

**U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR SECURITY AND INCIDENT RESPONSE  
DIVISION OF PREPAREDNESS AND RESPONSE  
EMERGENCY PREPAREDNESS DIRECTORATE**

**STATEMENT OF WORK**

**PROJECT:**                   **Proposed Amendment to Current Project                   JOB CODE: R3137**  
**Entitled: *Review of NUREG-0654,***  
***Supplement 3, "Criteria for Protective Action***  
***Recommendations for Severe Accidents"***

**PROJECT TITLE:    Study of Public Views on Nuclear Power Plant Emergency**  
**Preparedness Protective Actions**

**I.       BACKGROUND**

In July, 2004, Sandia National Laboratories (Sandia), working with the Nuclear Regulatory Commission's (NRC) Emergency Preparedness Directorate (EPD), began a project entitled, "Review of NUREG-0654, Supplement 3, 'Criteria for Protective Action Recommendations for Severe Accidents'" (Job Code: R3137). The objective of this project is to provide an evaluation of the current NRC Protective Action Recommendation (PAR) guidance contained in Supplement 3 to NUREG-0654/FEMA-REP-1 (Supp. 3). (Reference: NRC Form 189, DOE B&R No. 401001140, dated June 28, 2004, and as revised on July 20, 2004.) The "PAR Study", as it has come to be called, resulted from Commission direction that the effectiveness of the NRC's PAR development guidance be reviewed, and that the relative merits of certain protective actions (e.g., evacuation, sheltering-in-place) be studied for a variety of situations.

Studies of severe reactor accidents and their consequences conducted in the early 1990's led NRC staff to conclude that the preferred initial PAR for a severe (core damage) accident is to evacuate promptly, rather than to shelter the population in place (sheltering-in-place). And, as recently as January, 2005, NUREG/CR-6884, "Identification and Analysis of Factors Affecting Emergency Evacuations," Sandia (under contract to the NRC) studied the recent history of large-scale public evacuations in the United States and found that evacuations are effective in protecting public health and safety.

Supp. 3 provides guidance for implementing protective actions through a simplified decision-making process. Following the guidance provided, Supp. 3 would have nuclear power plant (NPP) licensees preferentially recommending evacuation within a 2-mile radius and five miles downwind, in lieu of sheltering, in the case of severe reactor accidents. Licensees have largely accepted this guidance. As an unintended consequence, some licensees now severely restrict the consideration and use of sheltering-in-place as evidenced in the design of initial and follow-up notification forms, and may (as evidenced in one case) entirely preclude the use of sheltering-in-place in their Emergency Plan.

At the same time, 10 CFR 50.47(b)(10) requires that nuclear plant licensees develop a range of PARs (evacuation and sheltering-in-place) for the 10-mile plume exposure Emergency Planning Zone (EPZ). The capability to appropriately provide PAR's to State and local governmental authorities is inspected during NRC-evaluated radiological emergency preparedness biennial exercises, and tracked as a Performance Indicator (PI) within the NRC's Reactor Oversight Process (ROP).

In reviewing the appropriateness of PARs for a variety of situations, the current project is considering:

- Technological advances,
- A spectrum of nuclear plant accidents,
- Improvements in accident progression understanding,
- The "post-9/11 threat environment",
- Improvements in Evacuation Time Estimate (ETE) technologies,
- Additional sheltering and evacuation strategies,
- "Fast breaking" accident scenarios, and
- Improvements in dose projection techniques.

Sandia has focused on the appropriateness of Supp. 3 guidance for preferential evacuation, as compared with modified or enhanced sheltering options. The spectrum of nuclear plant accidents that can result in the need for protective actions to protect the public health and safety is being considered, and a spectrum of frequencies developed, to place in perspective the relative need for each protective action.

Since the inception of this project, an additional consideration has presented itself. NRC staff realizes that public perception plays an important part in our ability to plan and execute protective actions, both that of evacuation and sheltering-in-place. It is believed that public reaction to a Protective Action Determination (PAD) is based on a variety of factors, such as the clarity of the direction, perception of and confidence in Federal, State and local governmental authority, understanding of the hazard, and effectiveness of public information programs.

