

ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES
1 16

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

BFA NO.

1. DATE OF ORDER SEP 5 2007	2. CONTRACT NO. (If any) GS23F0060L	6. SHIP TO:	
3. ORDER NO. DR-04-07-085	MODIFICATION NO.	4. REQUISITION/REFERENCE NO. RES-07-085 FFS #: RES-C07-198	
5. ISSUING OFFICE (Address correspondence to) U.S. Nuclear Regulatory Commission Div. of Contracts Attn: Nicole A. Pratt 301-415-0236 Mail Stop T-7-I-2 Washington, DC 20555		a. NAME OF CONSIGNEE U.S. Nuclear Regulatory Commission	
7. TO:		b. STREET ADDRESS Office of Nuclear Regulatory Research Attn: Pete Cochran, Mail Stop T10 K8	
a. NAME OF CONTRACTOR INFORMATION SYSTEMS LABORATORIES, INC ATTN: Jim Meyer		c. CITY Washington	d. STATE DC
b. COMPANY NAME		e. ZIP CODE 20555	
c. STREET ADDRESS 11140 Rockville Pike, Suite 500		f. SHIP VIA	
d. CITY Rockville	e. STATE MD	8. TYPE OF ORDER	
9. ACCOUNTING AND APPROPRIATION DATA 76015171103 N6387 252A 31X0200.760 Duns: 107928806 OBLIGATE: \$600,000.00		10. REQUISITIONING OFFICE RES	
11. BUSINESS CLASSIFICATION (Check appropriate box(es))		12. F.O.B. POINT Destination	
<input checked="" type="checkbox"/> a. SMALL	<input 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 SMALLBUSINESS	
13. PLACE OF		14. GOVERNMENT B/L NO.	15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date)
a. INSPECTION Rockville, MD	b. ACCEPTANCE Rockville, MD	16. DISCOUNT TERMS Net 30	

17. SCHEDULE (See reverse for Rejections)

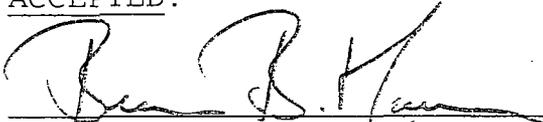
ITEM NO. (a)	SUPPLIES OR SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	<p>The Contractor shall provide the U.S. Nuclear Regulatory Commission with services titled, "TRACE Development, Assessment and Applicability for AP-1000," in accordance with the attached statement of work and the terms and conditions of the GSA Contract No. GS-23F-0060L, at the prices stated in the attached schedule.</p> <p>PERIOD OF PERFORMANCE: September 1, 2007 through August 31, 2009</p> <p>** SEE PAGE 3 FOR COMPLETE SCHEDULE OF SUPPLIES/SERVICES**</p>					

18. SHIPPING POINT	19. GROSS SHIPPING WEIGHT	20. INVOICE NO.	\$977,815.00
21. MAIL INVOICE TO:			
a. NAME U.S. Nuclear Regulatory Commission Division of Contracts, Mail Stop T7 I2			
b. STREET ADDRESS (or P.O. Box) Attn: DR-04-07-085			
c. CITY Washington	d. STATE DC	e. ZIP CODE 20555	\$977.815.00

22. UNITED STATES OF AMERICA BY (Signature) 	23. NAME (Typed) Stephen M. Pool Contracting Officer TITLE: CONTRACTING/ORDERING OFFICER
----------------------------------------------------	---------------------------------------------------------------------------------------------------

Please indicate your acceptance of this contract by having an official who is authorized to bind your organization execute three copies of this document in the spaces provided below and return two copies to the Contract Officer. You should retain the third copy for your records.

ACCEPTED:



Name Bruce B. Mrowca

V.P. & Division Manager

Title

9/7/07

Date

COST SCHEDULE

September 1, 2007 through August 31, 2009

Labor Category	Rate	Est. Hours	Totals
Engineering Fellow			\$ 42,185.00
Sr. Executive 2			\$213,257.00
Principal Engineer			\$439,774.00
Sr. Engineer			\$169,617.00
Subject Matter Expert			\$ 77,506.00
TOTAL LABOR			\$971,815.00
Travel			\$ 6,000.00
TOTAL COST			\$977,815.00

STATEMENT OF WORK

TRACE DEVELOPMENT, ASSESSMENT AND APPLICABILITY FOR AP1000

I. Background

The Office of Nuclear Reactor Regulation user need requested the Office of Nuclear Regulatory Research (RES) to develop the TRAC/RELAP Advanced Computational Engine (TRACE) computer code to be used in the evaluation of the AP1000. While the AP1000 design has been certified, we must anticipate the possibility of staff analyses during operating licence reviews and when AP1000 units become operational. Furthermore as prescribed in Regulatory Guide 1.203 TRACE must undergo a rigorous Evaluation Model Development and Assessment Process (EMDAP) in order to determine its Applicability for AP1000.

