

ORDER FOR SUPPLIES OR SERVICES

IMPORTANT: Mark all packages and papers with contract and/or order numbers.

BPA NO.

1. DATE OF ORDER SEP 29 2015		2. CONTRACT NO. (if any) NRC-04-04-065		6. SHIP TO:	
3. ORDER NO. T006		MODIFICATION NO.		a. NAME OF CONSIGNEE U.S. Nuclear Regulatory Commission ATTN: Michael B. Rubin	
4. REQUISITION REFERENCE NO. RES-04-065 DTD, 6/14		5. ISSUING OFFICE (Address correspondence to) U.S. Nuclear Regulatory Commission Division of Contracts Mail Stop: T-7-I-2 Contract Management Branch 2 Washington, DC 20555		b. STREET ADDRESS M/S: T-10K8	
7. TO:		c. CITY Washington		d. STATE DC	e. ZIP CODE 20555
a. NAME OF CONTRACTOR INFORMATION SYSTEMS LABORATORIES		b. COMPANY NAME		8. TYPE OF ORDER	
c. STREET ADDRESS 11140 ROCKVILLE PIKE STE 500		e. STATE MD		f. ZIP CODE 208522310	
9. ACCOUNTING AND APPROPRIATION DATA See Attached Pages 2-3		10. REQUISITIONING OFFICE RES Office of Nuclear Regulatory Research		<input type="checkbox"/> a. PURCHASE <input checked="" type="checkbox"/> b. DELIVERY <small>Reference your _____ Please furnish the following on the terms and conditions specified on both sides of this order and on the attached sheet, if any, including delivery as indicated.</small> <small>Except for billing instructions on the reverse, this delivery/task order is subject to instructions contained on this side only of this form and is issued subject to the terms and conditions of the above-numbered contract.</small>	

11. BUSINESS CLASSIFICATION (Check appropriate box(es))				12. F.O.B. POINT N/A	
<input type="checkbox"/> a. SMALL	<input checked="" type="checkbox"/> b. OTHER THAN SMALL	<input type="checkbox"/> c. DISADVANTAGED	<input type="checkbox"/> g. SERVICE-DISABLED VETERAN-OWNED		
<input type="checkbox"/> d. WOMEN-OWNED	<input type="checkbox"/> e. HUBZone	<input type="checkbox"/> f. EMERGING SMALL BUSINESS			
13. PLACE OF		14. GOVERNMENT B/L NO.		15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date)	
a. INSPECTION	b. ACCEPTANCE			16. DISCOUNT TERMS N/A	

17. SCHEDULE (See reverse for Rejections)

ITEM NO. (A)	SUPPLIES OR SERVICES (B)	QUANTITY ORDERED (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)	QUANTITY ACCEPTED (G)
	<p>SEE ATTACHED PAGES 2-3 FOR DESCRIPTION OF TASK ORDER NO. 006 UNDER NRC-04-04-065</p> <p>Title: TRACE Developmental Assessment Phase 2</p> <p>Period of Performance: Date of Award through the following 12 months</p> <p>Reimbursable Costs: \$211,380 Fixed Fee: \$16,456 Total Costs and Fee: \$227,836</p> <p>This task order is incrementally funded in the total amount of \$132,000.00</p> <p>Contractor Signature Required on Page 3 of 3</p>					

SEE BILLING INSTRUCTIONS ON REVERSE	18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.		17(h) TOTAL (Cont. pages) 17(i) GRAND TOTAL
	21. MAIL INVOICE TO:						
	a. NAME U.S. Nuclear Regulatory Commission Div. of Contracts, Mail Stop: T-7-I-2						
	b. STREET ADDRESS (or P.O. Box) ATTN: NRC-04-04-065, Task Order No. 006						
c. CITY Washington		d. STATE DC	e. ZIP CODE 20555		23. NAME (Typed) Stephen M. Pool Contracting Officer TITLE: CONTRACTING/ORDERING OFFICER		
22. UNITED STATES OF AMERICA BY (Signature) 							

In accordance with Section G.5, Task Order Procedures, of contract number NRC-04-04-065, this definitizes Task Order No. 006. The effort shall be performed in accordance with the enclosed Statement of Work.

Task Order No. 006 shall be in effect from date of award through the following 12 months with a cost ceiling of \$227,836. The amount of \$211,380 represents the estimated reimbursable costs, and the amount of \$16,456 represents the fixed fee.

