

## NUCLEAR SECURITY AND INCIDENT RESPONSE

**GUIDELINES FOR THE REVIEW OF UPDATES  
TO EVACUATION TIME ESTIMATES**

REVISION: 0

EFFECTIVE DATE: January 27, 2012

**1.0 PURPOSE**

The purpose of this office procedure is to provide the process for the review of evacuation time estimate (ETE) study updates by the Division of Preparedness and Response (DPR), Office of Nuclear Security and Incident Response (NSIR) staff.

**2.0 APPLICABILITY**

This procedure will be used by NRC staff to review nuclear power reactor licensee updates to ETE studies submitted to the NRC under Section IV to Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR).

**3.0 OBJECTIVES**

The objective of this procedure is to provide guidance for the NRC staff to effectively review the ETE study updates which are required by Section IV, paragraphs 4-7, of Appendix E to 10 CFR Part 50.

**4.0 BACKGROUND**

The purpose of the ETE analysis is to inform protective action recommendations, strategies and decision making in the unlikely event of a significant radiological incident at a nuclear power plant. The ETE analysis also assists in the development of traffic management plans to support an evacuation. The calculated ETE is the number used to assess the effectiveness and efficiency of the evacuation plans. Principal benefits of the ETE are the planning and analysis to help licensees and local governmental authorities formulate well-coordinated evacuation plans.

Requirements for the updating of ETEs are contained in Section IV, paragraphs 4-7, of Appendix E to 10 CFR Part 50, which states, in part, that:

(4) Within 365 days of the later of the date of the availability of the most recent decennial census data from the U.S. Census Bureau or the effective date of the final rule, nuclear power reactor licensees shall develop an ETE analysis using this decennial data and submit it under § 50.4 to the NRC. These licensees shall submit this ETE analysis to the NRC at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.

(5) During the years between decennial censuses, nuclear power reactor licensees shall estimate EPZ [emergency planning zone] permanent resident population changes once a year, but no later than 365 days from the date of the

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previous estimate, using the most recent U.S. Census Bureau annual resident population estimate and State/local government population data, if available. These licensees shall maintain these estimates so that they are available for NRC inspection during the period between decennial censuses and shall submit these estimates to the NRC with any updated ETE analysis.

(6) If at any time during the decennial period, the EPZ permanent resident population increases such that it causes the longest ETE value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ to increase by 25 percent or 30 minutes, whichever is less, from the nuclear power reactor licensee's currently NRC approved or updated ETE, the licensee shall update the ETE analysis to reflect the impact of that population increase. The licensee shall submit the updated ETE analysis to the NRC under § 50.4 no later than 365 days after the licensee's determination that the criteria for updating the ETE have been met and at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.

(7) After an applicant for a combined license under part 52 of this chapter receives its license, the licensee shall conduct at least one review of any changes in the population of its EPZ at least 365 days prior to its scheduled fuel load. The licensee shall estimate EPZ permanent resident population changes using the most recent U.S. Census Bureau annual resident population estimate and State/local government population data, if available. If the EPZ permanent resident population increases such that it causes the longest ETE value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ, to increase by 25 percent or 30 minutes, whichever is less, from the licensee's currently approved ETE, the licensee shall update the ETE analysis to reflect the impact of that population increase. The licensee shall submit the updated ETE analysis to the NRC for review under §50.4 of this chapter no later than 365 days before the licensee's scheduled fuel load.

The publication of NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power plants," established planning standards and evaluation criteria for emergency response plans, including those relating to evacuation. Appendix 4 to NUREG-0654, "Evacuation Time Estimates within the Plume Exposure Pathway Emergency Planning Zone", provided limited guidance on preparing ETE studies.

Concurrently, the NRC published NUREG/CR-1745, "Analysis of Techniques for Estimating

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Evacuation Time for Emergency Planning Zones,” which examined techniques for estimating evacuation times and provided recommendations on how to conduct ETE studies. These recommendations, along with work by FEMA contractors; were subsequently included in Revision 1 to NUREG-0654/FEMA-REP-1 and provided initial guidance on the development of ETE studies.

In March 1992, NUREG/CR-4831, “State of the Art in Evacuation Time Estimate Studies for Nuclear Power Plants,” was published and provided guidance on the relevant information, assumptions, and methods to be used in performing ETE studies. This report discussed both transportation analysis, the primary concern in an ETE study, and other considerations, such as populations with special transportation or housing needs.