Evacuation of the public located within the 10-mile EPZ of NPPs, in particular, has received wide and critical attention. Within some segments of the population, the prospect of evacuating even small population centers may be feared and the implications misunderstood, and sheltering-in-place may be contrary to the natural instincts of individuals to move away from the hazard. Further, the perception that evacuation is the only adequate PAR and PAD may degrade public confidence, particularly where high population density and existing transportation infrastructure make public evacuation more challenging.

It is also recognized that public perception and reaction to a PAD within a 10-mile EPZ of an NPP might be different to that of the public-at-large. For instance, those living within a 10-mile EPZ may be better informed than the public-at-large. NRC regulations require that licensees periodically provide written information to this population on emergency preparedness and response. Licensees may also be quite active in providing various forms of "outreach" to the local public and community organizations.

Thus, NRC guidance for PAR development may not fully consider the appropriateness of sheltering and other strategies in response to certain scenarios, and questions have been

raised as to the public's actual response to any protective action direction from governmental authorities. Likely public reaction is an important factor in the consideration of appropriate protective actions. Actual public reaction is an important factor in the overall effectiveness of the emergency response. It is important that a study of public perception and likely response be incorporated into the scope of the current review of Supp. 3.

## **II. OBJECTIVE**

The objective of this study is to determine the likely reaction of the public within NPP EPZs to the direction to take protective action during an NPP emergency. Secondary objectives include survey of the likely reactions of emergency workers, and determination of the effectiveness of protective action messages and public education efforts.

## **III. TASK STATEMENT**

To accomplish the objective in Section II, an extensive multi-site, multi-method study will be undertaken. Methods to be employed include focus groups, telephone surveys and one-on-one interviews. While the study will take into account previous work in this field, it is expected to break new ground in the understanding of public perception, behavior, preferences, concerns and information needs during an emergency at a NPP.

The study, identified in this amendment, is comprised of seven (7) interrelated tasks.

### **Task 1: Review of Existing Literature**

The Contractor shall begin the study with a review of the published scientific literature on emergencies, which have required the public to take protective actions. National and international sources of information will be examined.

Estimated Completion Date: One month after project initiation.

Estimated Level of Effort: To Be Determined by the Contractor and Stated in the Proposal.

### **Task 2: Development of a Research Plan**

Based on the objective of this study and information found in the literature review (Task 1), the Contractor shall develop a detailed research plan designed to support the multi-site, multi-method approach. The plan will fully identify the secondary objectives of the study (referred to in Section II).

As the plan is being developed, it is anticipated that the Contractor will participated in two (2) in-person meetings with NRC decision-makers and subject matter experts. One of the meetings may be publicly observed, and both may involve the participation of the Federal Emergency Management Agency (FEMA) and other governmental agencies.

The goal of the development process will be to identify key constructs, issues and questions the NRC wishes to have explored in the research. The plan will be submitted to the NRC Technical

Reviewer and the Project Manager for review and comment. It is anticipated that the plan will also be forwarded to others within the NRC for review and comment. The NRC Technical Reviewer will collect comments, and forward those accepted to the Contractor for incorporation into the plan.

Estimated Completion Date: Two months after project initiation; final, one month after NRC comments received by the Contractor.

Estimated Level of Effort: To Be Determined by the Contractor and Stated in the Proposal.

### **Task 3: Development of a (Focus Group) Facilitator Guide**

Based on information gained in Tasks 1 and 2, the Contractor shall design a facilitator's guide for use in a series of focus groups to be held throughout the United States in NPP EPZ's. The guide will be tested internally to identify and correct problems with its use and design. The draft guide will be submitted to the NRC Technical Reviewer and the Project Manager for review and comment. It is anticipated that the guide will also be forwarded to others within the NRC for review and comment. The NRC Technical Reviewer will collect comments, and forward those accepted to the Contractor for incorporation into the guide.

Estimated Completion Date: Three months after project initiation; final, one month after NRC comments received by the Contractor.

Estimated Level of Effort: To Be Determined by the Contractor and Stated in the Proposal.