The staff used the Reactor Excursion and Leak Analysis Program code version 5 (RELAP5) during the design certification of AP1000, however, RELAP5 will be retired in the near future. As a result, staff will use the TRACE computer code to verify thermal-hydraulic calculations of the reactor coolant system and emergency core cooling systems. RES will need to make necessary revisions to the TRACE code for it to be used to simulate AP1000 transients. Finally TRACE will need to be assessed to determine its applicability for analyzing AP1000 behavior.

In support of the AP600 design certification during the 1990s, RES performed extensive experiments of the plant design. Additionally, RES carried out considerable RELAP5 code development, assessment and qualification. The outcome of this work determined the applicability of RELAP5 for audit and analyses of the AP600. During AP1000 design certification, RES extended this experimental data base and RELAP5 qualification to the larger plant.

To qualify the TRACE code for AP1000, it will be necessary to utilize the AP1000 data base generated during the RELAP5 qualification to assess the code. Based upon the experimental program and RELAP5 code development carried out during the design certification of AP600 and AP1000, the staff has formulated the research program detailed in the ensuing sections to develop and qualify TRACE as the staff's principal thermal hydraulic systems audit tool for AP1000 applications.

Some examples of phenomena/processes to be investigated are mixture level in the reactor vessel, entrainment/de-entrainment in the upper plenum and hot leg, and phase separation in the hot leg during operation of the automatic depressurization system (ADS). The program is intended to assure that TRACE can accurately model these and other thermal hydraulic processes in predicting AP1000 performance during a loss-of-coolant accident (LOCA).

Need for TRACE Development and Assessment

The agency must maintain its capability to evaluate AP1000 changes both now and in the future. Since the staff completed the AP1000 Design Certification review, TRACE has undergone a significant amount of assessment. If additional TRACE development is required to make it applicable to the AP1000, RES staff will complete the assessment and any code revisions within two years of commencement of the contract in time for COL applications referencing the AP1000 design. The assessment will demonstrate the ability of TRACE to simulate the AP1000 and the major thermal-hydraulic experimental tests that support the design.

II. OBJECTIVE

To provide audit capability using TRACE for AP1000 thermal hydraulic analyses.

III. SCOPE OF WORK

Task 1. The contractor shall complete and quality assure the AP1000 Input Deck for TRACE based on existing RELAP5/MOD3 and TRACE input decks. Consistent with the RELAP5 assessment conducted during design certification, three beyond design basis transient analyses shall be performed with multiple failures to explore design margins and minimum equipment availability requirements for input to probabilistic risk assessment review. NRC staff will specify the three beyond design basis analyses.

Estimated Level of Effort: 4 staff months

Task 2. The contractor shall perform the necessary TRACE assessments to qualify the code for AP1000.

Task 2.1 Starting with the RELAP5 input deck, calculational notebook and the preliminary TRACE input deck, for each of the seven APEX-AP1000 tests listed below, the contractor shall perform a counterpart AP1000 plant calculation with TRACE. The contractor shall provide documentation for the assessments as described in Section IV of this statement of work.

- i. NRC-AP1000-1 Double ended guillotine break of direct vessel injection (DVI)-1 with failure of ADS1-3
- ii. NRC-AP1000-3 Double ended guillotine break of DVI-1 with failure of 2/4 ADS4 valves on the pressurizer loop
- iii. NRC-AP1000-4 One inch break at the bottom of cold leg 4 with degraded sump
- iv. NRC-AP1000-5 Double ended guillotine break of DVI-1 with failure of 2/4 ADS4 valves on non-pressurizer loop
- v. NRC-AP1000-6 Two inch break at bottom of cold leg 4 with failure of 2/4 ADS4 valves on non-pressurizer loop
- vi. NRC-AP1000-11 No reserve test, initial pressure = 100 psia, containment backpressure =25 psia, core power =1 MW
- vii. NRC-AP1000-8 Station blackout, fail 50% ADS1-4

Estimated level of effort: 6 staff months

Task 2.2 Starting with the RELAP5 input deck, calculational notebook and the preliminary TRACE input deck for ROSA-IV, for each of the five ROSA AP600 tests listed below, the contractor shall perform a counterpart AP1000 plant calculation with TRACE. The contractor shall provide documentation for the assessments as described in Section IV of this statement of work.

