



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

JAN 01 1985

National Bureau of Standards  
Structures Division  
Building 226, Room B146  
Washington, DC 20234  
ATTN: Dr. Emil Simiu

Dear Dr. Simiu:

Subject: Interagency Agreement No. NRC-03-84-088 Entitled "Review of Tornado Missile Probabilistic Risk Assessment - Limerick, Seabrook, Hope Creek and Oconee Plants"

Effective September 12, 1984, the U. S. Nuclear Regulatory Commission (NRC) and the National Bureau of Standards (NBS) entered into an agreement for a project entitled "Review of Tornado Missile Probabilistic Risk Assessment - Limerick Generating Station and Seabrook Nuclear Power Plant." Inclusion of the Hope Creek and Oconee Plants is now desired.

Accordingly, the parties hereby mutually agree to the following revised terms of the agreement.

Article I - Statement of Work

The National Bureau of Standards will provide services to the Nuclear Regulatory Commission as set forth in Attachment 1, Statement of Work, Modification No. 1.

Article II - Period of Performance

The period of performance is hereby extended from March 31, 1985 through April 30, 1985.

Article III - Estimate of Cost and Obligation of Funds

- A. The estimated cost to the NRC of the work to be performed hereunder is increased by \$59,800.00 from \$54,400.00 to \$114,200.00.
- B. The amount presently obligated by the NRC for the performance of work hereunder is increased by \$59,800.00 from \$54,400.00 to \$114,200.00, chargeable to the following accounting data:

B&R No: 20-19-40-41-3  
FIN: D1310  
APPN No: 31X0200.204 \$54,400.00

8503200189 850227  
PDR CONTR  
NRC-03-84-088 PDR

B&R No: 20-19-10-11-3  
FIN: D1326  
APPN No: 31X0200.205 \$29,900.00

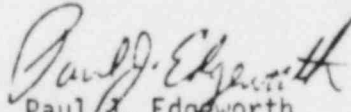
B&R No: 20-19-40-41-3  
FIN: D1310  
APPN No: 31X0200.205 \$29,900.00

Article IV - Technical Direction and Authorized Representatives

Article IV remains unchanged.

Upon receipt of these documents, please execute and return one (1) fully executed copy of this agreement to the undersigned.

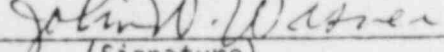
Sincerely,

  
Paul D. Edgeworth  
Contracting Officer

Attachment: Statement of Work

ACCEPTED:

NATIONAL BUREAU OF STANDARDS

By:   
(Signature)  
David B. Skrove, Comptroller  
(Typed Name and Title)

Date: FEB 27 1965

STATEMENT OF WORK  
REVIEW OF TORNADO MISSILE PROBABILISTIC RISK ASSESSMENT  
(LIMERICK, SEABROOK, HOPE CREEK AND OCONEE PLANTS)

I. BACKGROUND

As part of the staff's (Auxiliary Systems Branch) normal licensing review responsibility for OIs, and auxiliary feedwater system (AFWS) evaluation for ORs under IMI-2 Action Plan, NUREG-0737, Item II.E.1.1, the staff compared all safety-related system designs for OIs and auxiliary feedwater system design for ORs against the criteria for tornado missile protection in Standard Review Plan Sections 3.5.1.4 and 3.5.2. Some OL applicants have taken exception to the traditional positive tornado missile protection (barriers) criteria for certain specific safety-related plant features. Certain OL licensees were unable to show proper AFWS safety function following a postulated tornado strike because of unprotected AFWS components. In order to satisfy the staff's concern in this area, these applicants/licensees have elected to demonstrate compliance with tornado missile protection criteria as identified in SRP Section 3.5.1.4 by providing a probabilistic risk assessment (PRA) of tornado missile damage effects on plant safety.

One operating reactor licensee, Oconee Nuclear Station and three OL applicants, Limerick Generating Station, Seabrook Nuclear Power Plant, and Hope Creek Generating Station have made submittals as part of the Final Safety Analysis Report and have chosen to use PRA concerning tornado missile damage that might occur to certain essential plant components as the means for complying with licensing criteria. The complexity of these studies requires assistance from outside agents to review the applicant's submittals and provide a basis for the staff to resolve issues affecting their licensing reviews.

II. OBJECTIVE

To review the applicant's and licensee's submittals and provide an independent assessment of the models and methodology used in the submittals, and the results obtained.

III. WORK REQUIREMENTS

(COMPLETION DATE)

A. The contractor shall review the document entitled, "Limerick Generating Station Ultimate Heat Sink Extreme Wind Hazard Analysis, MUS-4507, March 1984."