### **Task 4: Conduct of Focus Groups**

Based on information gained in Tasks 1 and 2, and the product developed in Task 3, the Contractor shall conduct a series of at least 10 focus groups. The groups will be comprised of individuals who live within the 10-mile EPZ of an NPP, and will be purposefully diverse (e.g., by age, race, ethnicity, educational background, socioeconomic status). Sites for conduct of focus group activity will be chosen to ensure geographic, population density and governmental system variability. Other activities that are included to support this task are transcription, analysis and report preparation.

The sites, group composition and focus group schedule will be reviewed with the NRC Technical Monitor prior to conduct. The focus group effort will be documented, along with the results, in a technical letter report addressed to the NRC Technical Reviewer, with a copy to the Project Manager.

Note that NRC personnel may be present at any or all of the focus groups.

Estimated Completion Date: Nine months after project initiation.

Estimated Level of Effort: To Be Determined by the Contractor and Stated in the Proposal.

### **Task 5: Planning and Conduct of Telephone Survey**

Based on information gained in Tasks 1, 2 and 4, the Contractor shall develop a telephone survey instrument (questionnaire) and an appropriate sampling methodology and approach to be used in a large-scale (perhaps 0.5%) survey of individuals living within NPP EPZ's. The instrument should allow the Contractor to followup and tap issues identified in the focus groups

described in Task 4. In addition, the sampling approach should ensure that participants are drawn from a wide variety of EPZ's with varying locations and characteristics. Once the instrument and sampling approach have been determined and documented, the telephone survey will be conducted; the data compiled; and, an analysis of the data performed.

Prior to the conduct of the telephone survey, a survey plan will be developed and submitted to the NRC Technical Monitor and the Project Manager in a technical letter report for review and comment. It is anticipated that the plan will also be forwarded to others within the NRC for review and comment. The NRC Technical Reviewer will collect comments, and forward those accepted to the Contractor for incorporation into the plan.

The results of the survey will be documented in a technical letter report addressed to the NRC Technical Reviewer, with a copy to the Project Manager.

Estimated Completion Date: Nine months after project initiation.

Estimated Level of Effort: To Be Determined by the Contractor and Stated in the Proposal.

### **Task 6: Analysis of Public Education and Information Materials**

The Contractor shall examine how people living in NPP EPZ's view related public education and informational materials and messages. First, since the types of materials and content of messages will vary from site to site, materials and message content for each site studied will be identified. To measure individual response to the materials and messages, appropriate questions will be developed and incorporated into the focus group process (Tasks 3 & 4).

To augment information gathered from focus groups, cognitive response testing interviews will also be conducted. These interviews will allow for the identification of terms that are unclear and passages that are difficult to understand.

Information on public education and information materials, gained as a result of the focus groups and interviews, will be gathered, analyzed and summarized. This effort will be documented, along with the results, in a technical letter report addressed to the NRC Technical Reviewer, with a copy to the Project Manager.

Estimated Completion Date: Nine months after project initiation.

Estimated Level of Effort: To Be Determined by the Contractor and Stated in the Proposal.

### **Task 7: Reporting and Dissemination of Findings**

Upon completion of Tasks 1 through 6, the Contractor shall give a series of briefings to NRC staff and management summarizing the findings and discussing their implications. Also included will be recommendations as to how the public information and education materials and messages can be improved.

In addition, the Contractor shall discuss the methodology of the study and report key findings to the broader emergency preparedness and response community by giving papers and presenting at professional conferences, and participating in a select group of interagency meetings. Examples include the FEMA/NRC Steering Committee meeting, the Federal Radiological Preparedness Coordinating Committee (FRPCC), the National Radiological

Emergency Preparedness conference (NREP), and the annual meeting of the National Council on Radiation Protection and Measurements. The Contractor shall also provide support at one or two related public meetings hosted by the NRC.

Estimated Completion Date: 12 months after project initiation.

Estimated Level of Effort: To Be Determined by the Contractor and Stated in the Proposal.

