

AWARD/CONTRACT		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350)		RATING		PAGE 1 OF 45 PAGES	
2. CONTRACT (Proc. Inst. Ident.) NO. NRC-04-07-063		3. EFFECTIVE DATE 10/25/2006		4. REQUISITION/PURCHASE REQUEST/PROJECT NO.			
5. ISSUED BY US NUCLEAR REGULATORY COMMISSION DIVISION OF CONTRACTS, ATTN: NEHA DHIR M/S T-7-I-2 WASHINGTON, DC 20555		CODE		6. ADMINISTERED BY (If other than Item 5)		CODE	
7. NAME AND ADDRESS OF CONTRACTOR (No. street, county, state and ZIP Code) PENNSYLVANIA STATE UNIVERSITY OFFICE OF GRADUATE STUDIES, RESEARCH AND OUTREACH 101 HAMMOND BUILDING UNIVERSITY PARK, PA 16802				8. DELIVERY <input type="checkbox"/> FOB ORIGIN <input checked="" type="checkbox"/> OTHER (See below)			
				9. DISCOUNT FOR PROMPT PAYMENT N/A			
				10. SUBMIT INVOICES (4 copies unless otherwise specified) TO THE ADDRESS SHOWN IN: ITEM			
CODE		FACILITY CODE					
11. SHIP TO/MARK FOR US NUCLEAR REGULATORY COMMISSION ATTN: N. Prasad Kadambi, T-10-K-8 OFFICE OF NUCLEAR REGULATORY RESEARCH WASHINGTON, DC 20555		CODE		12. PAYMENT WILL BE MADE BY US NUCLEAR REGULATORY COMMISSION PAYMENT TEAM ATTN: NRC-04-07-063 WASHINGTON, DC 20555		CODE	
13. AUTHORITY FOR USING OTHER FULL AND OPEN COMPETITION: <input type="checkbox"/> 10 U.S.C. 2304(c)() <input checked="" type="checkbox"/> 41 U.S.C. 253(c)()				14. ACCOUNTING AND APPROPRIATION DATA B&R: 760-15-111-205; JC: N6154; BOC 252A; APPN: 31X200760 OBLIGATION: \$65,000			
15A. ITEM NO.	15B. SUPPLIES/SERVICES		15C. QUANTITY	15D. UNIT	15E. UNIT PRICE	15F. AMOUNT	
	SEE SECTION B.2 FOR DESCRIPTION OF SERVICES. THIS IS A COST REIMBURSEMENT TYPE CONTRACT.						
15G. TOTAL AMOUNT OF CONTRACT (ceiling)						\$ 395,000.00	
16. TABLE OF CONTENTS							
(✓) SEC.	DESCRIPTION		PAGE(S)	(✓) SEC.	DESCRIPTION		PAGE(S)
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B	SUPPLIES OR SERVICES AND PRICE/COST			PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACH.			
C	DESCRIPTION/SPECS./WORK STATEMENT			J	LIST OF ATTACHMENTS		
D	PACKAGING AND MARKING			PART IV - REPRESENTATIONS AND INSTRUCTIONS			
E	INSPECTION AND ACCEPTANCE			K	REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS		
F	DELIVERIES OR PERFORMANCE			L	INSTRS., CONDS., AND NOTICES TO OFFERORS		
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H	SPECIAL CONTRACT REQUIREMENTS						
CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE							
17. <input checked="" type="checkbox"/> CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to sign this document and return <u>2</u> copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents: (a) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)				18. <input type="checkbox"/> AWARD (Contractor is not required to sign this document.) Your offer on Solicitation Number <u>RES-06-056</u> , including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the items listed above and on any continuation sheets. This award consummates the contract which consists of the following documents: (a) the Government's solicitation and your offer, and (b) this award/contract. No further contractual document is necessary.			
19A. NAME AND TITLE OF SIGNER (Type or print) David W. Richardson Assistant Vice President for Research				20A. NAME OF CONTRACTING OFFICER Neha S. Dhir			
19B. NAME OF CONTRACTOR		19C. DATE SIGNED MAY 22 2007		20B. UNITED STATES OF AMERICA		20C. DATE SIGNED 5/15/2007	
<i>(Signature of person authorized to sign)</i>		<i>(Signature of Contracting Officer)</i>					

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PART I - THE SCHEDULE**SECTION B - SUPPLIES OR SERVICES AND PRICE/COSTS****B.1 PROJECT TITLE**

Spacer Grid Thermal Hydraulics Program

B.2 BRIEF DESCRIPTION OF WORK (MAR 1987)

To obtain experimental data for use in the development of more accurate spacer grid thermal-hydraulic models.

B.3 CONSIDERATION AND OBLIGATION--COST REIMBURSEMENT (JUN 1988) ALTERNATE I (JUN 1988)

- (a) The total estimated cost to the Government for full performance of the base period of this contract is \$395,000.00.
- (b) The total estimated cost to the Government for full performance of the first option period under this contract is \$300,000.00.
- (c) The total estimated cost to the Government for full performance of the second option period under this contract is \$300,000.00.
- (d) The amount presently obligated by the Government with respect to this contract is \$65,000.00.

SECTION C - DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK**STATEMENT OF WORK**

Title: Spacer Grid Thermal-Hydraulics Program

I. BACKGROUND

Under the Rod Bundle Heat Transfer (RBHT) Test Program sponsored by the NRC, the Pennsylvania State University (PSU) constructed a 7x7 rod bundle test facility and generated unique experimental data suitable for computer code model development and assessment for the analysis of loss-of-coolant-accidents (LOCAs). The test data generated from the RBHT program were over 33 reflood tests, over 45 interfacial drag tests, 20 steam cooling convective heat transfer tests without liquid droplet injection, and 25 steam cooling tests with liquid droplet injection. Results from the RBHT tests have conclusively shown that spacer grids have a significant effect on the downstream rod bundle thermal-hydraulics. In the RBHT tests, the spacer grids were found to increase the local rod-to-fluid heat transfer, and decrease steam temperatures in dispersed droplet flows. However, the precise mechanisms of the local heat transfer downstream of the spacer grid remain uncertain. Therefore, new experimental information is needed to identify these mechanisms so that more accurate spacer grid thermal-hydraulic models can be developed.

