AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
	1 | 2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
Two (2)	7-13-89	RES-88-092 dtd 4/13/89	

6. ISSUED BY — CODE

U.S. Nuclear Regulatory Commission
Division of Contracts & Property Management
Washington, D.C. 20555

7. ADMINISTERED BY (If other than Item 6) — CODE

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)

MPR Associates, Inc.
1050 Connecticut Avenue, N.W.
Washington, D.C. 20036

(X) 9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

10A. MODIFICATION OF CONTRACT/ORDER NO.

X NRC-04-88-092

10B. DATED (SEE ITEM 13)
1/1/88

CODE — FACILITY CODE

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

B&R No. 9-60-19-20-010 FIN No.: D20839 APPN. No.: 31X0200.609 Obligated: $50,000.00

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(X) A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

X FAR 52.243-2 Changes - Cost Reimbursement

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).

C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 2 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

See attached.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)
DOUGLAS M. CHAPIN PRINCIPAL OFFICER	Paul J. Edgeworth

15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
Douglas M Chapin (Signature of person authorized to sign)	7/20/89	BY Paul J. Edgeworth (Signature of Contracting Officer)	7/13/89

NSN 7540-01-152-8070
PREVIOUS EDITION UNUSABLE 8-21

30-105

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

This modification is issued to provide the following within scope change, extend the period of performance, revise the indirect rate, add $50,000.00 of incremental funding to the contract, and to increase the ceiling by $200,000.00. Accordingly, the contract is hereby modified as follows:

1. Paragraph a and c of Section B.2, Consideration and Obligation, are revised to read as follows:

"a. It is estimated that the total cost to the Government for full performance of this contract will be $1,045,648.00 of which the sum of $950,590.00 represents the estimated reimbursable costs, and of which $95,058.00 represents the fixed fee."

"c. The amount presently obligated by the Government with respect to this contract is $650,000.00."

2. Revise subparagraph a of G.1, Indirect Rates to read as follows:

"a. Pending the establishment of final indirect rates which shall be negotiated based on audit of actual costs, the Contractor shall be reimbursed for allowable indirect costs as follows:

CATEGORY	RATE(%)	COST BASE	APPLICABLE PERIOD
Overhead	78.78	direct labor	1/1/88 through ~~5/16/89~~ 12/31/88
	80.62	direct labor	~~5/17/89~~ 1/1/89 through ~~12/31/91~~" 12/31/89

DMC 7/21/89 BJL/NRC

3. Revise Section F.4, Duration of Contract Period, to read as follows:

"This contract shall commence on 1/1/88 and will expire on 12/31/91."

4. Section J is revised to delete Attachment 4 and replace with the attached revised Attachment 4 entitled, "Statement of Work - Revision 1". Work under this contract shall be performed in accordance with the attached revised Attachment A and the contractor's technical proposal dated May 17, 1989, incorporated herein by reference.

All other terms and conditions remain the same.

STATEMENT OF WORK FOR MPR ASSISTANCE TO NRC-RES FOR PERIOD JANUARY 1, 1988 THROUGH DECEMBER 31, 1991

Statement of Task and Objective

This task consists of assisting NRC-RES in planning and implementing reactor safety research, with particular emphasis on the 2D/3D International Cooperative Program on Three-Dimensional Effects During Refill and Reflood (2D/3D Program), which is being undertaken as a joint effort by the German, Japanese, and United States Governments. The objective of this task is to ensure that suitable engineering and technical planning continue to be provided to NRC-RES research activities in the following areas:

- Facilities
- Instrumentation
- International Interaction and Cooperation
- Test Conditions
- Test Data Evaluation
- Computer Analyses of Tests and Nuclear Power Plants

As such, this task supports the overall objective that NRC-RES research should satisfactorily support the regulatory function of the NRC.

Background

NRC participation in the 2D/3D Program dates back to 1977, although a formal agreement between the three countries has existed only since April, 1980. The main purpose of the 2D/3D Program is to investigate the thermal-hydraulic behavior which occurs during the refill and reflood stages of a large break loss-of-coolant accident (LOCA) in a pressurized water reactor (PWR). Particular emphasis in this program is given to the two- and three-dimensional flows in the primary system and to the steam/water flow patterns and flow behavior in large-scale test facilities. These features were identified before the outset of the program as being the most significant contributors to uncertainty in calculating LOCA refill/reflood performance. As such, the 2D/3D Program includes some of the largest scale LOCA thermal-hydraulic test facilities ever constructed.