#### **Task 8: Preparation of a Draft NUREG/CR**

The Contractor shall prepare a draft NUREG/CR, and submit it to the NRC Technical Monitor, with a copy to the Project Manager, for review and comment. The Contractor shall incorporate the comments of the NRC Technical Monitor into the draft NUREG/CR, and upon approval of the draft NUREG/CR by the NRC Technical Monitor, the Contractor shall submit the document as a final draft version of the report for further management and staff review. This will be in anticipation of four additional review cycles. It is expected that the NRC will have on average three weeks for each review cycle to comment on the draft document. The Contractor will address each set of comments and re-submit for further review within two weeks of receipt. Upon completion of incorporation of the final set of comments, the Contractor shall prepare a camera-ready NUREG/CR, and submit it to the NRC for publication.

Estimated Completion Date: 15 months after project initiation.

Estimated Level of Effort: To Be Determined by the Contractor and Stated in the Proposal.

#### **Additional Assumptions:**

### **IV. DELIVERABLES**

#### **A. Technical Reporting**

Task 1 - Document literature review.

Estimated Completion Date: One month after project initiation.

Task 2 - Draft research plan for review and comment; final research plan with comments incorporated.

Estimated Completion Date: Draft, two months after project initiation; final, three months after project initiation.

Task 3 - Draft facilitator guide for review and comment; final facilitator guide with comments incorporated.

Estimated Completion Date: Draft, three months after project initiation; final, four months after project initiation.

Task 4 - Technical letter report.

Estimated Completion Date: Nine months after project initiation.

Task 5 - Draft survey plan for review and comment; final survey plan with comments incorporated. Technical letter report.

Estimated Completion Date: Draft, six months after project initiation; final, seven months after project initiation. Technical letter report, nine months after project initiation.

Task 6 - Technical letter report.

Estimated Completion Date: Nine months after project initiation.

Task 7 - Presentations, TBD.

Estimated Completion Date: 12 months after project initiation.

Task 8 - Draft NUREG/CR, incorporation of comments from multiple review cycles, final NUREG/CR.

Estimated Completion Date: 15 months after project initiation.

#### B. Monthly Business Letter Report

The Contractor shall submit a monthly business letter report by the 20<sup>th</sup> of each month to the Project Manager listed in Section VII, with a copy provided to the NRC Technical Monitor. The Contractor shall include the following information, at a minimum, within the report's content:

- Title of Project.
- Job Code.
- Primary Contractor Contact & Contact Information.
- Period of Performance of the Contract.
- Reporting Period.
- List of Tasks Accomplished to Date.
- Tasks Accomplished During the Reporting Period (along with brief descriptions of how these items were accomplished & dates of accomplishment).
- Tasks to be Accomplished During the Upcoming Reporting Period (along with brief descriptions of how & when these items are to be accomplished).
- Monthly Spending, Total Spending to Date, and Remaining Funds.
- Identification of Any Problems or Concerns.\*

\* The Contractor shall bring any administrative or technical difficulties which may affect the schedule or costs of the project to the immediate attention of the NRC Project Manager.

#### C. Submittal of Written Material

All documents mailed from DOE to NRC should have "Addressee Only" on the envelope to keep it from being entered into the NRC's document management system, Agency-wide Documents Access and Management System (ADAMS). Send mail for the addressee and cc's as separate mailings.

#### D. New Standards for Contractors Who Prepare NUREG-Series Manuscripts

The final document, specified in Task 8, will be in the form of a NUREG/CR. All format guidance for NUREG-Series Manuscripts, as specified in NUREG-0650, Revision 2, remains the same with one exception. There is no longer a requirement to include the NUREG-series designator on the bottom of each page of the manuscript. The NRC will assign this designator when the camera-ready copy is sent to the printer and the designator will then be placed on the

cover, the title page and spine. The designator for each report will no longer be assigned when the decision to prepare a publication is made. NRC's Publishing Services Branch will inform the NRC Technical Monitor for the publication of the assigned designator when the final manuscript is sent to the printer.

For the electronic manuscript, prepare the text in WordPerfect 8, and use any of the following file types for tables, charts, spreadsheets, etc.

<u>File Type</u>	<u>File Extension</u>
WordPerfect®	.wpd
Microsoft® PowerPoint®	.ppt
Corel® QuattroPro®	.wb3
Corel® Presentations	.shw
Lotus® 1-2-3	.wk4
Portable Document Format	.pdf

The Contractor will publish the final document on both compact disk and in a bound document (five copies).