Because of the detailed instrumentation in the RBHT facility, it is possible to use the facility to obtain separate effects data suitable for development of improved models for spacer grid heat transfer and two-phase hydraulics. This project will develop such a data base.

This project will consist of a base year and two optional years. The optional year testing will be decided later when it is ready to be taken.

Task 1 described in the base year must be satisfactorily completed first, and the contractor shall proceed to the other tasks only after the NRC provides a written letter accepting all the reports generated under the previous RBHT contracts.

II. OBJECTIVES

The objectives of the Spacer Grid Thermal-Hydraulics Program are as follows:

1. Upgrade the reports generated under the previous RBHT contracts to meet the criteria delineated in Base Year Task 8 description and in Section IX, Quality of NRC Research Projects.
2. Obtain experimental data for prototypical mixing vane spacer grids to determine droplet break up mechanisms and the effect of the spacer grid on drop size.

3. Obtain experimental data with a range of steam flow rates and upstream drop sizes providing information suitable to determine the downstream local-rod-to fluid heat transfer coefficients and steam temperatures.
4. Obtain experimental data on grid rewet temperatures as a function of local thermal-hydraulic conditions such as steam flow rates and temperatures, and the upstream drop size and population.
5. Prepare a test data report documenting the results of the tests.
6. If Option 1 is exercised, obtain experimental data and prepare a report on high temperature reflood tests which will provide the effect of dry spacer grids.
7. If Option 2 is exercised, obtain experimental data and prepare a report on convective heat transfer between heater rods and steam and between heater rods and a non-condensable gas.

III. SCOPE OF WORK

BASE YEAR

Task 1 described below must be satisfactorily completed first, and the contractor shall proceed to the other tasks only after the NRC provides a written letter accepting all the reports generated under the previous RBHT contracts.

Task 1 Improvement of Reports

Improve the reports generated under the previous RBHT contracts to meet the criteria delineated in Base Year Task 8 below and in Section IX, Quality of NRC Research Projects.

Estimated Level of Effort: 5 staff-months

Task 2. Test Facility Preparation

Prepare the existing RBHT test facility, including the replacement of the ground plate which was damaged during the previous test series, to obtain the experimental data, as indicated above. One possibility is to move the drop injectors to a location high in the bundle where the local power is near its maximum and the spacer grids are likely to be dry.

Estimated Level of Effort: 4 staff-months

Task 3. Test Matrix and Test Procedure Formulation

Prepare a test matrix for 21 tests with detailed test conditions. When formulating test conditions, previously run steam cooling tests with and without droplet injections should be taken into account to avoid duplicating tests. Establish test procedures including steps to be performed to improve the quality control. Submit the test matrix and test procedures to the

NRC for approval.

Estimated Level of Effort: 1 staff-month

Task 4. Conduct of Tests

Conduct a series of 21 tests in which the steam flow and the bundle power are varied and drops of a known size are injected towards the grid. Different injectors can be used to vary the initial drop size in subsequent groups of tests. Conduct a steam cooling test as part of shakedown tests for checking out droplet injector installation and determine whether the injectors cause a significant effect on downstream thermal hydraulics where test results are to be investigated. If there is a significant effect, the NRC may want to use a part of 21 tests for steam-cooling-only tests to separate the injector effect and the grid effect. For the purpose of counting the number of tests, the runs made during one heating cycle should be counted as one test. In other words, if multiple runs can be made during the same heating cycle, those multiple runs should be counted as one test.

Estimated Level of Effort: 4 staff-months

Task 5. Transmittal of Qualified Data to the NRC Data Bank

Qualify the data and send the qualified data to the NRC data bank in the data bank format along with test condition summary sheets.

Estimated Level of Effort: 2 staff-months

Task 6. Preparation of Quick Look Reports

Prepare a quick look report after each test or after each group of tests, if multiple tests can be run within the same heating cycle. This report shall contain a standard set of plots such as inlet flow and temperature, power input, rod temperatures and differential pressures at selected locations, liquid mass carry-over, and the upper plenum pressure. The mass balance information shall also be plotted. These or similar plots can be made a part of the final data report in order to reduce the effort for preparing a data report.

Estimated Level of Effort: 4 staff-months

Task 7. Preparation of a Data Report

Prepare a test data report for the spacer grid test series. The data report shall present, for each test, a consistent set of figures which includes those figures needed for setting up an input deck for TRACE calculations and other figures which are important to understand the results of the test. The report shall also present derived quantities such as heat transfer coefficients and void fractions and discuss how the data was obtained and how it was reduced to get

parameters such as heat transfer coefficients and void fractions. An outline of the report is to be submitted to the NRC for review early in the preparation stage. A draft data report is to be submitted to the NRC within 3 months following completion of the testing, and a final report within 6 months following completion of the testing.

Estimated Level of Effort: 4 staff-months

Task 8. Preparation of an Evaluation Report

Analyze and correlate the data and prepare a data analysis report on spacer grid tests. Subchannel analysis shall be performed to determine local conditions to compute derived quantities. The report shall discuss test analysis results addressing the objectives indicated above under Section II. The report shall also discuss other parametric effects and recommend spacer grid models for the TRACE code. The report shall be prepared to satisfy the following criteria:

- 1) Clarity of presentation
- 2) Identification of assumptions
- 3) Justification of assumptions
- 4) Soundness of technical approach
- 5) Treatment of uncertainties and sensitivities

If desired, a test data report and a test evaluation report can be combined into one report. An evaluation report shall be submitted to the NRC within 8 months following completion of the testing.

Estimated Level of Effort: 4 staff-months

OPTION YEAR 1

If Option Year 1 is exercised, the following tasks shall be performed for high temperature reflood tests.

Task 1. Test Facility Preparation

Prepare the existing RBHT test facility to obtain the experimental data, as indicated above for Option 1, high temperature reflood tests.

Estimated Level of Effort: 2 staff-months

Task 2. Test Matrix and Test Procedure Formulation

Prepare a test matrix for 8 tests with detailed test conditions. When formulating test conditions, previously run reflood tests shall be taken into account to help formulate new test conditions. Establish test procedures including steps to be performed to improve the quality control.

Submit the test matrix and test procedures to the NRC for approval.