As advancements in technologies that support evacuations and evacuation planning continued, NUREG/CR-6863, “Development of Evacuation Time Estimate Studies for Nuclear Power Plants,” was issued in January 2005. This document served as an update to NUREG/CR-4831 by integrating new technologies in traffic management, computer modeling, and communications systems to identify additional tools useful in the development of new, or updates to existing, ETE studies.

NUREG/CR-7002, “Criteria for Development of Evacuation Time Estimate Studies,” provides the most recent guidance on the development of ETE studies and the criteria to determine if an ETE study update should be performed. This document also contains ETE evaluation criteria which will be used by NRC staff to review ETE study updates for completeness.

### 5.0 BASIC REQUIREMENTS

#### 5.1 Document Collection and Initial Screening

1. The ETE Coordinator or designated DPR personnel will ensure, through the NSIR Information Technology Coordinator, that they have access to the resource mailbox [NSIRDPR-ORLT.Resource@nrc.gov](mailto:NSIRDPR-ORLT.Resource@nrc.gov).
2. The ETE Coordinator will regularly monitor the email account (at least weekly) for updates to licensees’ ETE studies.
3. The ETE Coordinator will record all updated studies on the “Updated Evacuation Time Estimate Study Master Review Schedule” for the appropriate Calendar Quarter document in SharePoint.
4. The ETE Coordinator will screen each submittal to determine what guidance was used to develop the ETE study update.

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- a. If the ETE study update was developed with guidance other than that provided in NUREG/CR-7002, notify the Branch Chief, Operating Reactor Licensing for guidance.
- b. If the ETE study update was developed with the guidance contained in NUREG/CR-7002, then proceed to Section 5.2.

**5.2 ETE Study Update Developed with NUREG/CR-7002**

1. If the review is to be performed by DPR staff, proceed to Step 5.2.2; otherwise, proceed to Step 5.2.3 for contractor review actions.
2. For DPR staff reviews of updated ETE studies, the designated reviewer will perform the following:
  - a. Review the updated ETE study using Appendix B to NUREG/CR-7002.
  - b. If there is an issue with missing or incomplete information, discuss with the Branch Chief responsible for licensing activities and applicable NRC regional personnel to obtain clarification.
  - c. Document results of the review by forwarding Attachment 1 and the completed Appendix B of NUREG/CR-7002 to the ETE Coordinator.
    - i. This document should be entered into ADAMS as "non-public" under ADAMS package (containing respective updated ETE study submittal).
3. For contractor supported reviews of updated ETE studies, the ETE Coordinator should perform the following:
  - a. In coordination with the Technical Assistant Project Manager, contact the designated contractor representative to discuss pending reviews and determine an agreed upon completion date(s) per statement of work.
  - b. Transmit ADAMS Accession number(s), highlighting agreed upon completion date(s), to designated contractor representative for ETE studies to be reviewed using Appendix B to NUREG/CR-7002.
  - c. Review the letter received from the designated contractor representative that documents the review findings, and enter it into ADAMS as "non-public" under ADAMS package (containing respective updated ETE study

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submittal).

- i. If the letter identifies outstanding comments, discuss with the Branch Chief responsible for licensing activities and applicable NRC regional personnel to obtain clarification.
  - ii. If the review was complete with no outstanding comments, proceed to next step.
- d. Document results of review in accordance with Section 5.3.
  - e. Update status of review in the SharePoint Master Schedule.

### 5.3 **Documentation of Staff Review**

1. The ETE Coordinator will both document the review in an internal memorandum to the Branch Chief responsible for licensing activities for disposition and enter the memorandum into ADAMS as publicly available / non-sensitive. The memorandum should specify the scope of the review and whether the updated ETE study is in accordance with NRC guidance. In addition, the internal memorandum shall clearly indicate that this review does not constitute formal NRC approval of the changes and the changes would be subject to future NRC inspection in their entirety (Attachment 3). Documentation of this review will also be provided to the cognizant NRC regional Branch Chief for inclusion in the subject licensee's Quarterly Inspection Report.
2. If the ETE study update is determined not to be complete in accordance with NRC guidance, this may reflect a failure to maintain an up-to-date ETE study based on the requirements of Section IV of Appendix E to 10 CFR Part 50, thereby making the issue subject to enforcement. The designated reviewer will conduct the following:
  - i. Discuss apparent inconsistencies between NRC guidance and the licensee's updated ETE study with the respective DPR Headquarters inspection staff and applicable NRC regional personnel.