- i. AP-CL-03: 1-inch cold leg break
- ii. AP-DVI-1: Double ended guillotine break of DVI-1
- iii. AP-BO-01: Station blackout
- iv. AP-CL-05: 1-inch cold leg break with failure of ADS 1-3

- v. AP-CL-09: 1-inch cold leg break with makeup pump, no core makeup tanks (CMTs), 1 accumulator, 50% ADS1-4, 1 in-containment refueling water storage tank line.

Estimated level of effort: 6 staff months

- Task 2.3 The contractor shall develop a TRACE input deck for the CMT separate effects tests starting from existing RELAP5 decks. The contractor shall calculate two tests: condensation test (C044106) and draining test (C036302). The contractor shall provide documentation for the assessments as described in section IV of this statement of work.

Estimated level of effort: 2 staff months

- Task 2.4 The contractor shall develop an input deck and calculate ADS system separate effects tests starting from existing RELAP5 decks. The contractor shall provide documentation for the assessments as described in section IV of this statement of work.

Estimated level of effort: 2 staff months

- Task 3. The contractor shall support code modifications (e.g., running sensitivity calculations, suggesting input model and code fixes, reporting bugs, etc.) for the following 4 phenomena important to AP1000 .

- i. Branch line off-take model (including developmental assessment against ATLATS test)
- ii. Modifications to interfacial heat transfer to improve containment make-up tank modeling
- iii. Mixture level in the vessel and entrainment/de-entrainment in the upper plenum.
- iv. Phase separation and containment fluid the hot leg during ADS 1-3 and ADS4 blowdown

Estimated level of effort: 6 staff months

- Task 4. The contractor shall prepare a TRACE Applicability Report. The report shall document the adequacy of the code for performing confirmatory analyses for AP1000. The TRACE applicability report will be modeled considering the work done for RELAP5 for AP600 ["Adequacy Evaluation of RELAP5/MOD5, Version 3.2.1.2 for Simulating AP600 Small Break Loss-of-Coolant Accidents," INEL-96/0400] and AP1000.

Estimated level of effort: 10 staff months

IV. DELIVERABLES AND DELIVERY SCHEDULE

1. Monthly Letter Status Report (MLSR)

A MLSR is to be submitted to the NRC Contracting Officer and Project Manager by the 20th of the month following the month to be reported. The MLSR will identify the title of the project, job code, Principal Investigator, period of performance, and reporting period. It will summarize each months technical progress, list monthly spending, total spending to date, and remaining funds. Any administrative or technical difficulties which may affect the schedule or cost of the project shall be immediately brought to the attention of the NRC project manager.

2. TRACE Assessment Results for Task 2

The contractor shall document the assessment results in the same manner as the existing TRACE assessments, as follows. This documentation is due by the end of the period of performance.

The TRACE Assessment Manual is written using Framemaker. This document is intended to serve as a sample of the section structure. Given the wide variety of test facilities being simulated, there will be some variation between sections, but staying with this general format will help us keep some uniformity. In using Framemaker, if you decide to add new paragraph or font formats, when you create them; prepend their names with an "_" (underscore). Adherence to this convention will better allow NRC editors to figure out exactly what customizations you have performed to the overall document structure. In order to use equations, you need to first install the MathType font sets (the Euclid family, MT Extra, and MT Symbol). These can be obtained from the NRC Developers Website or directly from the Design Science website (<http://www.dessci.com/en/dl/fonts/>).

2-1.1. Introduction

- Identify test series objectives, e.g., PWR SBLOCA
- State purpose of assessment study, e.g., verify code ability to predict system response to SBLOCA with different break sizes and different orientations, etc.
- Summarize the types of tests conducted and test simulations to be presented

2-1.2. Test Facility Description

- Include general information on the facility
 - Provide a physical description of the facility with sufficient diagrams so that the tests can be understood.
 - Provide instrumentation diagram to show measurements that will be of interest in the code to data comparisons.
 - Provide reference to test reports and other sources of information that document the facility.
- Discuss major scaling considerations of the facility and phenomena that are to be assessed.