Estimated Level of Effort: 1 staff-month

Task 3. Conduct of Tests

Conduct a series of 8 tests in which the inlet flow rate and temperature, pressure, and the bundle power may be varied.

Estimated Level of Effort: 4 staff-months

Task 4. Transmittal of Qualified Data to the NRC Data Bank

Qualify the data and send the qualified data to the NRC data bank in the data bank format along with test condition summary sheets.

Estimated Level of Effort: 2 staff-months

Task 5. Preparation of Quick Look Reports

Prepare a quick look report after each test. This report shall contain a standard set of plots such as inlet flow and temperature, power input, rod temperatures and differential pressures at selected locations, liquid mass carry-over, and the upper plenum pressure. The mass balance information shall also be plotted. These or similar plots can be made a part of the final data report in order to reduce the effort for preparing a data report.

Estimated Level of Effort: 4 staff-months

Task 6. Preparation of a Data Report

Prepare a test data report for the test series. The data report shall present, for each test, a consistent set of figures which includes those figures needed for setting up an input deck for TRACE calculations and other figures which are important to understand the results of the test. The report shall also present derived quantities such as heat transfer coefficients and void fractions and discuss how the data was obtained and how it was reduced to get parameters such as heat transfer coefficients and void fractions. An outline of the report is to be submitted to the NRC for review early in the preparation stage. A draft data report is to be submitted to the NRC within 3 months following completion of the testing, and a final report within 6 months following completion of the testing.

Estimated Level of Effort: 4 staff-months

Task 7. Preparation of an Evaluation Report

Analyze and correlate the data and prepare a data analysis report on high temperature reflood tests. Subchannel analysis shall be performed to determine local conditions to compute derived quantities. The report shall discuss test analysis results addressing the objectives indicated

above under Section II. The report shall also discuss other parametric effects. The report shall be prepared to satisfy the following criteria:

- 1) Clarity of presentation
- 2) Identification of assumptions
- 3) Justification of assumptions
- 4) Soundness of technical approach
- 5) Treatment of uncertainties and sensitivities

If desired, a test data report and a test evaluation report can be combined into one report. An evaluation report shall be submitted to the NRC within 8 months following completion of the testing.

Estimated Level of Effort: 4 staff-months

OPTION YEAR 2

If Option Year 2 is exercised, the following tasks shall be performed:

Task 1. Test Facility Preparation

Prepare the existing RBHT test facility to obtain the experimental data, as indicated above for Option 2, fluid convection tests.

Estimated Level of Effort: 2 staff-months

Task 2. Test Matrix and Test Procedure Formulation

Prepare a test matrix for 14 tests with detailed test conditions. When formulating test conditions, previously run steam cooling tests with and without droplet injections shall be taken into account to help formulate new test conditions. Establish test procedures including steps to be performed to improve the quality control. Submit the test matrix and test procedures to the NRC for approval.

Estimated Level of Effort: 1 staff-month

Task 3. Conduct of Tests

Conduct a series of 14 tests in which the steam and non-condensable gas flows, temperatures, pressure, and the bundle power may be varied. The cooling fluid used shall be either steam or a non-condensable gas but not both during the same test.

Estimated Level of Effort: 4 staff-months

Task 4. Transmittal of Qualified Data to the NRC Data Bank

Qualify the data and send the qualified data to the NRC data bank in the data bank format along with test condition summary sheets.

Estimated Level of Effort: 2 staff-months

Task 5. Preparation of Quick Look Reports

Prepare a quick look report after each test or after each group of tests, if multiple tests can be run within the same heating cycle. This report shall contain a standard set of plots such as inlet steam and non-condensable gas flows and temperatures, power input, rod temperatures at selected locations, and the upper plenum pressure. The mass balance information shall also be plotted. These or similar plots can be made a part of the final data report in order to reduce the effort for preparing a data report.

Estimated Level of Effort: 2 staff-months

Task 6. Preparation of a Data Report

Prepare a test data report for the test series. The data report shall present, for each test, a consistent set of figures which includes those figures needed for setting up an input deck for TRACE calculations and other figures which are important to understand the results of the test. The report shall also present derived quantities such as heat transfer coefficients and discuss how the data was obtained and how it was reduced to get parameters such as heat transfer coefficients. A draft data report is to be submitted to the NRC within 3 months following completion of the testing, and a final report within 6 months following completion of the testing.

Estimated Level of Effort: 4 staff-months

Task 7. Preparation of an Evaluation Report

Analyze and correlate the data and prepare a data analysis report on the test series. Subchannel analysis shall be performed to determine local conditions to compute derived quantities. The report shall discuss test analysis results addressing the objectives indicated above under Section II. The report shall also discuss other parametric effects and recommend suitable models for the TRACE code. The report shall be prepared to satisfy the following criteria:

- 1) Clarity of presentation
- 2) Identification of assumptions
- 3) Justification of assumptions
- 4) Soundness of technical approach
- 5) Treatment of uncertainties and sensitivities

If desired, a test data report and a test evaluation report can be combined into one report. An

evaluation report is to be submitted to the NRC within 8 months following completion of the testing.

Estimated Level of Effort: 4 staff-months

IV. REPORTING REQUIREMENTS

1. Reports generated under the previous RBHT contracts shall be improved as indicated in the description of Base Year Task 1 and in Section IX, Quality of NRC Research Projects, and submitted as draft reports within 3 months following the contract initiation. The final reports shall be submitted as NUREG/CR reports within 6 months following the contract initiation.
2. A quick look report shall be submitted to the NRC as soon as data are qualified but no later than one month after each test.
3. A test facility description report shall be updated, peer reviewed, and submitted to the NRC within 3 months after completion of the testing. An updated test facility report shall be prepared instead of documenting only changes to the previous configuration.
4. A draft data report shall be prepared, peer reviewed, and submitted to the NRC within 3 months and a final data report within 6 months after completion of the testing. As indicated above in the scope of work, this report shall present a set of data plots including derived quantities and shall indicate how the data was qualified.
5. A test data evaluation report shall be prepared, peer reviewed, and submitted to the NRC within 8 months after completion of the testing.
6. A final report shall be prepared to document all experiments, descriptions of facility modifications, and all evaluations performed as part of this program in a single report, and published as a NUREG/CR report within 9 months after completion of the testing.
7. Monthly Letter Status Report (MSLR)

An MSLR shall 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 and Property Management, Office of Administration (MS T-712)

The MSLR 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, the remaining funds, and shall contain information as directed in NRC Management Directive 11.7. 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 and Contracting Officer.