Incremental funds in the amount of \$132,000 are being obligated under this task order. The obligated amount shall, at no time, exceed the task order ceiling. When and if the amount(s) paid and payable to the Contractor hereunder shall equal the obligated amount, the Contractor shall not be obligated to continue performance of the work unless and until the Contracting Officer shall increase the amount obligated with respect to this task order. Any work undertaken by the Contractor in excess of the obligated amount specified above is done so at the Contractor's sole risk.

Accounting and Appropriation Data for this task order is as shown below.

B&R No.: 56015111205 - RES-C05-433***
Job Code: Y6674
BOC: 252A
Appropriation No.: 31X0200.560
Amount: \$32,000

B&R No.: 5606011A710 - RES-C05-435***
Job Code: F6241
BOC: 252A
Appropriation No.: 31X0200.560
Amount: \$19,978

B&R No.: 5606011A710 - RES-C05-436***
Job Code: F6242
BOC: 252A
Appropriation No.: 31X0200.560
Amount: 26,000

B&R No.: 5606011A710 - RES-C05-437***
Job Code: F6246
BOC: 252A
Appropriation No.: 31X0200.560
Amount: \$25,000

B&R No.: 5606011A710 - RES-C05-438***
Job Code: F6244
BOC: 252A
Appropriation No.: 31X0200.560
Amount: \$10,082

B&R No.: 5606011A710 - RES-C05-439***
Job Code: F6245
BOC: 252A
Appropriation No.: 31X0200.560
Amount: \$18,940

The following individual is considered to be essential to the successful performance for work hereunder: V. Palazvo. The Contractor agrees that such personnel shall not be removed from the effort under the task order without compliance with Contract Clause H.4, Key Personnel.

The issuance of this task order does not amend any terms or conditions of the subject contract.

Your contacts during the course of this task order are:

Technical Matters: Michael Rubin
Project Officer
(301) 415-6769

Contractual Matters: Rachel Glaros
Contract Specialist
(301) 415-0115

Acceptance of Task Order No. 006 should be made 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.

ACCEPTED: Task Order No. 006

NAME


V. P.

TITLE

9/23/05

DATE

**STATEMENT OF WORK
NRC-04-04-065
Task Order No. 006**

TITLE: TRACE Developmental Assessment Phase 2

I. BACKGROUND

The NRC consolidated its existing suite of thermal hydraulic safety analysis codes (RELAP5, TRAC-PWR, TRAC-BWR, and RAMONA) into a single code called TRACE in order to reduce code maintenance and improvement costs. As models in the TRACE code are improved, the code must be checked out against analytic solutions for simple problems as well as assessed against a variety of test data to provide guidance for the predictive capability of the code. The assessment work to be done under this project is a part of the overall assessment needed for the code developers to understand how the code performs.

II. OBJECTIVE OF PROPOSED WORK

The objective of this task order is to assess the TRACE code against analytic solutions for simple problems as well as against a variety of test data to provide guidance for the predictive capability of the code.

III. SCOPE OF WORK

Task 1. Review of Assessment Matrix

The contractor shall review the proposed assessment matrix, as shown below, to determine the best assessment matrix, in consultation with the NRC, among the fundamental processes and the separate and integral effect tests.

Assessment Types	Process Definitions	Process Characteristics
Fundamental Processes	1D radial conduction	basic
	2D radial + axial conduction	basic
	1D drain + fill	basic
	U-tube manometer	basic
	vertical flow pattern map	flow pattern
	horizontal flow pattern map	flow pattern
	single phase wall friction	pressure drop
	two phase wall friction	pressure drop
	CISE adiabatic tube	interfacial drag
	Separate Effect Tests	CCFL at Bankoff perforated plate

	BWR GOTA Test 27	radiation heat transfer
	PWR component test MIT ST4	pressurizer
Integral Effect Tests	Semiscale Test S-NH-1(rerun)	natural circulation
	Semiscale Test S-NH-2(rerun)	natural circulation
	Semiscale Test N-NC-01	natural circulation
	Semiscale Test S-NC-02	natural circulation

Estimated Level of Effort: 1 staff-month (Sr. Engr. 50%, Engr. 50%)
Estimated Completion Date: 2 months after task order award on the date established by the NRC Technical Monitor

Task 2. Identification of Figures of Merit for Assessment Matrix

In consultation with the NRC, the contractor shall identify, for each of the assessment cases, figures of merit (FOMs) which will be used to evaluate code results to quantify overall performance of the code. These FOMs should be included in the input decks such that they are calculated as part of the assessment calculations.

