes in wind direction."

Markup of NRC Draft Response Question 7

The following text was excerpted from NRC EPFAQ 2013-004 Response, Rev 1, date 8.14.2013 (ML13226A313), Question 7, NRC Response, starting with paragraph 1. NEI provides a strike-out of text it would like removed and additional underlined text it would like added to the NRC response. A basis for the change is explained below

If a wind shift occurs when the control room has command and control, then plant conditions may be used as a basis for expanding the PAR to the new sector. If radiological assessment is available during this time period, it should be used to inform ~~the~~ subsequent PAR decision making.

Basis for the Proposed Change to NRC Response 7

NEI requests that the NRC clarify that the control room use a radiological assessment to inform the following subsequent PARs:

- Radiological assessment performed for an actual radioactive release shall be used as the basis for a subsequent PAR when EPA PAGs will be exceeded in an area:
 - Wider than the 2 to 5 miles downwind 22.5-degree compass sector(s) and adjacent sectors.

OR

- 5 to 10 miles downwind.

This answer ensures consistency with the last paragraph of NRC response to question 6. The paragraph states:

In any case, Supplement 3 should be implemented in a manner that minimizes demands upon on-shift ERO decision maker(s). The considerations discussed in Section 2.6 are applicable to the augmented ERO and are not applicable to the protective action strategy guidance provided to the on-shift ERO.

NRC EPFAQ 2013-006 Response

Markup of NRC Draft Response

The following text was excerpted from NRC EPFAQ 2013-006 Response, Rev 1, date 6.4.2013 (ML13226A316), NRC Response, starting with paragraph two. NEI provides a strike-out of text it would like removed from the NRC response. A basis for the change is explained below.

The requirement in Section IV.A.7 of Appendix E to 10 CFR Part 50 is to identify and describe the assistance expected from appropriate State, local, and Federal agencies. This is applicable to the offsite agencies providing assistance to implement onsite response actions in support of the licensee's radiological emergency plan. ~~For law enforcement agencies, this assistance may include, for example, one or more of the following activities: site access and traffic control, emergency response facility access control and security, vehicle escorts to offsite locations, operation of public alert and notification systems, or communications between emergency responders and emergency response facilities.~~

Basis for the Proposed Change

NEI requests NRC remove the examples of law enforcement agency assistance from the NRC response. The examples are not necessary to answer the FAQ question. The examples may not apply to every licensee situation and may result in licensee confusion and NRC inspector misunderstanding. The balance of the NRC response adequately answers the FAQ question.

Using NUREG/CR-6953 Assumptions to Support Staged Evacuation Use

Studies conducted by the NRC (NUREG/CR-6953, Vol. 1, "Review of NUREG-0654, Supplement 3, 'Criteria for Protective Action Recommendations for Severe Accidents,'" ADAMS Accession No. ML080360602) were conducted to support the efficacy of staged evacuation over the historical evacuation criteria of 2 mile radius areas and 2-5 mile downwind sectors.

NEI concludes, based on assumptions from NUREG/CR-6953 (summarized below), that a comparison of Evacuation Time Estimate (ETE) results can be used to determine the efficacy of alternate protective action strategies. NEI provides an example methodology starting on the next page.

NEI Assumptions and Conclusions Based on a Review of NUREG/CR-6953

1. Evacuation time estimates evaluated included 4, 6, 8 and 10 Hour ETEs.
2. Travel speed, when staged evacuation was not employed, were calculated so that a person departing near the site boundary would reach the 10 mile radius at the prescribed ETE. For example, if the designated ETE was 4 hours, then the calculated speed would be 2.5 MPH, a constant speed through the entire 10 mile zone.
3. Travel speed, when staged evacuation was employed, was varied over three time intervals, such that the population would travel faster for the first two miles, slower for the next three miles and even slower for the next 5 miles. Speeds were calculated so that a person near the site boundary would still reach the 10 mile radius at the prescribed ETE. For instance if the ETE was 4 hours then the speeds would be 6.8/3.4/1.7 MPH.
4. If an actual site's 0-2 mile traffic control analysis concurred with assumption 3, then staged evacuation is the preferred strategy (e.g., for the 4 hour ETE, an individual starting at the site boundary travels at 6.8 MPH until 2 miles is reached. Thereafter, the individual travels 3.4 MPH for the next 3 miles and 1.7 MPH for the remaining 5 miles). The model predicts this individual receives less overall radiation dose because of the increased speed during the time spent in the area of closest proximity to the radioactive release.
5. Release timing used in NUREG/CR-6953:
 - a. Containment release within 40 minutes (rapidly progressing severe accident) from GE declaration with 6-hour duration.
 - b. Containment release within 3 hours from GE declaration with 10-hour duration.
 - c. Containment release within 40 minutes from GE declaration with 10-hour duration.
 - d. Containment release within 3 hours from GE declaration with 6-hour duration.
6. Evacuation begins 30 minutes from time of warning.