## **V. MEETINGS AND TRAVEL REQUIREMENTS**

Frequently and periodically, over the course of this contract, the Contractor and the NRC Technical Monitor will interact (e.g., email, telephone, conference call) to discuss the contract's progress, NRC comments, and the general conduct and content of sub-tasks associated with this contract. It is anticipated that most of the communication between the NRC and the Contractor will be handled in this manner. The following specific meetings and travel are anticipated under this project:

Task 1: One trip (for two) for two days to NRC Headquarters is anticipated to kick-off this project amendment; meet with the NRC Project Manager & Technical Monitor (whose names are provided in Section VII); support the completion of Task 1; and, discuss project requirements and the schedule as a whole.

Tasks 2 & 3: None.

Task 4: Travel will be needed to support participation of the Contractor in at least 10 focus groups at (at least) 10 sites, which will be determined over the course of the conduct of this contract amendment.

Task 5: Travel may be needed to support participation of the Contractor in the development and conduct of the telephone survey.

Task 6: Travel may be needed to support participation of the Contractor in the collection and analysis of public education and information materials.

Task 7: Two trips (for one or two) to support meetings with NRC staff and briefings of NRC management. A minimum of four trips to support interagency meetings and presentations at professional conferences.

Task 8: One trip (for two) for two days to NRC Headquarters is anticipated to close this contract amendment; meet with the NRC Project Manager & Technical Monitor (whose names are provided in Section VII); and, support the completion of Task 8.

The Contractor may propose additional travel deemed necessary for the successful completion of this effort. Over the course of this contract amendment, NRC staff may travel to the Contractor site for meetings. Once the contract has been awarded, the NRC Technical Monitor and Project Manager must approve all additional travel in advance.

## **VI. PERIOD OF PERFORMANCE**

Proposed Period of Performance: August 15, 2005 - November 15, 2006. Note that these periods of performance include completion of the multiple review cycles documented in Section III. No deviation from this schedule is anticipated. Deviation from the established period of performance must be approved by the Project Manager, upon advisement by the NRC Technical Monitor.

## **VII. CONTACT INFORMATION**

### Technical Monitor

R. L. Sullivan  
Sr. Emergency Preparedness Specialist  
Emergency Preparedness Directorate

Phone: 301-415-1123  
Email: [RXS3@nrc.gov](mailto:RXS3@nrc.gov)

### Project Manager

Kathryn M. Brock  
Sr. Emergency Preparedness Specialist / Project Manager  
Emergency Preparedness Directorate

Phone: 301-415-2015  
Email: [KMB@nrc.gov](mailto:KMB@nrc.gov)

## **VIII. NRC FURNISHED MATERIALS**

NRC documents related to this effort.

## **IX. CONTRACTOR-ACQUIRED MATERIAL**

Normally, the purchase of property costing \$500 or more (including Federal Information Processing (FIP) resources) will be approved through issuance of a work order accepting the proposal in which the property is listed. If additional property costing \$500 or more (including FIP resources) is needed after work starts, the Contractor shall request approval of the additional property in writing to the Project Manager. This written request shall be in the form of a revised proposal or a letter.

**X. SUBCONTRACTING/CONSULTANT INFORMATION**

Describe any technical support effort that is proposed to be performed by a subcontractor or consultant. Identify the level of effort, by task, of any proposed subcontractor or consultant and provide an explanation of the need for subcontracting that portion of the effort. For any subcontract or consultant effort, describe the following:

- Necessity of subcontracting,
- Tasks and sub-tasks the subcontractor or consultant will perform,
- Level of effort proposed for the subcontract effort,
- Status and expected time frame for selection, and
- Method of selection of the subcontractor or consultant.

**XI. ORGANIZATIONAL CONFLICT OF INTEREST DISCLOSURE**

Provide descriptions of present/planned/past work for other organizations in the same/similar technical area as the NRC project scope of work, e.g., (included but not limited to), NRC licensees, vendors, industry groups or research institutes that represent or are substantially comprised of nuclear utilities. Provide the name of the organization, dollar value, and period of performance of the work identified.