### 5.4 **Status Reports**

The ETE Coordinator will provide a quarterly report summarizing the results from ETE study update screenings and reviews conducted within the calendar quarter to the Branch Chief responsible for licensing activities and coordinate reporting of

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the results to the Federal Emergency Management Agency (FEMA) Headquarters (Branch Chief, Radiological Emergency Preparedness Program) (Attachment 4).

### 6.0 RESPONSIBILITIES AND AUTHORITIES

NSIR staff conducting ETE study update reviews are responsible for applying this procedure. NSIR staff are also encouraged to suggest improvements to procedures to their management or to the assigned technical contact. The following describes the responsibilities and authorities.

#### 6.1 Branch Chief, DPR/Operating Reactor Licensing

1. Assist in planning, coordinating, and scheduling of required ETE study update reviews.
2. Provide guidance and technical direction for ETE reviews and serves as the management interface between Headquarters staff and the Region.
3. Review and concur on the results from all ETE study update review determinations, and for incomplete reviews, communicate review results to the licensee and request the additional information needed to complete the ETE study update.
4. Review the periodic report of ETE review activity that is prepared by the ETE Coordinator.

#### 6.2 ETE Coordinator

1. The ETE Coordinator will be a certified NRC Contracting Officer Representative (COR) (formerly called Project Manager).
  - i. The ETE Coordinator will serve as the technical interface with the designated contractor, as described in the Statement of Work (SOW) for distribution of work to the contractor, accepting all deliverables from the contractor, reviewing and approving invoices for services, and monitoring the performance of the contractor in the performance of the work defined in the SOW.
2. Identify updates to ETEs submitted by power reactor licensees under 10 CFR 50.4 and track for screening and review by designated DPR personnel.

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3. Review all licensee ETE study update documentation to determine if it is was developed using the guidance in NUREG/CR-7002.
4. Serve as the Project Manager to coordinate ETE study update reviews performed by contractor organizations.
5. Update status of reviews in the SharePoint Master Schedule.
6. Prepare summary and recommendation for each completed review package (whether the reviewer was either NSIR staff or a contractor).
7. Develop periodic status reports and coordinate transmittal of the status reports to FEMA Headquarters on a quarterly basis in accordance with Section 5.4.

### 6.3 Designated Reviewer

1. Perform review for completeness of the assigned updated ETE using Appendix B of NUREG/CR-7002.
2. Request guidance from the Branch Chief as needed.
3. Complete Appendix B of NUREG/CR-7002.
4. Prepare a memorandum to document the result of the review for completeness (Attachment 1).

### 7.4 Regional Branch Chief, Plant Support Branch

1. Coordinate the inclusion of the ETE results into the applicable licensee's Quarterly Inspection Report.
2. Facilitate requests for additional information from licensees as required.

## 7.0 PERFORMANCE MEASURES

This procedure verifies aspects of the Emergency Preparedness Cornerstone for which there are no other indicators to measure performance.

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**8.0 PRIMARY POINTS OF CONTACT**

Joseph D. Anderson, Chief  
DPR/ORLOB  
(301) 415-4114

Michael Norris, Team Leader  
DPR/ORL  
(301) 415-4098

**9.0 RESPONSIBLE ORGANIZATION**

The Operating Reactor Licensing and Outreach Branch, Division of Preparedness and Response, is the responsible organization.