2-1.3. TRACE Model Description

The purpose of this section is to describe the TRACE input model and major assumptions. It is not meant to be an input calculational note, for instance it is not the place to discuss how flow areas are calculated.

- Describe the TRACE nodalization of the facility
 - provide a complete set of diagrams to show VESSEL and Loop Components
- Discuss major input assumptions and provide References to previous calculations using this model.
- Describe important trips and control functions
- For the integral tests involving steady-states, provide a subsection to discuss the results of steady-state simulations.
- You are, however, expected to keep a calc notebook for your input model development and submit this to NRC along with all other calc files. Paper copies of the calc note are acceptable - NRC can have them scanned to PDF so it can be archived electronically.

2-1.4. Tests Simulated with TRACE

- Provide sufficient description of tests & procedures as necessary so that reader can understand the simulations
- Note major differences among selected tests so that sensitivities to important parameters are clear.

2-1.4.1. Simulation of Test xxxx.

- Provide a detailed comparison of code predicted parameters to the experimental data. Exactly what comparisons are made will of course depend on the particular test and facility. The major goal is to show how well TRACE agrees with the test and demonstrate that TRACE is "right for the right reasons." Provide a discussion of the transient and/or steady state results in addition to figures.
- Identify possible code deficiencies.
- Include figures that show how the code is performing, even if there is not a direct comparison to data. For example loop flow rates in a small LOCA integral test can often help show what the code is doing even though the test probably does not have a measurement for loop flow.
- Include error bars on the data, if available.
- These figures are comparisons of predicted to measured results. They are not "figures of merit."
- Figures : TRACE is to be shown as a solid, black curve in the figures. It will be first in the legend. Data is to be shown in the figure as dashed curve(s) with periodic symbols. If you need more than one data curve, use different types of dashes and different symbols. Make the *data* curves any color you like - just as long as it is clearly visible after being printed on a B&W printer.
- Try to stay with two figures per page so the layout is more manageable.

2-1.4.2. Simulation of Test xxxx.

- Put each simulations and comparison in its own sub-section.

2-1.5. Assessment Results Summary

This section is intended to provide an overall characterization of how well TRACE compared to the several tests described earlier in the section. This provides a way to show how TRACE does for the set of tests, not just an individual case.

- Provide code to data measured quantities that allow evaluation of code performance at a glance - scatter plots often show this well. Tables summarizing predicted and measured parameters so that a bias & uncertainty can be determined are valuable because they provide a target for future code improvements.
- Provide an overall discussion of assessment results
- Discuss possible sources of discrepancy and identify possible code deficiencies.
- Recommendations for input model improvement are OK

2-1.6. References

Use brackets and a numerical value in the text as in: Tests in both the Semiscale [21] and LOBI [22] facilities indicate that flow instabilities in the primary system are induced at low secondary system levels. In the References sub-section, include:

[21] Shimeck, D. J. and Johnson, F. W., "Natural Circulation Cooling in a Pressurized Water Reactor Geometry Under Accident Induced Conditions," Nucl. Sci. Eng., **88**, 311 (1984).

[22] D'Auria, F., and Galassi, G. M., "Flowrate and Density Oscillation During Two-Phase Natural Circulation in PWR Typical Conditions," Nucl. Eng. Des., **122**, 209 (1990).

3. Models and Correlations Description for Task 3

The contractor shall document all new or modified models and correlations for inclusion in the TRACE code manual. This documentation is due by the end of the period of performance.

4. TRACE Applicability Report for Task 4

The contractor shall prepare a NUREG/CR on the Adequacy Evaluation of TRACE for Simulating AP1000 LOCAs and Transients. The report should follow the content of the report of the same name from INEL [INEL-96-400]. This documentation is due by the end of the period of performance.

V. MEETINGS AND TRAVEL REQUIREMENTS

One trip to Rockville, MD per year for two staff for two days to participate in ACRS meetings, dates to be determined.

Two trips to Rockville, MD per year for two staff for program review, dates to be determined.

VI. PUBLICATIONS

RES encourages the publication of the scientific results from RES sponsored programs in 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."

<mailto:dec1@nrc.gov>).