8. Organizational Conflict of Interest Disclosure

A. Provide descriptions of present/planned/past work for other organizations, in the same/similar technical area as the NRC project scope of work, e.g., (included but not limited to), NRC licensees, vendors, industry groups or research institutes that represent or are substantially comprised of nuclear utilities.

B. Provide name of organization, dollar value, and period of performance of the work identified in (A).

V. DELIVERABLES AND DELIVERY SCHEDULE

1. Reports generated under the previous RBHT contracts shall be improved as indicated in the description of Base Year Task 1 and in Section IX, Quality of NRC Research Projects, and submitted as draft reports within 3 months following the contract initiation. The final reports shall be submitted as NUREG/CR reports within 6 months following the contract initiation.

2. A test matrix for a series of spacer grid thermal hydraulic tests shall be submitted within a month after contract award. A test matrix for optional tests shall be submitted within a month after the option is exercised.

3. Test procedures for spacer grid thermal hydraulic tests shall be submitted to the NRC within two months after contract award. Test procedures for optional tests shall be submitted within two months after the option is exercised.

4. A quick look report shall be submitted within one month after each test.

5. All of the qualified data shall be provided in CDs in the NRC data bank format within one month after the last test data of the test series are obtained. The data of certain selected tests may be requested earlier than the last test.

6. A test data report and a test evaluation report shall be provided within six and eight months, respectively, after testing is completed.

7. A test facility description report shall be updated as the facility is modified to perform the test series. A revised test facility report shall be issued and peer reviewed within 3 months after testing is completed.

8. A final report documenting all experiments, descriptions of facility modifications, and all evaluations shall be peer reviewed and provided to the NRC as a NUREG/CR report within nine months following completion of the experimental work. The final report shall be in accordance with instructions given in NUREG-0650, Revision 2, Jan. 1999, with two exceptions as noted in Item X below.

VI. MEETINGS AND TRAVEL REQUIREMENTS

Two two-day trips to the NRC by two people shall be planned for a program review and ACRS presentations for each year.

VII. LEVEL OF EFFORT

The estimated level of effort for Task 1 through 7 are as follows:

Base Year		Option Year 1		Option Year 2	
Task	Staff-Month	Task	Staff-Month	Task	Staff-Month
1	5	1	2	1	2
2	4	2	1	2	1
3	1	3	4	3	4
4	4	4	2	4	2
5	2	5	4	5	4
6	4	6	4	6	4
7	4	7	4	7	4
8	4	N/A	N/A	N/A	N/A
Total	28	Total	21	Total	21

VIII. PUBLICATIONS (IF APPLICABLE)

RES encourages the publication of the scientific results from RES sponsored programs in refereed scientific and engineering journals as appropriate. If the contractor proposes to publish in the open literature or present the information at meetings in addition to submitting the required technical reports, approval of the proposed article or presentation shall 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 3.7, "NUREG Series Publications," 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 two exceptions. 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. The other exception is that the text shall use a single column format instead of a two-column format.

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 shall 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.

XI. QUALITY OF NRC RESEARCH PROJECTS

The following attributes shall be explicitly built into the project tasks, their execution and documentation. The definition of quality research includes two major characteristics:

1. Results meet the objectives, and
2. The results and methods are adequately documented.

Within the first characteristic, consider the following general attributes in performing the NRC research project:

- A. Soundness of technical approach and results
 - Has execution of the work used available expertise in appropriate disciplines?
- B. Justification of major assumptions
 - Have assumptions key to the technical approach and the results been tested or otherwise justified?
- C. Treatment of uncertainties/sensitivities
 - Have significant uncertainties been characterized?
 - Have important sensitivities been identified?

For the second characteristic (documentation), consider the following attributes:

- D. Clarity of presentation
- E. Identification of major assumptions

XII. NRC-FURNISHED MATERIALS (IF APPLICABLE)

None

XIII. REFERENCES AND ATTACHMENTS (IF APPLICABLE)

None

SECTION D - PACKAGING AND MARKING**D.1 PACKAGING AND MARKING (MAR 1987)**

The Contractor shall package material for shipment to the NRC in such a manner that will ensure acceptance by common carrier and safe delivery at destination. Containers and closures shall comply with the Interstate Commerce Commission Regulations, Uniform Freight Classification Rules, or regulations of other carriers as applicable to the mode of transportation. On the front of the package, the Contractor shall clearly identify the contract number under which the product is being provided.

SECTION E - INSPECTION AND ACCEPTANCE**E.1 NOTICE LISTING CONTRACT CLAUSES INCORPORATED BY REFERENCE**

The following contract clauses pertinent to this section are hereby incorporated by reference (by Citation Number, Title, and Date) in accordance with the clause at FAR "52.252-2 CLAUSES INCORPORATED BY REFERENCE" in Section I of this contract. See FAR 52.252-2 for an internet address (if specified) for electronic access to the full text of a clause.

NUMBER	TITLE	DATE
52.246-9	FEDERAL ACQUISITION REGULATION (48 CFR Chapter 1) INSPECTION OF RESEARCH AND DEVELOPMENT (SHORT FORM)	APR 1984

E.2 PLACE OF INSPECTION AND ACCEPTANCE (MAR 1987)

Inspection and acceptance of the deliverable items to be furnished hereunder shall be made by the Project Officer at the destination.

SECTION F - DELIVERIES OR PERFORMANCE**F.1 NOTICE LISTING CONTRACT CLAUSES INCORPORATED BY REFERENCE**

The following contract clauses pertinent to this section are hereby incorporated by reference (by Citation Number, Title, and Date) in accordance with the clause at FAR "52.252-2 CLAUSES INCORPORATED BY REFERENCE" in Section I of this contract. See FAR 52.252-2 for an internet address (if specified) for electronic access to the full text of a clause.