These assumptions are used to support the evaluation methodology starting on the next page.

Evaluation

Step 1: Impact of Staged Evacuation on the 2-Mile Zone

1. List each downwind zone or sector in column 1.
2. In Column 2, list the 90th percentile ETE for the 2 mile zone assuming concurrent evacuation of the 2 mile zone plus the downwind zone.
3. In Column 3, list the 90th percentile ETE for the 2 mile zone.
4. In Column 4, multiply the ETE in Column 3 by 125% (A significant change in ETE is assumed to be a 25% or greater increase).
5. Question 1: Is the time in Column 2 greater than the time in Column 4?
6. If Column 5 is answered yes then answer Column 6 yes.

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
2-5 Mile Sector or Zone Impacted ¹	90 th Percentile ETE for the 2 mile zone for concurrent evacuation of 2 mile zone plus the impacted zone	90 th Percentile ETE for the 2 mile zone	Column 3 x 125%	Question 1 Column 2 > Column 4?	Staged evacuation should be utilized

¹ Zone Impacted is defined as the zone the wind is blowing toward when a PAR decision is made for the General Emergency. If staged evacuation is employed this zone would SIP until 90% of the 0-2 Mile Zone is evacuated.

Evaluation

Step 2: Impact of Staged Evacuation on the 2 to 5 Mile Downwind Zone:

1. List each downwind zone or sector in column 1.
2. In Column 2, list the 90th percentile ETE for the keyhole (2 mile zone + downwind zone to 5 miles) assuming concurrent evacuation of the 2 mile zone plus the downwind zone.
3. In Column 3, list the 90th percentile ETE for the keyhole (2 mile zone + downwind zone to 5 miles) assuming staged evacuation is employed (those in the downwind zone do not begin evacuation until 90% of the 2 mile zone has evacuated).
4. In Column 4, multiply the ETE in Column 2 by 125% (A significant change in ETE is assumed to be 25% or greater increase).
5. If Column 3 is greater than Column 4, answer yes in Column 5 (as the 2 to 5 mile downwind zone is increased by >25% by using staged evacuation).

Table 2. Impact of Staged Evacuation on the 2 to 5 Mile Downwind Zone				
Column 1	Column 2	Column 3	Column 4	Column 5
2-5 Mile Sector or Zone Impacted ²	90 th Percentile ETE for the Keyhole for Concurrent Evacuation	90 th Percentile ETE for Keyhole for Staged Evacuation	Column 2 x 125%	Column 3 > Column 4?

² Zone Impacted is defined as the zone the wind is blowing toward when a PAR decision is made for the General Emergency. If means, for the event the wind is blowing toward this sector such that if staged evacuation is employed this zone or sector would SIP until 90% of the 0-2 Mile Zone is evacuated.

Evaluation

Step 3: Analyzing Results

There are 4 possible outcomes:

1. All rows in Column 6 of Table 1 are answered No and all rows in Column 5 of Table 2 are answered No. This indicates that staged evacuation is not beneficial to the 2-mile radius and staged evacuation does not delay those from 2 to 5 miles by more than 25%. Conclusion – STAGED EVACUATION IS NOT RECOMMENDED.
2. All rows in Column 6 of Table 1 are answered No and some or all rows in Column 5 of Table 2 are answered Yes. This indicates that staged evacuation is not beneficial to the 2-mile radius and staged evacuation does delay those from 2 to 5 miles by more than 25%. Conclusion – STAGED EVACUATION IS NOT RECOMMENDED.
3. Some rows in Column 6 of Table 1 are answered Yes and the corresponding rows (same sectors) in Column 5 of Table 2 are answered No. This indicates that staged evacuation is beneficial to the 2-mile radius and does not delay those from 2 to 5 miles by more than 25%. Conclusion – STAGED EVACUATION IS RECOMMENDED.
4. Some rows in Column 6 of Table 1 are answered Yes and the corresponding rows in Column 5 of Table 2 are answered Yes. This indicates that staged evacuation is beneficial to the 2-mile radius and staged evacuation does delay those from 2 to 5 miles by more than 25%. Conclusion – SITE SPECIFIC DOSE ASSESMENT NEEDED to assess whether the dose benefits to the 2-mile evacuees outweigh the increased dose to those from 2 to 5 miles.