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, 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 Word, 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
Word	.doc
WordPerfect®	.wpd
Microsoft® PowerPoint®	.ppt
Excel	.xls
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 Word 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.

VII. 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.

The quality of NRC research programs are assessed each year by the Advisory Committee on Reactor Safeguards. Within the context of their reviews of RES programs, the definition of quality research is based upon several major characteristics:

- Results meet the objectives (75% of overall score)
- Justification of major assumptions (12%)
- Soundness of technical approach and results (52%)
- Uncertainties and sensitivities addressed (11%)

Documentation of research results and methods is adequate (25% of overall score)
Clarity of presentation (16%)
Identification of major assumptions (9%)

It is the responsibility of the contractor to ensure that these quality criteria are adequately addressed throughout the course of the research that is performed. The NRC project manager and technical monitor will review all research products with these criteria in mind.

V. NRC-FURNISHED MATERIALS

Current versions of TRACE, PIRTs, code documentation, will be provided within two weeks of contract startup. Within one month of contract startup, the project manager will provide the RELAP5 calculational notebooks for APEX and ROSA IV simulations, as well as existing RELAP5 and preliminary TRACE input decks.

IX. TECHNICAL AND OTHER SPECIAL QUALIFICATIONS REQUIRED

This project requires computer programmers who have experience and knowledge of various versions of TRACE and RELAP5, PYGI, SNAP, AcGRACE (formerly Xmgr5), the automated developmental assessment (AVScript) script, and the NRC Data Bank (all referred to as "the codes" hereinafter), thermal-hydraulic and reactor physics principles, numerical methods, and modeling for both transient and accident analyses of both operating and advanced PWRs and BWRs. In addition, computer capabilities to perform code development and validation are required. Finally, there must also be diversity in computer hardware availability (specifically, SUN, IBM, Intel (32 & 64 bit), AMD (32 & 64 bit), Linux, Windows, Apple Mac/OSX) and compiler technologies (Compaq Visual Fortran, Intel Visual Fortran, NAG, Lahey, Salford, g95, PathScale, & Absoft) used for compiling and running TRACE by most of the users.

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 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 contract including assurance that all information contained in the technical and cost proposal, including resumes, is accurate and truthful.

The use of key personnel and any proposed change to key personnel on this contract is subject to the NRC Contracting Officer's approval. This includes proposed use of principal persons (i.e., key contributors) during the life of the contract.

For any work to be subcontracted or performed by consultants the contractor shall obtain the NRC Contracting Officer's written approval of the subcontractor or consultant prior to initiation of the subcontract effort. Conflict of interest considerations shall apply to any subcontracted effort.

X. CONTRACTOR ACQUIRED EQUIPMENT/PROPERTY

The work specified in this SOW does not require the purchase of new equipment.

XI. LICENSE FEE RECOVERY

The work specified in this SOW is not license fee recoverable.

TASK ORDER TERMS AND CONDITIONS

B.1 CONSIDERATION AND OBLIGATION

- (a) The total not to exceed estimated amount of this contract is **\$971.815.00**.
- (b) The amount presently obligated with respect to this contract is **\$600,000.00**. The Contractor shall not exceed the obligated amount.

B.2 2052.215-70 KEY PERSONNEL (JAN 1993)

(a) The following individuals are considered to be essential to the successful performance of the work hereunder:

Don Fletcher	Sr. Executive 2
Vesselin Palazov	Principal Engineer
David Caraher	Principal Scientist 2
Dean Wang	Principal Engineer

The contractor agrees that personnel may not be removed from the contract work or replaced without compliance with paragraphs (b) and (c) of this section.

(b) If one or more of the key personnel, for whatever reason, becomes, or is expected to become, unavailable for work under this contract for a continuous period exceeding 30 work days, or is expected to devote substantially less effort to the work than indicated in the proposal or initially anticipated, the contractor shall immediately notify the contracting officer and shall, subject to the concurrence of the contracting officer, promptly replace the personnel with personnel of at least substantially equal ability and qualifications.

(c) Each request for approval of substitutions must be in writing and contain a detailed explanation of the circumstances necessitating the proposed substitutions. The request must also contain a complete resume for the proposed substitute and other information requested or needed by the contracting officer to evaluate the proposed substitution. The contracting officer and the project officer shall evaluate the contractor's request and the contracting officer shall promptly notify the contractor of his or her decision in writing.