2 months after contract award

- B. Prepare a Technical Evaluation Report (TER) which describes the validity and conservatisms of the mathematical approach, assumptions, and data employed in assessing the probability of tornado missile damage to the ultimate heat sink. Include an assessment of the correctness of the results obtained. 1 month after completion of review
- C. The contractor shall review the document entitled "Seabrook Nuclear Power Plant Tornado Missile Analysis, Final Report C569, September 1983." Additionally, the contractor shall review the supplements to this submittal. 3 months after completion of review
- D. Prepare a Technical Evaluation Report (TER) which describes the validity and conservatisms of the mathematical approach, assumptions, and data employed in assessing the probability of tornado missile damage to a specific set of targets. Include an assessment of the correctness of the results obtained. 1 month after completion of review
- E. The contractor shall review the documents entitled, "Huge Creek Generating Station Extreme Event Site Flooding Supplemental Report on Meteorology" dated August 1984 and "An analysis of the effects of wind borne traffic and other floating objects on the Lawrence River affecting the Huge Creek Station in severe storms" dated September 1984. 2 months after contract award
- F. Prepare a Technical Evaluation Report (TER) which describes the validity and conservatisms of the mathematical approach, assumptions, and data employed in assessing the probability of tornado missile damage to the critical equipment required for safe shutdown. Include an assessment of the correctness of the results obtained. 1 month after completion of review
- G. The contractor shall review the documents to be submitted by Duke Power Company for Oconee Station regarding tornado strike probability and probabilistic risk assessments of tornado missiles and their effects on exposed safety-related plant features with respect to the ability to provide steam generator cooling. 1 month after completion of review

1. The contractor shall prepare an evaluation of the validity and conservatisms of the mathematical approach, assumptions, and data employed in assessing the probability of tornado damage to exposed safety-related components. Include an assessment of the correctness of the results obtained. 1 month after completion of review

#### IV. REPORT REQUIREMENTS, TECHNICAL EVALUATION REPORT

The contractor shall prepare a Technical Evaluation Report (TER) describing the results of the review of the above documents. Ten copies of each TER should be provided to the NRC Project Officer.

#### V. BUSINESS LETTER REPORTS

A monthly business letter report will be submitted by the 15th of the month and after completion of each task to the Project Officer with copies provided to the Contracting Officer, the Director, Division of Systems Integration, AITN: S. Boyd and L. Rubenstein, DSI, and M. Kallman, NRR. These reports will identify the title of the project, the FIN, the contract number, the Principal Investigator, the period of performance, and the reporting period and will contain two sections as follows:

##### PROJECT STATUS SECTION

1. A listing of the efforts expended during the period, with dates recorded, or if missed, an explanation provided.
2. Any problems or delays encountered or anticipated and recommendations for resolution.
3. A summary of progress to date.
4. Plans for the next reporting period.

##### FINANCIAL STATUS SECTION

1. Provide the total cost (value) of the Tasks as stated in the contract and the total amount of funds obligated to date.
2. Provide the total amount of funds expended (costed) during the period and cumulative to date as follows:

- 1/ If the recommended resolution involves a contract modification, e.g., change in work requirements, level of effort (costs), or period of performance, a separate letter should be prepared and submitted to the Contracting Officer, DC, with copies provided to the Director, Division of Systems Integration, AITN: S. Boyd and M. Kallman, NRR.

	<u>PERIOD</u>	<u>CUMULATIVE</u>
a. Direct labor		
b. Overhead		
c. ADP Support		
d. Travel		
e. Subcontracts		
f. Equipment and Materials		
TOTAL		(%)2/3/

3. Provide the total amount of funds expended during the period (noted) and cumulative to date for each task, i.e., each plant.

#### VI. MEETINGS AND TRAVEL

Frequency of meetings will be mutually determined after discussion with the National Bureau of Standards. Some local travel is anticipated between Gaithersburg and Bethesda, Maryland. Additionally, travel to sites may be required.

#### VII. PROVISION FOR ADDITIONAL WORK

Should a modification of the work described above, or if it is determined that there is a requirement for additional effort, this agreement may be modified by mutual agreement of the parties as to the scope, resources, and period of performance of such additional work.

#### VIII. LEVEL OF EFFORT AND PERIOD OF PERFORMANCE

The level of effort is estimated at 1.0 staff-year over the two year period.

#### IX. NRC FURNISHED MATERIALS

The documents identified in the work requirements will be furnished upon project initiation.

- 2/ Provide percentage against total funds obligated to date.
- 3/ Cost of licensing nuclear power must be kept by NRC under the license fee program for the purpose of billing the utility for processing the application.

X. KEY PERSONNEL

Because of previous experience with LRC projects and his technical expertise on tornado missile probabilities and damage, it is required that Dr. Emil Simiu be the principal investigator.