Estimated Level of Effort: 1 staff-month
Estimated Completion Date: 4 months after task order award on the date established by the NRC Technical Monitor

Task 3. Preparation of TRACE Input Decks

The contractor shall assemble all the available input decks for the above assessment matrix and construct the necessary input decks if not available. All TRACE input files are to be retained for archival in the NRC data bank.

Estimated Level of Effort: 3 staff-months
Estimated Completion Date: 6 months after task order award on the date established by the NRC Technical Monitor

Task 4. Development of Automatic Validation Scripts

The contractor shall develop tables and other information needed to utilize Automatic Validation (AV) Scripts to perform the calculations and to automate comparison of code results with analytic values or data and to generate a meaningful numerical value to indicate how the code predicted FOMs for each assessment case. AV scripts shall also generate the data curves from which figures of merit are extracted.

Estimated Level of Effort: 2 staff-months

Estimated Completion Date: 10 months after task order award on the date established by the NRC Technical Monitor

Task 5. Performance of All Assessment Cases

The contractor shall perform all assessment cases and generate a set of figures using AV scripts. All TRACE input, output, and plot files are to be retained for archival in the NRC data bank.

Estimated Level of Effort: 1 staff-month
Estimated Completion Date: 11 months after contract award

Task 6. Preparation of Assessment Reports

The contractor shall prepare an assessment report evaluating the performance of the code for each case and discussing the main causes of discrepancies between code results and analytic solutions or data.

Estimated Level of Effort: 2 staff-months
Estimated Completion Date: 12 months after task order award on the date established by the NRC Technical Monitor

IV. REPORTING REQUIREMENTS

1. The contractor shall prepare a letter report on the finalized assessment matrix no later than one month after task order award on the date established by the NRC Technical Monitor.
2. The contractor shall prepare an assessment report no later than 12 months after task order award on the date established by the NRC Technical Monitor. The contractor shall discuss how well the code performed and what the major causes of discrepancy are *between code results and analytic solutions or data*. All important parameters should be plotted in the report. The report should include all input decks and notes for developing the input decks. In addition, all AV scripts and tables should also be included in the report.
3. Monthly Letter Status Report

A MLSR is to be submitted to the NRC Project Manager by the 20th of the month following the month to be reported with copies provided to the following:

Division Management Analyst, (Mail Stop T-10E32)
Division of Contracts, Office of Administration - Contracting Officer (Mail Stop T-7-I-2)

The MLSR will identify the title of the project, the job code, the Principal Investigator, the period of performance, the reporting period, summarize each month's technical progress, list monthly spending, total spending to date, and the remaining funds. Any

administrative or technical difficulties which may affect the schedule or costs of the project shall be immediately brought to the attention of the NRC project manager.

V. DELIVERABLES AND DELIVERY SCHEDULE

1. The finalized assessment matrix no later than one month after task order award on the date established by the NRC Technical Monitor.
2. An assessment report no later than 12 months after task order award on the date established by the NRC Technical Monitor.

VI. MEETINGS AND TRAVEL REQUIREMENTS

Meetings and travel shall occur as needed to support the task order effort and shall be coordinated with the NRC Technical Monitor and/or NRC Project Officer.

VII. LEVEL OF EFFORT

The total level of effort is estimated at 5 staff-months at the Principal Engineer level and 5 staff-months at the Senior Engineer level.

VIII. PERIOD OF PERFORMANCE

The period of performance is 12 months from the award date.

IX. TECHNICAL DIRECTION

Technical direction will be provided by the Project Manager, Michael B. Rubin, and the Technical Monitor, Stephen Bajorek, who can be reached at:

Mail Stop: (T-10 F13A)
U. S. Nuclear Regulatory Commission
Washington DC 20555-0001
Phone: (301) 415-7574
Fax: (301) 415-5160
Email: (smb4@nrc.gov)

X. CONTRACTOR SPENDING PLAN

A contractor spending plan is required if the estimated cost is greater than \$100,000.00 and the period of performance is greater than six months.