(d) If the contracting officer determines that suitable and timely replacement of key personnel who have been reassigned, terminated, or have otherwise become unavailable for the contract work is not reasonably forthcoming, or that the resultant reduction of productive effort would be so substantial as to impair the successful completion of the contract or the service order, the contract may be terminated by the contracting officer for default or for the convenience of the Government, as appropriate. If the contracting officer finds the contractor at fault for the condition, the contract price or fixed fee may be equitably adjusted downward to compensate the Government for any resultant delay, loss, or damage.

B.3 2052.209-72 CONTRACTOR ORGANIZATIONAL CONFLICTS OF INTEREST (JAN 1993)

(a) Purpose. The primary purpose of this clause is to aid in ensuring that the contractor:

(1) Is not placed in a conflicting role because of current or planned interests (financial, contractual, organizational, or otherwise) which relate to the work under this contract; and

(2) Does not obtain an unfair competitive advantage over other parties by virtue of its performance of this contract.

(b) Scope. The restrictions described apply to performance or participation by the contractor, as defined in 48 CFR 2009.570-2 in the activities covered by this clause.

(c) Work for others.

(1) Notwithstanding any other provision of this contract, during the term of this contract, the contractor agrees to forego entering into consulting or other contractual arrangements with any firm or organization the result of which may give rise to a conflict of interest with respect to the work being performed under this contract. The contractor shall ensure that all employees under this contract abide by the provision of this clause. If the contractor has reason to believe, with respect to itself or any employee, that any proposed consultant or other contractual arrangement with any firm or organization may involve a potential conflict of interest, the contractor shall obtain the written approval of the contracting officer before the execution of such contractual arrangement.

(2) The contractor may not represent, assist, or otherwise support an NRC licensee or applicant undergoing an NRC audit, inspection, or review where the activities that are the subject of the audit, inspection, or review are the same as or substantially similar to the services within the scope of this contract (or task order as appropriate) except where the NRC licensee or applicant requires the contractor's support to explain or defend the contractor's prior work for the utility or other entity which NRC questions.

(3) When the contractor performs work for the NRC under this contract at any NRC licensee or applicant site, the contractor shall neither solicit nor perform work in the same or similar technical area for that licensee or applicant organization for a period commencing with the award of the task order or beginning of work on the site (if not a task order contract) and ending one year after completion of all work under the associated task order, or last time at the site (if not a task order contract).

(4) When the contractor performs work for the NRC under this contract at any NRC licensee or applicant site,

(i) The contractor may not solicit work at that site for that licensee or applicant during the period of performance of the task order or the contract, as appropriate.

(ii) The contractor may not perform work at that site for that licensee or applicant during the period of performance of the task order or the contract, as appropriate, and for one year thereafter.

(iii) Notwithstanding the foregoing, the contracting officer may authorize the contractor to solicit or perform this type of work (except work in the same or similar technical area) if the contracting officer determines that the situation will not pose a potential for technical bias or unfair competitive advantage.

(d) Disclosure after award.

(1) The contractor warrants that to the best of its knowledge and belief, and except as otherwise set forth in this contract, that it does not have any organizational conflicts of interest as defined in 48 CFR 2009.570-2.

(2) The contractor agrees that if, after award, it discovers organizational conflicts of interest with respect to this contract, it shall make an immediate and full disclosure in writing to the contracting officer. This statement must include a description of the action which the contractor has taken or proposes to take to avoid or mitigate such conflicts. The NRC may, however, terminate the contract if termination is in the best interest of the Government.

(3) It is recognized that the scope of work of a task-order-type contract necessarily encompasses a broad spectrum of activities. Consequently, if this is a task-order-type contract, the contractor agrees that it will disclose all proposed new work involving NRC licensees or applicants which comes within the scope of work of the underlying contract. Further, if this contract involves work at a licensee or applicant site, the contractor agrees to exercise diligence to discover and disclose any new work at that licensee or applicant site. This disclosure must be made before the submission of a bid or proposal to the utility or other regulated entity and must be received by the NRC at least 15 days before the proposed award date in any event, unless a written justification demonstrating urgency and due diligence to discover and disclose is provided by the contractor and approved by the contracting officer. The disclosure must include the statement of work, the dollar value of the proposed contract, and any other documents that are needed to fully describe the proposed work for the regulated utility or other regulated entity. NRC may deny approval of the disclosed work only when the NRC has issued a task order which includes the technical area and, if site-specific, the site, or has plans to issue a task order which includes the technical area and, if site-specific, the site, or when the work violates paragraphs (c)(2), (c)(3) or (c)(4) of this section.