Case Study for an Example Nuclear Power Plant Site

Step 1: Impact of Staged Evacuation on the 2-Mile Zone

1. List each downwind zone or sector in column 1.
2. In Column 2, list the 90th percentile ETE for the 2 mile zone assuming concurrent evacuation of the 2 mile zone plus the downwind zone.
3. In Column 3, list the 90th percentile ETE for the 2 mile zone.
4. In Column 4, multiply the ETE in Column 3 by 125% (A significant change in ETE is assumed to be a 25% or greater increase).
5. Question 1: Is the time in Column 2 greater than the time in Column 4?
6. If Column 5 is answered yes then answer Column 6 yes.

Notes:

- *The ETEs documented below are for Scenario 1 – Summer, midweek, midday, good weather*
- *The ETEs in Column 2 are taken from Table 7-3 of an example ETE Report*
- *The ETE in Column 3 is the ETE for Region R01 (2-mile radius) in Table 7-1 of an example ETE Report.*

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
2-5 Mile Sector or Zone Impacted ³ (wind from)	90 th Percentile ETE for the 2 mile zone for concurrent evacuation of 2 mile zone plus the impacted zone	90 th Percentile ETE for the 2 mile zone for staged evacuation	Column 3 x 125%	Question 1 Column 2 > Column 4?	Staged evacuation should be utilized
R04 (South)	2:35	2:25	3:02	No	No
R05 (SSW, SW)	2:30	2:25	3:02	No	No
R06 (WSW, W)	2:35	2:25	3:02	No	No
R07 (WNW, NW)	2:30	2:25	3:02	No	No

³ Zone Impacted is defined as the zone the wind is blowing toward when a PAR decision is made for the General Emergency. If staged evacuation is employed this zone would SIP until 90% of the 0-2 Mile Zone is evacuated.

R08 (NNW)	2:30	2:25	3:02	No	No
R09 (N)	2:30	2:25	3:02	No	No
R10 (NNE)	2:25	2:25	3:02	No	No
R11 (NE)	2:25	2:25	3:02	No	No
R12 (ENE)	2:25	2:25	3:02	No	No
R13 (E)	2:25	2:25	3:02	No	No
R14 (ESE)	2:25	2:25	3:02	No	No
R15 (SE, SSE)	2:30	2:25	3:02	No	No

Step 2: Impact of Staged Evacuation on the 2 to 5 Mile Downwind Zone

1. List each downwind zone or sector in column 1.
2. In Column 2, list the 90th percentile ETE for the keyhole (2 mile zone + downwind zone to 5 miles) assuming concurrent evacuation of the 2 mile zone plus the downwind zone.
3. In Column 3, list the 90th percentile ETE for the keyhole (2 mile zone + downwind zone to 5 miles) assuming staged evacuation is employed (those in the downwind zone do not begin evacuation until 90% of the 2 mile zone has evacuated).
4. In Column 4, multiply the ETE in Column 2 by 125% (A significant change in ETE is assumed to be a 25% or greater increase).
5. If Column 3 is greater than Column 4, answer yes in Column 5 (as the 2 to 5 mile downwind zone is increased by > 25% using staged evacuation).

Notes:

- *The ETEs documented below are for Scenario 1 – Summer, midweek, midday, good weather*
- *The ETEs in Column 2 are taken from Table 7-1 (Regions R04 through R15) of an example ETE Report*
- *The ETEs in Column 3 are taken from Table 7-1 (Regions R32 through R43) of an example ETE Report*

Column 1	Column 2	Column 3	Column 4	Column 5
2-5 Mile Sector or Zone Impacted ⁴	90 th Percentile ETE for the Keyhole for Concurrent Evacuation	90 th Percentile ETE for Keyhole for Staged Evacuation	Column 2 x 125%	Column 3 > Column 4?
R04 (South)	3:00	3:10	3:45	No
R05 (SSW, SW)	3:00	3:10	3:45	No
R06 (WSW, W)	3:00	3:05	3:45	No
R07 (WNW, NW)	2:55	3:10	3:39	No
R08 (NNW)	2:50	3:15	3:33	No
R09 (N)	2:55	3:35	3:39	No
R10 (NNE)	2:55	3:40	3:39	Yes
R11 (NE)	2:50	3:40	3:33	Yes
R12 (ENE)	2:25	3:05	3:02	Yes
R13 (E)	2:25	2:55	3:02	No
R14 (ESE)	2:25	2:25	3:02	No
R15 (SE, SSE)	3:00	3:05	3:45	No

Step 3: Analyzing Results

All rows in Table 1 are answered No, while some rows in Table 2 are answered Yes. This indicates that the 2-mile region does not benefit from staged evacuation, while the ETE for those evacuees from 2 to 5 miles are increased by > 25% for some scenarios using staged evacuation. Conclusion - STAGED EVACUATION IS NOT RECOMMENDED.

⁴ Zone Impacted is defined as the zone the wind is blowing toward when a PAR decision is made for the General Emergency. If staged evacuation is employed this zone would SIP until 90% of the 0-2 Mile Zone is evacuated.