NUMBER	TITLE	DATE
	FEDERAL ACQUISITION REGULATION (48 CFR Chapter 1)	
52.242-15	STOP-WORK ORDER, ALTERNATE 1 (APR 1984)	AUG 1989
52.247-34	F.O.B. DESTINATION	NOV 1991
52.247-48	F.O.B. DESTINATION--EVIDENCE OF SHIPMENT	FEB 1999

F.2 2052.211-70 PREPARATION OF TECHNICAL REPORTS (JAN 1993)

All technical reports required by Section C and all Technical Progress Reports required by Section F are to be prepared in accordance with the attached Management Directive 3.8, "Unclassified Contractor and Grantee Publications in the NUREG Series." Management Directive 3.8 is not applicable to any Contractor Spending Plan (CSP) and any Financial Status Report that may be included in this contract. (See List of Attachments).

F.3 2052.211-71 TECHNICAL PROGRESS REPORT (JAN 1993)

The contractor shall provide a monthly Technical Progress Report to the project officer and the contracting officer. The report is due within 15 calendar days after the end of the report period and must identify the title of the project, the contract number, appropriate financial tracking code specified by the NRC Project Officer, project manager and/or principal investigator, the contract period of performance, and the period covered by the report. Each report must include the following for each discrete task/task order:

- (a) A listing of the efforts completed during the period, and milestones reached or, if missed, an explanation provided;
- (b) Any problems or delays encountered or anticipated and recommendations for resolution. If the recommended resolution involves a contract modification, e.g., change in work requirements, level of effort (cost) or schedule delay, the contractor shall submit a separate letter to the contracting officer identifying the required change and estimated cost impact.
- (c) A summary of progress to date; and

- (d) Plans for the next reporting period.

F.4 2052.211-72 FINANCIAL STATUS REPORT (OCT 1999)

The contractor shall provide a monthly Financial Status Report (FSR) to the project officer and the contracting officer. The FSR shall include the acquisition of, or changes in the status of, contractor-held property acquired with government funds valued at the time of purchase at \$50,000 or more. Whenever these types of property changes occur, the contractor shall send a copy of the report to the Chief, Property and Acquisition Oversight Branch, Office of Administration. The report is due within 15 calendar days after the end of the report period and must identify the title of the project, the contract number, the appropriate financial tracking code (e.g., Job Code Number or JCN) specified by the NRC Project Officer, project manager and/or principal investigator, the contract period of performance, and the period covered by the report. Each report must include the following for each discrete task:

- (a) Total estimated contract amount.
- (b) Total funds obligated to date.
- (c) Total costs incurred this reporting period.
- (d) Total costs incurred to date.
- (e) Detail of all direct and indirect costs incurred during the reporting period for the entire contract or each task, if it is a task ordering contract.
- (f) Balance of obligations remaining.
- (g) Balance of funds required to complete contract/task order.
- (h) Contractor Spending Plan (CSP) status: A revised CSP is required with the Financial Status Report whenever the contractor or the contracting officer has reason to believe that the total cost for performance of this contract will be either greater or substantially less than what had been previously estimated.
 - (1) Projected percentage of completion cumulative through the report period for the project/task order as reflected in the current CSP.
 - (2) Indicate significant changes in the original CSP projection in either dollars or percentage of completion. Identify the change, the reasons for the change, whether there is any projected overrun, and when additional funds would be required. If there have been no changes to the original NRC-approved CSP projections, a written statement to that effect is sufficient in lieu of submitting a detailed response to item "h".
- (i) Property status:
 - (1) List property acquired for the project during the month with an acquisition cost between \$5,000 and \$49,999. Give the item number for the specific piece of equipment.
 - (2) Provide a separate list of property acquired for the project during the month with an acquisition cost of \$50,000 or more. Provide the following information for each item of property: item description or nomenclature, manufacturer, model number, serial number, acquisition cost, and receipt date. If no property

was acquired during the month, include a statement to that effect. The same information must be provided for any component or peripheral equipment which is part of a "system or system unit."

(3) For multi-year projects, in the September monthly financial status report provide a cumulative listing of property with an acquisition cost of \$50,000 or more showing the information specified in paragraph (i)(2) of this clause.

(4) In the final financial status report provide a closeout property report containing the same elements as described above for the monthly financial status reports, for all property purchased with NRC funds regardless of value unless title has been vested in the contractor. If no property was acquired under the contract, provide a statement to that effect. The report should note any property requiring special handling for security, health, safety, or other reasons as part of the report.

(j) Travel status: List the starting and ending dates for each trip, the starting point and destination, and the traveler(s) for each trip.

(k) If the data in this report indicates a need for additional funding beyond that already obligated, this information may only be used as support to the official request for funding required in accordance with the Limitation of Cost (LOC) Clause (FAR 52.232-20) or the Limitation of Funds (LOF) Clause FAR 52.232-22.

F.5 PLACE OF DELIVERY--REPORTS (JUN 1988)

The items to be furnished hereunder shall be delivered, with all charges paid by the Contractor, to:

(a) Project Officer (copies)

Prasad Kadambi
U.S. Nuclear Regulatory Commission
M/S T-10-K-8
Washington, DC 20555

(b) Contracting Officer (1 copy)

Neha Dhir
U.S. Nuclear Regulatory Commission
M/S T-7-I-2
Washington, DC 20555

F.6 DURATION OF CONTRACT PERIOD (MAR 1987) ALTERNATE 2 (MAR 1987)

This contract shall commence on October 25, 2006 and will expire after a period of one (1) year. The term of this contract may be extended at the option of the Government for an additional two (2) one-year option periods.

F.7 DELIVERABLES AND DELIVERY SCHEDULE

(1) Reports generated under the previous RBHT contracts shall be improved as indicted in the description of Base year Task 1 and Section XI, Quality of NRC Research Projects in the Statement of Work (attached). These reports shall be submitted as draft reports within three (3) months following the

contract initiation. The final reports shall be submitted as NUREG/CR reports within six (6) months following the contract initiation.