(e) Access to and use of information.

(1) If in the performance of this contract, the contractor obtains access to information, such as NRC plans, policies, reports, studies, financial plans, internal data protected by the Privacy Act of 1974 (5 U.S.C. Section 552a (1988)), or the Freedom of Information Act (5 U.S.C. Section 552 (1986)), the contractor agrees not to:

(i) Use this information for any private purpose until the information has been released to the public;

(ii) Compete for work for the Commission based on the information for a period of six months after either the completion of this contract or the release of the information to the public, whichever is first;

(iii) Submit an unsolicited proposal to the Government based on the information until one year after the release of the information to the public; or

(iv) Release the information without prior written approval by the contracting officer unless the information has previously been released to the public by the NRC.

(2) In addition, the contractor agrees that, to the extent it receives or is given access to proprietary data, data protected by the Privacy Act of 1974 (5 U.S.C. Section 552a (1988)), or the Freedom of Information Act (5 U.S.C. Section 552 (1986)), or other confidential or privileged technical, business, or financial information under this contract, the contractor shall treat the information in accordance with restrictions placed on use of the information.

(3) Subject to patent and security provisions of this contract, the contractor shall have the right to use technical data it produces under this contract for private purposes provided that all requirements of this contract have been met.

(f) Subcontracts. Except as provided in 48 CFR 2009.570-2, the contractor shall include this clause, including this paragraph, in subcontracts of any tier. The terms contract, contractor, and contracting officer, must be appropriately modified to preserve the Government's rights.

(g) Remedies. For breach of any of the above restrictions, or for intentional nondisclosure or misrepresentation of any relevant interest required to be disclosed concerning this contract or for such erroneous representations that necessarily imply bad faith, the Government may terminate the contract for default, disqualify the contractor from subsequent contractual efforts, and pursue other remedies permitted by law or this contract.

(h) Waiver. A request for waiver under this clause must be directed in writing to the contracting officer in accordance with the procedures outlined in 48 CFR 2009.570-9.

(i) Follow-on effort. The contractor shall be ineligible to participate in NRC contracts, subcontracts, or proposals therefor (solicited or unsolicited), which stem directly from the contractor's performance of work under this contract. Furthermore, unless so directed in writing by the contracting officer, the contractor may not perform any technical consulting or management support services work or evaluation activities under this contract on any of its products or services or the products or services of another firm if the contractor has been substantially involved in the development or marketing of the products or services.

(1) If the contractor, under this contract, prepares a complete or essentially complete statement of work or specifications, the contractor is not eligible to perform or participate in the initial contractual effort which is based on the statement of work or specifications. The contractor may not incorporate its products or services in the statement of work or specifications unless so directed in writing by the contracting officer, in which case the restrictions in this paragraph do not apply.

(2) Nothing in this paragraph precludes the contractor from offering or selling its standard commercial items to the Government.

B.4 PROJECT OFFICER AUTHORITY (November 2006)

(a) The contracting officer's authorized representative (hereinafter referred to as the project officer) for this contract is:

Name: Peter Cochran
Address: 11545 Rockville Pike
Mailstop T10 K8
Rockville, MD 20852-2738

Telephone Number: (301) 415-5887

(b) Performance of the work under this contract is subject to the technical direction of the NRC project officer. The term "technical direction" is defined to include the following:

(1) Technical direction to the contractor which shifts work emphasis between areas of work or tasks, authorizes travel which was unanticipated in the Schedule (i.e., travel not contemplated in the Statement of Work (SOW) or changes to specific travel identified in the SOW), fills in details, or otherwise serves to accomplish the contractual SOW.

(2) Provide advice and guidance to the contractor in the preparation of drawings, specifications, or technical portions of the work description.

(3) Review and, where required by the contract, approval of technical reports, drawings, specifications, and technical information to be delivered by the contractor to the Government under the contract.

(c) Technical direction must be within the general statement of work stated in the contract. The project officer does not have the authority to and may not issue any technical direction which:

(1) Constitutes an assignment of work outside the general scope of the contract.

(2) Constitutes a change as defined in the "Changes" clause of this contract.