At the inception of the 2D/3D Program, the cooperative approach among three countries was identified as the optimum way for the NRC to obtain the needed data in this area. The data from the program are shared among

the three countries, which avoids unnecessary duplication of effort. There is no exchange of funds between the three countries; instead a "contributory" approach was developed where the three participants make roughly equal technical contributions to the program and all share the resultant data. The key contributions from the participants are:

- German -- Construction and Operation of Upper Plenum Test Facility (UPTF)

- Japan -- Construction and Operation of Cylindrical Core Test Facility (CCTF) and Slab Core Test Facility (SCTF)

- US -- Provision of Advanced Two-phase Flow Instruments to CCTF, SCTF and UPTF, and provision of analysis services using the Transient Reactor Analysis Code (TRAC)

The USNRC contribution to the 2D/3D Program has a total cost on the order of $85 million. The Japanese contribution is of a similar order; however, the German contribution is considerably higher, on the order of $130 million. At this time, CCTF testing (two major series) and SCTF testing (three major series) are both complete. UPTF testing is underway. All USNRC instrumentation has been delivered and installed in CCTF, SCTF and UPTF. TRAC analyses of many CCTF, SCTF tests and UPTF have been performed, and further analyses of experiments are planned.

Since the inception of the 2D/3D Program in 1977, the contractor has provided technical assistance to NRC-RES. A significant portion of this assistance has been in the planning and design requirements for the three test facilities and the advanced instrumentation. As the facilities have been constructed and moved into testing, a significant level of the contractor's effort has shifted into the areas of test planning, analysis planning and review, and test facility/instrumentation problem review. Further, as major test series are completed, the contractor has been extensively involved in data review and evaluation, and preparation of the formal reports documenting and interpreting the test results.

Detailed Scope

During the period January 1, 1988 to December 31, 1991, the MPR assistance to NRC-RES will cover the following tasks:

1. Evaluate instruments installed in test facilities used in NRC-RES programs and follow-up on problems encountered with the instruments in these facilities. For example, the contractor coordinated the technical response to several instrument problems recently experienced in UPTF, and is currently working on documenting the lessons learned from those problems in a formal report. The estimated effort on this task is six man-months.

2. Develop design and measurement requirements for experimental facilities and for possible modifications or further uses of experimental facilities. An example of this is CCTF, which has been "mothballed" by Japan. The Japanese have sought out USNRC interest in further applications of CCTF. A second example is UPTF, which was modified during 1981-82 to accommodate small-break LOCA tests. Additional work evaluating changes or additions to programs is likely during the next three years. The estimated effort on this task is three man-months.

3. Prepare and follow-up specifications for development, design, fabrication and installation of test instrumentation for experimental facilities. In addition, evaluate the suitability of existing instruments for new types of tests or evaluate modifications to instruments if existing instruments are not suitable. These instruments are mostly advanced two-phase flow instruments and include gamma densitometers, turbine flowmeters, drag disks, conductivity and optical probes. The estimated effort on this task is three man-months.

4. Review facility designs and design changes developed by other U.S. and foreign participants and coordinate design changes to assure that the desired program objectives are met. The estimated effort on this task is three man-months.

5. Help prepare minutes of the 2D/3D Program Meetings and other NRC/RES technical meetings, and investigate technical issues brought forth in these meetings. These meetings include two "2D/3D Coordination Meetings" each year as well as three-to-five 2D/3D technical specialists meetings each year to discuss and resolve specific program issues. The estimated effort on this task is six man-months.

6. Visit both U.S. contractor sites and foreign test facility and manufacturing sites to help resolve specific problem which develop in facility or component design and manufacture. The estimated effort on this task is six man-months.

7. Coordinate test planning, particularly for UPTF, including definition of key test parameters, based on analytical studies and results of previous tests. The estimated effort on this task is 20 man-months.

8. Review data from tests selected by NRC to evaluate specific reactor safety technical issues. A recent example is a special technical evaluation of a Japanese "best-estimate condition" reflood test, which showed some different behavior than previous "licensing condition" reflood tests. The estimated effort on this task is six man-months.

