



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

107079

JAN 14 2002

Purdue Research Foundation  
 ATTN: Mr. Thomas B. Wright  
 1063 Hovde Hall  
 West Lafayette, IN 47907-1063

SUBJECT: MODIFICATION NO. 10 TO TASK ORDER NO. 5  
 UNDER CONTRACT NO. NRC-04-97-046

Dear Mr. Wright:

This letter definitizes Modification No. 10 to Task Order No. 5. Accordingly, this task order modification shall be performed in accordance with the attached Statement of Work and in accordance with the contractor's technical proposal dated January 8, 2002, which increases the ceiling amount by \$120,406 from \$571,160 to \$691,566 and the obligated amount by \$120,000 from \$566,910 to \$686,910. The task order is hereby modified as follows:

The total estimated cost for full performance of Task Order #5 is \$691,566 with a period of performance of January 14, 1998 through November 30, 2002. Funds in the amount of \$120,000 are being obligated for performance of this modification which hereby increases the obligated amount. The Contractor shall not incur costs for this task order which exceed the cumulative obligated amount of \$686,910.

Accounting Data for Task Order No. 5, Modification No. 10, are as follows:

B&R No.: 26015110205  
 APPN No.: 31X0200.260  
 Job Code: W6749  
 BOC: 252A  
 RES ID: RES-C02-346  
 Obligated Amount of this Action: \$120,000

A summary of obligation under this task order, from the date of award through this modification are provided below:

05 FEB 55 63:31  
 RECEIVED  
 Total FY 98 NRC Obligations: \$151,960  
 Total FY 99 NRC Obligations: \$145,000  
 Total FY 00 NRC Obligations: \$149,950  
 Total FY 01 NRC Obligations: \$120,000  
 Total FY 02 NRC Obligations: \$120,000  
 Cumulative Obligations: \$686,910

This modification obligates FY 02 funds in the amount of \$120,000

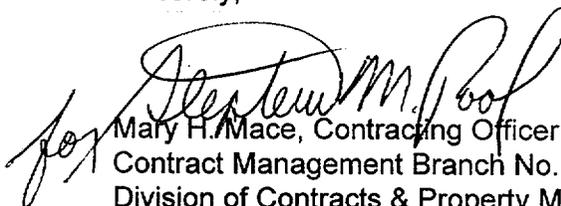
All other terms and conditions remain unchanged.

Please indicate your acceptance of this task order modification by having an official, authorized to bind your organization, execute three(3) copies of this document in the space provided and return two(2) copies to Deborah Neff, Contract Specialist, at the address listed below. You should retain the third copy for your records.

U.S. Nuclear Regulatory Commission  
Division of Contracts & Property Management  
Mail Stop T-7-I-2  
Washington, DC 20555

If you have any questions concerning this action, please contact Ms. Neff at 301-415-8160.

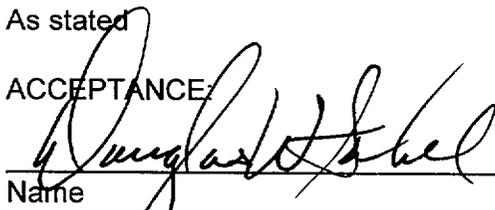
Sincerely,



Mary H. Mace, Contracting Officer  
Contract Management Branch No. 1  
Division of Contracts & Property Management  
Office of Administration

Enclosure:  
As stated

ACCEPTANCE:



Name

**Douglas W. Sabel, Director**  
**University Contracting Group**

Title

JAN 24 2002

Date

Modification (No.10) to the Statement of Work of Task Order #5, "Subcooled Boiling at Low Pressures," under Contract # NRC-04-97-046 and Job Code W6749, "Thermal-Hydraulic Research"

**Additional Work Requirements (1/16/02 - 11/30/02)**

Revise Task 7 as described below, and continue Task 8 for this performance period.

**Task 7. Perform 9-Rod Bundle Tests and Develop Models**

This task performs at least 90 tests in the 9-rod (3x3 electrically-heated rods with 36" uniformly-heated length) rod bundle, which was designed and constructed under Task 5. Measurements for each test include wall heat flux, wall superheat, single-phase and two-phase heat transfer coefficients, liquid temperature profile, onset of nucleate boiling, onset of significant voids, bubble diameter at departure, bubble release frequency, number density of nucleation sites, void fraction, pressure, and mass flow rate in the bundle.

Test conditions will cover a broad spectrum of key parameters - pressure in the range of 1 to 5 bars (1 bar = 14.5 psia), mass flux in the range of 100 to 1000 kg/m<sup>2</sup>s, fluid subcooling at bundle inlet in the range of 0 to 50 °C, heater rod wall heat flux in the range of 0.5 to 35 W/cm<sup>2</sup>, and boron concentration up to at least 5000 ppm.

Based on the data obtained (including any other relevant data available in the literature), analytical models and correlations on wall heat transfer partitioning, interfacial heat transfer, and interfacial friction will be developed for subcooled boiling at low pressure. Perform additional experiments if necessary.

Complete a NUREG/CR report to discuss the models and correlations developed for subcooled flow boiling at low pressure; comparison with other relevant models/correlations in the literature should also be included in the report. Provide electronically to NRC all the test data in the NRC databank format. Prepare a draft report by September 7, 2002, and send it to NRC for review and comments. Complete the final NUREG/CR report by October 15, 2002.

Estimated Level of Effort: 11.5 staff-months (for this performance period)

Estimated Completion Date: October 15, 2002 (new date)

**Task 8. Provide Technical Support**

This task provides technical support in terms of attending meetings, making presentations, reviewing technical reports, and conducting additional tests as requested by the NRC Technical Monitor.

Estimated Level of Effort: 0.5 staff-month (for this performance period)

Estimated Completion Date: November 30, 2002 (new date)

**Meetings and Travel:**

The contractor will attend two meetings at the NRC office in Rockville, Maryland. For planning purpose, each meeting will involve one person for a day. The contractor will also be allowed to attend a domestic technical meeting sponsored by ANS, ASME, or other national organizations. However, any travel must be approved in advance by the NRC Technical Monitor.