- (3) In any way causes an increase or decrease in the total estimated contract cost, the fixed fee, if any, or the time required for contract performance.
- (4) Changes any of the expressed terms, conditions, or specifications of the contract.
- (5) Terminates the contract, settles any claim or dispute arising under the contract, or issues any unilateral directive whatever.
- (d) All technical directions must be issued in writing by the project officer or must be confirmed by the project officer in writing within ten (10) working days after verbal issuance. A copy of the written direction must be furnished to the contracting officer. A copy of NRC Form 445, Request for Approval of Official Foreign Travel, which has received final approval from the NRC must be furnished to the contracting officer.
- (e) The contractor shall proceed promptly with the performance of technical directions duly issued by the project officer in the manner prescribed by this clause and within the project officer's authority under the provisions of this clause.
- (f) If, in the opinion of the contractor, any instruction or direction issued by the project officer is within one of the categories as defined in paragraph (c) of this section, the contractor may not proceed but shall notify the contracting officer in writing within five (5) working days after the receipt of any instruction or direction and shall request the contracting officer to modify the contract accordingly. Upon receiving the notification from the contractor, the contracting officer shall issue an appropriate contract modification or advise the contractor in writing that, in the contracting officer's opinion, the technical direction is within the scope of this article and does not constitute a change under the "Changes" clause.
- (g) Any unauthorized commitment or direction issued by the project officer may result in an unnecessary delay in the contractor's performance and may even result in the contractor expending funds for unallowable costs under the contract.
- (h) A failure of the parties to agree upon the nature of the instruction or direction or upon the contract action to be taken with respect thereto is subject to 52.233-1 - Disputes.
- (i) In addition to providing technical direction as defined in paragraph (b) of the section, the project officer shall:
- (1) Monitor the contractor's technical progress, including surveillance and assessment of performance, and recommend to the contracting officer changes in requirements.
 - (2) Assist the contractor in the resolution of technical problems encountered during performance.
 - (3) Review all costs requested for reimbursement by the contractor and submit to the contracting officer recommendations for approval, disapproval, or suspension of payment for supplies and services required under this contract.
 - (4) Assist the contractor in obtaining the badges for the contractor personnel.
 - (5) Immediately notify the Security Branch, Division of Facilities and Security (SB/DFS) (via e-mail) when a contractor employee no longer requires access authorization and return of any NRC issued badge to SB/DFS within three days after their termination.
 - (6) Ensure that all contractor employees that require access to classified Restricted Data or National Security Information or matter, access to sensitive unclassified information (Safeguards, Official Use Only, and

Proprietary information) access to sensitive IT systems or data, unescorted access to NRC controlled buildings/space, or unescorted access to protected and vital areas of nuclear power plants receive approval of SB/DFS prior to access in accordance with Management Directive and Handbook 12.3.

(7) For contracts for the design, development, maintenance or operation of Privacy Act Systems of Records, obtain from the contractor as part of closeout procedures, written certification that the contractor has returned to NRC, transferred to the successor contractor, or destroyed at the end of the contract in accordance with instructions provided by the NRC Systems Manager for Privacy Act Systems of Records, all records (electronic or paper) which were created, compiled, obtained or maintained under the contract.

B.5 COMPLIANCE WITH U.S. IMMIGRATION LAWS AND REGULATIONS

NRC contractors are responsible to ensure that their alien personnel are not in violation of United States Immigration and Naturalization (INS) laws and regulations, including employment authorization documents and visa requirements. Each alien employee of the Contractor must be lawfully admitted for permanent residence as evidenced by Alien Registration Receipt Card Form 1-151 or must present other evidence from the Immigration and Naturalization Services that employment will not affect his/her immigration status. The INS Office of Business Liaison (OBL) provides information to contractors to help them understand the employment eligibility verification process for non-US citizens. This information can be found on the INS website, <http://www.ins.usdoj.gov/graphics/services/employerinfo/index.htm#obl>.

The NRC reserves the right to deny or withdraw Contractor use or access to NRC facilities or its equipment/services, and/or take any number of contract administrative actions (e.g., disallow costs, terminate for cause) should the Contractor violate the Contractor's responsibility under this clause.

B.6 SEAT BELTS

Contractors, subcontractors, and grantees, are encouraged to adopt and enforce on-the-job seat belt policies and programs for their employees when operating company-owned, rented, or personally owned vehicles.