**10.0 EFFECTIVE DATE**

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### 11.0 REFERENCES

- 10 CFR Part 50, Appendix E, Section IV
- Appendix 4 to NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, November 1980
- NUREG/CR-1745, "Analysis of Techniques for Estimating Evacuation Time for Emergency Planning Zones," November 1980
- NUREG/CR-4831 (PNL-776), "State of the Art in Evacuation Time Estimate Studies for Nuclear Power Plants, March 1992"
- NUREG/CR-6863 (SAND2004-5900), "Development of Evacuation Time Estimate Studies for Nuclear Power Plants," January 2005
- NUREG/CR-7002, "Criteria for Development of Evacuation Time Estimate Studies" (TBD)

#### Attachments

1. Template for ETE Reviewer's Conclusions
2. Guidelines for the Review of Updates to ETEs Template
3. ETE Coordinator Recommendations Template
4. Quarterly Report Template

#### DISTRIBUTION:

ACCESSION NO.: ML 112430250

Publicly Available Non-Sensitive

OFFICE	BC: ORLOB/DPR/NSIR	BC: IRIB/DPR/NSIR	BC: NRLB/DPR/NSIR	DD: DPR/NSIR	OGC	BC: AMT/PMDA/NSIR
NAME	J. Anderson	B. Kahler	K. Williams	M. Thaggard	H. Benowitz	C. Raynor for
DATE	9/19/2011	9/20/2011	10/04/2011	11/01/2011	10/17/11	11/08/11

OFFICE	D: PMDA/NSIR	D: DPR/NSIR
NAME	C. Rheaume	R. Lewis
DATE	11/16/11	12/21/11

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**ATTACHMENT 1: Template for ETE Reviewer's Conclusions**

Date:

From: ETE Reviewer

To: ETE Coordinator / Project Manager

Subject: Updated Evacuation Time Estimate, results of review.  
Licensee/ Docket Number

The updated Evacuation Time Estimate submitted by licensee xxxxxx (Docket Number) has been found to be complete. The review was performed using the guidance in NUREG/CR-7002.

This Reviewer recommends that the Updated ETE be found "complete" consistent with the criteria of NUREG/CR-7002.

OR

The updated Evacuation Time Estimate that was submitted by licensee xxxxxx (Docket Number) has been found to be incomplete. Specifically, checklist items xxx, yyy, zzz were found to be incomplete.

These inconsistencies are listed below:

NUREG/ CR 7002 Appendix B	Short description of criterion	Explanation of how the text is "incomplete"

Copies to:

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[illegible]

From 5.1.2 Record the search results on the “Updated Evacuation Time Estimate Study Master Review Schedule” for the appropriate Calendar Quarter document in SharePoint.

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**ATTACHMENT 3 – Template for ETE Coordinator Recommendations**

Date:

From: ETE Coordinator

To: Branch Chief, NSIR/DPR/Operating Reactor Licensing

Subject: Updated Evacuation Time Estimate, results of review of Updated Evacuation Time Estimates, Licensee/ Docket Number

The updated Evacuation Time Estimate submitted by licensee xxxxxx (Docket Number) has been found to be complete. The review was performed using the guidance in NUREG/CR-7002. The Updated Evacuation Time Estimate was found to be complete.

This review does not constitute formal NRC approval.

OR

The updated Evacuation Time Estimate that was submitted by licensee xxxxxx (Docket Number) has been found to be incomplete.

Checklist items xxx, yyy, zzz were found to be incomplete.

Apparent inconsistencies between NRC guidance and the licensee's updated ETE study have been discussed with the respective NSIR Headquarters inspection staff and applicable NRC Regional Branch Chief (name, date).

These inconsistencies are listed below:

Copies to: FEMA/REP, Region BC, ADAMS

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### ATTACHMENT 4: Template for Quarterly Report

Date:

From: Branch Chief, NSIR/DPR/Operating Reactor Licensing

To: Branch Chief, FEMA/Radiological Emergency Preparedness Program

CC: Deputy Director for Emergency Preparedness  
 Branch Chief, Emergency Preparedness, R-I  
 Branch Chief, Emergency Preparedness, R-II  
 Branch Chief, Emergency Preparedness, R-III  
 Branch Chief, Emergency Preparedness, R-IV

Subject: **Quarterly Report of activity related to Updated Evacuation Time Estimates.**

During Q# FYxx, the following Review Activities were recorded for Updated Evacuation Time Estimates.

Updated ETEs received this Quarter: \_\_\_\_\_

Licensee	Docket No	ETE Received (Date)

Updated ETEs in review process this Quarter: \_\_\_\_\_

Licensee	Docket No	ETE Received (Date)	Estimated ETE Review Complete (Date)

Updated ETEs reviews completed this Quarter: \_\_\_\_\_

Licensee	Docket No	ETE Received (Date)	ETE Review Completed (Date)