- (2) A test matrix for a series of spacer grid thermal hydraulic tests shall be submitted within one (1) month after contract award. A test matrix for optional tests shall be submitted within one (1) month after the option is exercised.
- (3) Test procedures for spacer grid thermal hydraulic tests shall be submitted to the NRC within two (2) months after contract award. Test procedures for optional tests shall be submitted within two (2) months after the option is exercised.
- (4) A quick look report shall be submitted within one (1) month after each test.
- (5) All of the qualified data shall be provided in CDs in the NRC data bank format within one (1) month after the last test data of the test series are obtained. The data of certain selected tests may be requested earlier than the last test.
- (6) A test data report and a test evaluation report shall be provided within six (6) and eight (8) months, respectively, after testing is completed.
- (7) A test facility description report shall be updated as the facility is modified to perform the test series. A revised test facility report shall be issued and peer reviewed within three (3) months after testing is completed.
- (8) A final report documenting all experiments, descriptions of facility modification, and all evaluations shall be peer reviewed and provided to the NRC as a NUREG/CR report within nine (9) months following completion of the experimental work. The final report shall be in accordance with instructions given in NUREG-0650, Revision 2, Jan. 1999, with the following two (2) exceptions (see Section X of the Statement of Work):
 - (a) The Contractor 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 the camera-ready copy is sent to the printer. The NRC will place 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.
 - (b) The Contractor shall use a single column format instead of a two-column format.

SECTION G - CONTRACT ADMINISTRATION DATA**G.1 PROJECT OFFICER AUTHORITY (FEB 2004)**

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

Name: Prasad Kadambi

Address: U.S. Nuclear Regulatory Commission
M/S T-10-K-8
Washington, DC 20555

Telephone Number: (301) 415-5896

(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.

G.2 2052-215-77 TRAVEL APPROVALS AND REIMBURSEMENT (OCT 1999)

(a) All foreign travel must be approved in advance by the NRC on NRC Form 445, Request for Approval of Official Foreign Travel, and must be in compliance with FAR 52.247-63 Preference for U.S. Flag Air Carriers. The contractor shall submit NRC Form 445 to the NRC no later than 30 days before beginning travel.

(b) The contractor must receive written approval from the NRC Project Officer before taking travel that was unanticipated in the Schedule (i.e., travel not contemplated in the Statement of Work, or changes to specific travel identified in the Statement of Work).

(c) The contractor will be reimbursed only for travel costs incurred that are directly related to this contract and are allowable subject to the limitations prescribed in FAR 31.205-46.

(d) It is the responsibility of the contractor to notify the contracting officer in accordance with the Limitations of Cost clause of this contract when, at any time, the contractor learns that travel expenses will cause the contractor to exceed the estimated costs specified in the Schedule.

(e) Reasonable travel costs for research and related activities performed at State and nonprofit institutions, in accordance with Section 12 of Pub. L. 100-679, must be charged in accordance with the contractor's institutional policy to the degree that the limitations of Office of Management and Budget (OMB) guidance are not exceeded. Applicable guidance documents include OMB Circular A-87, Cost Principles for State and Local Governments; OMB Circular A-122, Cost Principles for Nonprofit Organizations; and OMB Circular A-21, Cost Principles for Educational Institutions.

G.3 INDIRECT COST RATES – ALTERNATE 1 (JAN 1993)

The contractor is reimbursed for allowable indirect cost in accordance with the following predetermined rates:

<u>Category</u>	<u>Rate</u>	<u>Cost Base</u>	<u>Applicable Period</u>
Fringe Benefits	26.6%	Direct Labor Salaries Plus Authorized Absence	Award - until revised
Fringe Benefits Graduate Assistants	14.1%	Direct Labor Salaries Graduate Assistants	Award - until revised
Fringe Benefits Salaries Wage Payroll	08.3%	Direct Labor Salaries Wage Payroll Employee	Award - until revised
Facilities & Administration Univ. (G&A) and Internal Overhead ARL	45.0%	Modified Total Direct Cost	Award - until revised

SECTION H - SPECIAL CONTRACT REQUIREMENTS**H.1 2052.242-70 RESOLVING NRC CONTRACTOR DIFFERING PROFESSIONAL VIEWS (DPVS) (OCT 1999)**

(a) The Nuclear Regulatory Commission's (NRC) policy is to support the contractor's expression of professional health and safety related concerns associated with the contractor's work for NRC that may differ from a prevailing NRC staff view, disagree with an NRC decision or policy position, or take issue with proposed or established agency practices. An occasion may arise when an NRC contractor, contractor's personnel, or subcontractor personnel believes that a conscientious expression of a competent judgment is required to document such concerns on matters directly associated with its performance of the contract. The NRC's policy is to support these instances as Differing Professional Views (DPVs).

(b) The procedure that will be used provides for the expression and resolution of differing professional views (DPVs) of health and safety related concerns associated with the mission of the agency by NRC contractors, contractor personnel or subcontractor personnel on matters directly associated with its performance of the contract. This procedure may be found in Attachments to this document. The contractor shall provide a copy of the NRC DPV procedure to all of its employees performing under this contract and to all subcontractors who shall, in turn, provide a copy of the procedure to its employees. The prime contractor or subcontractor shall submit all DPV's received but need not endorse them.

H.2 2052.242-71 PROCEDURES FOR RESOLVING NRC CONTRACTOR DIFFERING PROFESSIONAL VIEWS (DPVS) (OCT 1999)

(a) The following procedure provides for the expression and resolution of differing professional views (DPVs) of health and safety related concerns of NRC contractors and contractor personnel on matters connected to the subject of the contract. Subcontractor DPVs must be submitted through the prime contractor. The prime contractor or subcontractor shall submit all DPV's received but need not endorse them.

(b) The NRC may authorize up to eight reimbursable hours for the contractor to document, in writing, a DPV by the contractor, the contractor's personnel, or subcontractor personnel. The contractor shall not be entitled to any compensation for effort on a DPV which exceeds the specified eight hour limit.

(c) Before incurring costs to document a DPV, the contractor shall first determine whether there are sufficient funds obligated under the contract which are available to cover the costs of writing a DPV. If there are insufficient obligated funds under the contract, the contractor shall first request the NRC contracting officer for additional funding to cover the costs of preparing the DPV and authorization to proceed.

(d) Contract funds shall not be authorized to document an allegation where the use of this NRC contractor DPV process is inappropriate. Examples of such instances are: allegations of wrongdoing which should be addressed directly to the NRC Office of the Inspector General (OIG), issues submitted anonymously, or issues raised which have already been considered, addressed, or rejected, absent significant new information. This procedure does not provide anonymity. Individuals desiring anonymity should contact the NRC OIG or submit the information under NRC's Allegation Program, as appropriate.