9. Prepare Research Information Reports for major tests and/or series completed in the 2D/3D Program. These reports are to describe the research performed, interpret the results and summarize the major potential applications of the results to the regulation of U.S. nuclear power plants. The preparation of each one of these reports is a major effort involving reviewing, summarizing, and interpreting the applicable test data. In the period January 1, 1988 through December 31, 1991, one of these reports is to be prepared for the SCTF-III test series and several (3 or 4) are to be prepared covering the different types of tests performed in UPTF. The estimated effort on this task is 44 man-months.

10. Review key inputs and assumptions in computer code analyses of PWRs and of tests. This task is needed to assure a careful planning of computer code analyses before expensive calculations are undertaken. The estimated effort on this task is three man-months.

11. Coordinate the preparation of a 2D/3D Program Summary Report. The intent of this report is to organize all of the facilities, tests and analyses with the 2D/3D Program and to summarize the major findings and conclusions from the 2D/3D Program with regard to key reactor safety issues. The coordination of this report by MPR involves: (a) preparing approximately 1/3 of the sections of the report and resolving comments on these sections generated by other 2D/3D Program participants; (b) reviewing sections of the report prepared by others (principally LANL, FRG and JAERI), documenting our comments, and discussing these comments during the resolution phase; (c) incorporating and editing all of the report sections into a single report suitable for publication by NRC-RES. The estimated effort on this task is 16 man-months.

Reporting Requirements

1. Monthly Progress Report

   A monthly progress report shall be submitted each month within two weeks after the end of the preceding month. One copy of the progress report shall be attached to the invoice submitted to the Contracting Officer.

2. Letter Reports

   a. Upon completion of each task, a letter report shall be submitted except for those tasks covered under Item 3 below. This report shall include the objective of the task, method of investigation, discussion of the results, and the conclusion. One (1) copy of this report shall be delivered to the Project Officer and one (1) copy to the Contracting Officer within two weeks after the completion of each task. Other copies shall be distributed as directed by the Project Officer.

b. As appropriate to the performance of each task, meetings will be held with NRC-RES personnel to report progress on the work being performed. The meetings will be held at NRC Headquarters on an as required basis. The time and date for each meeting shall be mutually agreed upon between the contractor and the NRC.

3. Extensive Reports

For the tasks outlined in Items 9 and 11 in the statement of work, extensive reports shall be submitted. The reports shall contain enough details to satisfy the objectives outlined in Items 9 and 11. The delivery date for these reports shall be mutually agreed upon between the contractor and NRC. One(1) copy of these reports shall be delivered to the Project Officer and one(1) copy to the Contracting Officer. Other copies shall be distributed as directed by the Project Officer.

Expected Trips and Meetings

NRC-RES research activities and specifically the 2D/3D Program have shown that several trips and meetings per year are normally required to accomplish the tasks above. With the exception of the semi-annual "2D/3D Coordination Meeting," these trips and meetings are in response to specific program needs which evolve. It is very difficult to estimate the number and locations of these trips and meetings. However, based on experience the following general estimate is given:

1. Trips to US Laboratories or NRC-RES Contractor/Subcontractor Sites -- These trips are typically one-to-three-day trips covering special technical meetings and/or tests. Past examples of sites covered by these trips include: Idaho National Engineering Laboratory (INEL); Los Alamos National Laboratory (LANL); Oak Ridge National Laboratory (ORNL); Sandia National Laboratory (SNL); Massachusetts Institute of Technology (MIT); Eaton Corporation; Flow Technology, Inc.; Westinghouse Electric Corporation-Pittsburgh; Babcock & Wilcox-Alliance; and General Electric Company-Lynn. Many of these trips involve two persons traveling together. If each individual traveling is counted as a separate "trip", it is estimated that there will be a total of about 25 of these trips during the period January 1, 1988 - December 31, 1991.

2. Trips to Foreign Organizations or Test Sites -- These trips are typically one week trips covering major program meetings or special technical issues and/or tests. Past examples of sites covered by these trips include: Japan Atomic Energy Research Institute (JAERI)-Tokai and Tokyo, Japan; Gesellschaft fur Reaktorsicherheit (GRS)-Cologne and Munich, FRG; Kraftwerk Union (KWU)-Erlangen, Karlstein and Mannheim, FRG; Technical University of Hannover-Hannover, FRG; GHH Co.-FRG; and Voest Co.-Linz, Austria. Many of these trips involve two persons traveling together. If each

individual traveling is counted as a separate "trip", it is estimated that there will be a total of about 10 of these trips during the period January 1, 1988 - December 31, 1991.