



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

006390

NOV 21 2001

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

Dear Mr. Wright:

SUBJECT: MODIFICATION NO. 9 TO TASK ORDER NO. 5  
UNDER CONTRACT NO. NRC-04-97-046

This letter definitizes Modification No. 9 to Task Order No. 5. This modification extends the period of performance, at no additional cost to the Government, through January 15, 2002. Accordingly, the period of performance for Task Order No. 5 is from 01/14/98 through 01/15/02. Also, this task order shall be performed in accordance with the enclosed, modified pages of the Statement of Work that include new, estimated completion dates for Tasks 7 and 8 under this effort.

The Contractor shall not incur costs for this task order which exceed the obligated amount of \$566,910. **All other terms and conditions, including the ceiling of \$571,160, remain unchanged.** No FY02 funds are obligated with this modification.

Please indicate your acceptance of Modification No. 9 to Task Order No. 5 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 the Contract Specialist, Ms. Amy Siller, at the address listed below. You should retain the third copy for your records.

U.S. Nuclear Regulatory Commission  
ADM/DCPM/CMB1, Mail Stop T-7-I-2  
Washington, DC 20555

If you have any questions concerning this action, please contact Ms. Siller at (301) 415-6747.

Sincerely,



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

Enclosure:  
As stated

NOV 28 2001

ADM 02

TEMPLATE-ADM 001

ACCEPTED: MODIFICATION NO. 9 TO TASK ORDER NO. 5



NAME

**Eric E. Fulkerson**  
**Sr. Contract Manager**

TITLE

NOV 28 2001

DATE

Modification (No.9) 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 (12/1/00 - 1/15/02)**

This is a no-cost extension to extend the estimated completion dates of the following Tasks 7 and 8 to January 15, 2002.

**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, and heater rod wall heat flux in the range of 0.5 to 35 W/cm<sup>2</sup>.

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.

Prepare a letter 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.

Estimated Level of Effort: 19.5 staff-months (for this performance period)

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