(e) When required, the contractor shall initiate the DPV process by submitting a written statement directly to the NRC Office Director or Regional Administrator responsible for the contract, with a copy to the Contracting Officer, Division of Contracts and Property Management, Office of Administration. Each DPV submitted will be evaluated on its own merits.

(f) The DPV, while being brief, must contain the following as it relates to the subject matter of the contract:

(1) A summary of the prevailing NRC view, existing NRC decision or stated position, or the proposed or established NRC practice.

(2) A description of the submitter's views and how they differ from any of the above items.

(3) The rationale for the submitter's views, including an assessment based on risk, safety and cost benefit considerations of the consequences should the submitter's position not be adopted by NRC.

(g) The Office Director or Regional Administrator will immediately forward the submittal to the NRC DPV Review Panel and acknowledge receipt of the DPV, ordinarily within five (5) calendar days of receipt.

(h) The panel will normally review the DPV within seven calendar days of receipt to determine whether enough information has been supplied to undertake a detailed review of the issue. Typically, within 30 calendar days of receipt of the necessary information to begin a review, the panel will provide a written report of its findings to the Office Director or Regional Administrator and to the Contracting Officer, which includes a recommended course of action.

(i) The Office Director or Regional Administrator will consider the DPV Review Panel's report, make a decision on the DPV and provide a written decision to the contractor and the Contracting Officer normally within seven calendar days after receipt of the panel's recommendation.

(j) Subsequent to the decision made regarding the DPV Review Panel's report, a summary of the issue and its disposition will be included in the NRC Weekly Information Report submitted by the Office Director. The DPV file will be retained in the Office or Region for a minimum of one year thereafter. For purposes of the contract, the DPV shall be considered a deliverable under the contract. Based upon the Office Director or Regional Administrator's report, the matter will be closed.

H.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

(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.

H.4 2052.215-70 KEY PERSONNEL (JAN 1993)

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

[REDACTED]

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.

H.5 2052.235-70 PUBLICATION OF RESEARCH RESULTS (OCT 1999)

(a) The principal investigator(s)/contractor shall comply with the provisions of NRC Management Directive 3.8 (Vol. 3; Part 1) and NRC Handbook 3.8 (Parts I-IV) regarding publication in refereed scientific and engineering journals or dissemination to the public of any information, oral or written, concerning the work performed under this contract. Failure to comply with this clause shall be grounds for termination of this contract.

(b) The principal investigator(s)/contractor may publish the results of this work in refereed scientific and engineering journals or in open literature and present papers at public or association meetings at interim stages of work, in addition to submitting to NRC the final reports and other deliverables required under this contract. However, such publication and papers shall focus on advances in science and technology and minimize conclusions and/or recommendations which may have regulatory implications.

(c) The principal investigator(s) shall coordinate all such publications with, and transmit a copy of the proposed article or paper to, the NRC Contracting Officer or Project Officer, prior to publication. The NRC agrees to review and provide comments within thirty (30) days after receipt of a proposed publication. However, in those cases where the information to be published is (1) subject to Commission approval, (2) has not been ruled upon, or (3) disapproved by the Commission, the NRC reserves the right to disapprove or delay the publication. Further, if the NRC disagrees with the proposed publication for any reason, it reserves the right to require that any publication not identify the NRC's sponsorship of the work and that any associated publication costs shall be borne by the contractor.

H.6 2052.235-71 SAFETY, HEALTH, AND FIRE PROTECTION (JAN 1993)

The contractor shall take all reasonable precautions in the performance of the work under this contract to protect the health and safety of its employees and of members of the public, including NRC employees and contractor personnel, and to minimize danger from all hazards to life and property. The contractor shall comply with all applicable health, safety, and fire protection regulations and requirements (including reporting requirements) of the Commission and the Department of Labor. If the contractor fails to comply with these regulations or requirements, the contracting office may, without prejudice to any other legal or contractual rights of the Commission, issue an order stopping all or any part of the work. Thereafter, a start work order for resumption of work may be issued at the discretion of the contracting officer. The contractor may not make a claim for an extension of time or for compensation or damages by reason of, or in connection with, this type of work stoppage.

H.7 CONTRACTOR ACQUIRED GOVERNMENT EQUIPMENT/PROPERTY (DEC 1995)

- (a) Under Contract No. NRC-04-98-041, the Contractor was authorized to acquire and/or fabricate the "rod Bundle Test Facility" for use in the performance of that contract.
- (b) Under Contract Nos. NRC-04-03-059 and NRC-04-04-063, the Contractor utilized the existing rod bundle test facility to perform a service of additional testing, such as steam-water interfacial drag tests.
- (c) NRC and the Contractor (Pennsylvania State University a.k.a. Penn State) has joint ownership of the Rod Bundle Test Facility developed under Contract No. NRC-04-98041, in accordance with the following provisions:
 - (i) The Rod Bundle Test Facility will be used exclusively for conducting Phase 3 of the research program, and it will not be physically removed from Penn State throughout the duration of the contract.
 - (ii) Any third parties who wish to use the Test Facility during the duration of the contract shall require prior approval from both Penn State and the NRC.
 - (iii) When the test facility is no longer of use by the Government, in accordance with FAR Clause 52.245-5, GOVERNMENT PROPERTY (COST REIMBURSEMENT, TIME AND MATERIAL, OR LABOR HOUR CONTRACTS), ALTERNATE I (JUL 1985), paragraph

(c)(4), title to equipment and all personal property shall vest with Penn State; however Penn State agrees that no charge shall be made to the Government for any depreciation, amortization, or use under any existing or future Government contracts or subcontracts thereunder.

- (iv) Penn State shall provide the NRC with a list of all equipment to which title has been vested within 10 days after the end of the calendar quarter during which the equipment was received.

- (d) Under this contract, the Contractor is authorized to acquire and/or fabricate the equipment/property listed below for use in the performance of this contract.

VisiSizer Solo Software
Water Flow Meters (2)
Ground Plate

- (e) In the event that, during contract performance, the contractor determines that the acquisition for cost for the above item(s) is expected to exceed the amount(s) contained in the contractor's proposal, the contractor shall refer to the Limitation of Cost clause or the Limitation of Funds clause when either is included in the contract.