XI. PUBLICATIONS

RES encourages the publication of the scientific results from RES sponsored programs in refereed scientific and engineering journals as appropriate. If the laboratory proposes to publish in the open literature or present the information at meeting in addition to submitting the required technical reports, approval of the proposed article or presentation should be obtained from the NRC Project Manager. The RES Project Manager shall either approve the material as

submitted, approve it subject to NRC suggested revisions, or disapprove it. In any event, the RES Project Manager may disapprove or delay presentation or publication of papers on information that is subject to Commission approval that has not been ruled upon or which has been disapproved. Additional information regarding the publication of NRC sponsored research is contained in NRC Management Directives 3.8, "Unclassified Contractor and Grantee Publications in the NUREG Series," and 3.9, "NRC Staff and Contractor Speeches, Papers, and Journal Articles on Regulatory and Technical Subjects."

If the presentation or paper is in addition to the required technical reports and the RES Project Manager determines that it will benefit the RES project, the Project Manager may authorize payment of travel and publishing costs, if any, from the project funds. If the Project Manager determines that the article or presentation would not benefit the RES project, the costs associated with the preparation, presentation, or publication will be borne by the contractor. For any publication or presentations falling into this category, the NRC reserves the right to require that such presentation or publication will not identify the NRC's sponsorship of the work.

NEW STANDARDS FOR CONTRACTORS WHO PREPARE NUREG-SERIES MANUSCRIPTS

The U.S. Nuclear Regulatory Commission (NRC) began to capture most of its official records electronically on January 1, 2000. The NRC will capture each final NUREG-series publication in its native application. Therefore, commencing January 1, 2000, please submit your final manuscript that has been approved by your NRC Project Officer in both electronic and camera-ready copy.

All format guidance, as specified in NUREG-0650, Revision 2, will remain the same with one exception. You will no longer be required to include the NUREG-series designator on the bottom of each page of the manuscript. The NRC will assign this designator when we send the camera-ready copy to the printer and will place the designator on the cover, title page, and spine. The designator for each report will no longer be assigned when the decision to prepare a publication is made. The NRC's Publishing Services Branch will inform the NRC Project Officer for the publication of the assigned designator when the final manuscript is sent to the printer.

For the electronic manuscript, prepare the text in WordPerfect 8 (or more recent), and use any of the following file types for charts, spreadsheets, and the like.

File Types to be Used for NUREG-Series Publications	
File Type	File Extension
WordPerfect®	.wpd
Microsoft® PowerPoint®	.ppt
Corel® QuattroPro®	.wb3
Corel® Presentations	.shw
Lotus® 1-2-3	.wk4
Portable Document Format	.pdf

This list is subject to change if new software packages come into common use at NRC or by our licensees or other stakeholders that participate in the electronic submission process. If a portion of your manuscript is from another source and you cannot obtain an acceptable electronic file type for this portion (e.g., an appendix from an old publication), the NRC can, if necessary, create a tagged image file format (file extension.tif) for that portion of your report.

Note that you should continue to submit original photographs, which will be scanned, since digitized photographs do not print well.

If you chose to publish a compact disk (CD) of your publication, place on the CD copies of the manuscript in both (1) a portable document format (PDF); (2) a WordPerfect 8/9 file format, and (3) an Adobe Acrobat Reader, or, alternatively, print instructions for obtaining a free copy of Adobe Acrobat Reader on the back cover insert of the jewel box.

XII. QUALITY ASSURANCE

Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554) directs the Office of Management and Budget (OMB) to issue government-wide guidelines (FR Vol. 67, No. 36, pp. 8452-8460) that "provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by federal agencies." NRC Information Quality Guidelines are provided in FR Vol. 67, No. 190, pp. 61695-61699.

The Contractor shall cite contractor quality assurance procedures used in the conduct of this work that provide for compliance with OMB and NRC guidelines.

XIII. NRC-FURNISHED MATERIALS

The NRC shall provide the most recent version of the TRACE code and the existing input decks.

XIV. TECHNICAL AND OTHER SPECIAL QUALIFICATIONS REQUIRED

Personnel with demonstrated experience in thermal-hydraulic analysis.

It is the responsibility of the contractor to assign technical staff, employees, subcontractors, or specialists who have the required educational background, experience, or combination thereof to meet both the technical objectives of the work specified in this SOW. The NRC will rely on representations made by the contractor concerning the qualifications of the personnel assigned to this task order including assurance that all information contained in the technical and cost proposal, including resumes, is accurate and truthful. In addition, the contractor and personnel assigned to this work must be approved for handling and working with proprietary information.