UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

JUL 13 2001

Energy Research, Inc.
ATTN: Dr. Moshen Khatib-Rahbar
P. O. Box 2034
Rockville, MD 20847

Dear Dr. Khatib-Rahbar:

SUBJECT: MODIFICATION NO. 1 TO TASK ORDER NO. 5 ENTITLED, "INDEPENDENT EVALUATIONS OF SEVERE ACCIDENT RESEARCH" UNDER CONTRACT NO. NRC-04-97-040

The purpose of this modification is to incorporate the revised Statement of Work (SOW) (ATTACHMENT 1) dated June 6, 2001 from Energy Research, Inc. (ERI) under the subject task order. This revised SOW replaces the SOW previously mailed to ERI with Task Order No. 5.

All other terms and conditions of the subject task order remain unchanged.

Please indicate your acceptance of Modification No. 1 to Task Order No. 5 by having an official, authorized to bind your organization, execute three copies of this document in the space provided and return two copies to the Contract Specialist. You should retain the third copy for your records.

Sincerely,

Mary Mace, Contracting Officer
Contract Management Branch 1
Division of Contracts and
Property Management
Office of Administration

Enclosure:
Revised Statement of Work

ACCEPTED:
Moshen Khatib-Rahbar
NAME
President
TITLE
July 16, 2001
DATE

TEMPLATE-ADM001

ADM02

Contract Number: NRC-04-97-040

Task Order No 5: DIRECT CONTAINMENT HEATING (DCH) BWR ANALYSIS

Principal Investigator: Mohsen Khatib-Rahbar

1. BACKGROUND

The U. S. Nuclear Regulatory Commission (NRC) has undertaken significant research over the last 15 years on the development of a better understanding of High Pressure Melt Ejection (HPME) and Direct Containment Heating (DCH) for Pressurized Water Reactors. However, relatively small amount of work has been performed on this issue with regard to BWR plants. The results of U.S. Individual Plant Examinations (IPEs) show that some of the risk dominant sequences for BWR plants are a result of failure to depressurize the reactor coolant system early in the accident progression (prior to melt formation and vessel failure). Therefore, the assessment of the conditional containment failure probability (CCFP) for BWR containments due to DCH is of key interest in order to ensure that the associated risk is acceptable.

2. OBJECTIVE

The objective of this activity is to review the existing PWR DCH tests and analyses, and to apply a similar approach to determine the conditional containment failure probability for BWRs with Mark I containment. Work on other BWR containments will need to be performed as part of future work orders.

3. DESCRIPTION OF PROPOSED WORK

The work includes the following subtasks:

Subtask 1 Review of PWR Tests and Analysis Methods

ERI staff will perform a review of the the tests and analysis methods used to address the direct containment heating issue for PWR plants. The relevant insights and analyses techniques will be used to formulate the approach to be followed for assessment of the conditional containment failure probability for BWRs with Mark I containment.

Subtask 2 Formulation of the Approach for BWRs with Mark I Containmnet

Based on the work on Subtask 1, ERI will outline an approach to determination of the likelihood of containment failure due to DCH, that will follow an issue decomposition and quantification process similar to those utilized for PWR DCH issue resolution. However, due to the lack of BWR-specific test data, significance reliance will be placed on analyses and calculations using appropriate models and/or computer codes (e.g., MELCOR for determination of initial and boundary conditions, and CONTAIN for calculation of containment loads, etc.).

Subtask 3 Integration of Results and Peer Review

The results of the analyses will be integrated to arrive at the CCFP for BWRs with MARK I containments, that will be documented in a letter report to be submitted to NRC for review. Upon incorporating NRC comments, ERI will conduct a "limited" peer review of the report, using selected members of the original DCH peer review panel, in order to assess the adequacy and robustness of the finding. ERI will address the peer reviewers comments, and when appropriate, will incorporate changes into the final version of the report to be submitted to the NRC.

4. REPORTS

In addition to monthly progress report, for each task, a letter report documenting the analyses and the conclusions regarding the conditional containment failure probability due to DCH in BWRs with MARK I containment will be prepared and submitted to NRC for review and comments. Based on NRC comments, the revised report will be subjected to a limited peer review. Based on the peer reviewers comments, a final report will be prepared and submitted to the NRC.

5. PERIOD OF PERFORMANCE

12 months from the effective date of this task order

6. GOVERNMENT FURNISHED MATERIALS

The latest version of the various computer codes (e.g., TCE, MELCOR, CONTAIN), and reports containing the results of various test and analyses for PWR DCH issue resolution.

7. TRAVEL

Only local travel is anticipated for ERI personnel.

8. PROFESSIONAL PERSONNEL

The following staff and consultants will be involved in the performance of the present task order:

Dr. M. Khatib-Rahbar, Principal Investigator
Mr. M. Zavisca, ERI Staff
Dr. I. Kim, ERI
Dr. H. Esmaili, ERI Staff
Dr. F. Moody, Consultant (Peer Reviewer)
Dr. S. Levy, Consultant (Peer Reviewer)

These individuals are all experienced in all aspects of the proposed work order.

9. PRESENT AND FORMER NRC EMPLOYEES

None.