Only the equipment/property listed above, in the quantities shown, will be acquired by the contractor. Additional equipment/property valued at \$5000 or more may be acquired only after contracting officer approval is authorized by an amendment to this clause. The above listed equipment/property is subject to the provisions of the "Government Property" clause.

H.8 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.

H.9 ANNUAL AND FINAL CONTRACTOR PERFORMANCE EVALUATIONS

Annual and final evaluations of contractor performance under this contract will be prepared in accordance with FAR 42.15, "Contractor Performance Information," normally at the time the contractor is notified of the NRC's intent to exercise the contract option. If the multi-year contract does not have option years, then an annual evaluation will be prepared (state time for annual evaluation). Final evaluations of contractor performance will be prepared at the expiration of the contract during the contract closeout process.

The Contracting Officer will transmit the NRC Project Officer's annual and final contractor performance evaluations to the contractor's Project Manager, unless otherwise instructed by the contractor. The contractor will be permitted thirty days to review the document. The contractor may concur without comment, submit additional information, or request a meeting to discuss the performance evaluation. The Contracting Officer may request the contractor's Project Manager to attend a meeting to discuss the performance evaluation.

Where a contractor concurs with, or takes no exception to an annual performance evaluation, the Contracting Officer will consider such evaluation final and releasable for source selection purposes. Disagreements between the parties regarding a performance evaluation will be referred to an individual one level above the Contracting Officer, whose decision will be final.

The Contracting Officer will send a copy of the completed evaluation report, marked "For Official Use Only," to the contractor's Project Manager for their records as soon as practicable after it has been finalized. The

completed evaluation report also will be used as a tool to improve communications between the NRC and the contractor and to improve contract performance.

The completed annual performance evaluation will be used to support future award decisions in accordance with FAR 42.1502(a) and 42.1503(c). During the period the information is being used to provide source selection information, the completed annual performance evaluation will be released to only two parties - the Federal government personnel performing the source selection evaluation and the contractor under evaluation if the contractor does not have a copy of the report already.

H.10 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.

(End of Clause)

PART II - CONTRACT CLAUSES**SECTION I - CONTRACT CLAUSES****I.1 NOTICE LISTING CONTRACT CLAUSES INCORPORATED BY REFERENCE**

The following contract clauses pertinent to this section are hereby incorporated by reference (by Citation Number, Title, and Date) in accordance with the clause at FAR "52.252-2 CLAUSES INCORPORATED BY REFERENCE" in Section I of this contract. See FAR 52.252-2 for an internet address (if specified) for electronic access to the full text of a clause.

NUMBER	TITLE	DATE
	FEDERAL ACQUISITION REGULATION (48 CFR Chapter 1)	
52.202-1	DEFINITIONS	JUL 2004
52.203-3	GRATUITIES	APR 1984
52.203-5	COVENANT AGAINST CONTINGENT FEES	APR 1984
52.203-6	RESTRICTIONS ON SUBCONTRACTOR SALES TO THE GOVERNMENT	JUL 1995
52.203-7	ANTI-KICKBACK PROCEDURES	JUL 1995
52.203-8	CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY	JAN 1997
52.203-10	PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY	JAN 1997
52.203-12	LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS	SEP 2005
52.204-4	PRINTED OR COPIED DOUBLE-SIDED ON RECYCLED PAPER	AUG 2000
52.204-7	CENTRAL CONTRACTOR REGISTRATION (OCT 2003)	OCT 2003
52.209-6	PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT	JAN 2005
52.215-2	AUDIT AND RECORDS--NEGOTIATION ALTERNATE II (APR 1998)	JUN 1999
52.215-8	ORDER OF PRECEDENCE--UNIFORM CONTRACT FORMAT	OCT 1997
52.215-10	PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA	OCT 1997
52.215-12	SUBCONTRACTOR COST OR PRICING DATA	OCT 1997
52.215-15	PENSION ADJUSTMENTS AND ASSET REVERSIONS (JAN 2004)	OCT 2004
52.215-18	REVERSION OR ADJUSTMENT OF PLANS FOR POSTRETIREMENT BENEFITS OTHER THAN PENSIONS (PRB)	JUL 2005
52.215-19	NOTIFICATION OF OWNERSHIP CHANGES	OCT 1997

52.216-11	COST CONTRACT--NO FEE	APR 1984
52.216-15	PREDETERMINED INDIRECT COST RATES	APR 1998
52.219-8	UTILIZATION OF SMALL BUSINESS CONCERNS	MAY 2004
52.219-9	SMALL BUSINESS SUBCONTRACTING PLAN ALTERNATE II (OCT 2001)	JAN 2002
52.219-16	LIQUIDATED DAMAGES-SMALL BUSINESS SUBCONTRACTING PLAN	JAN 1999
52.222-3	CONVICT LABOR	JUN 2003
52.222-21	PROHIBITION OF SEGREGATED FACILITIES	FEB 1999
52.222-26	EQUAL OPPORTUNITY	APR 2002
52.222-35	EQUAL OPPORTUNITY FOR SPECIAL DISABLED VETERANS, OF THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS	DEC 2001
52.222-36	AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES	JUN 1998
52.222-37	EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS	DEC 2001
52.223-6	DRUG-FREE WORKPLACE	MAY 2001
52.225-13	RESTRICTIONS ON CERTAIN FOREIGN PURCHASES	FEB 2006
52.227-1	AUTHORIZATION AND CONSENT ALTERNATE I (APR 1984)	JUL 1995
52.227-2	NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT	AUG 1996
52.227-11	PATENT RIGHTS -- RETENTION BY THE CONTRACTOR (SHORT FORM)	JUN 1997
52.227-14	RIGHTS IN DATA--GENERAL ALTERNATE IV (JUN 1987)	JUN 1987
52.227-16	ADDITIONAL DATA REQUIREMENTS	JUN 1987
52.228-7	INSURANCE--LIABILITY TO THIRD PERSONS	MAR 1996
52.230-5	COST ACCOUNTING STANDARDS--EDUCATIONAL INSTITUTION	APR 1996
52.230-6	ADMINISTRATION OF COST ACCOUNTING STANDARDS	APR 2005
52.232-22	LIMITATION OF FUNDS	APR 1984
52.232-23	ASSIGNMENT OF CLAIMS	JAN 1986
52.232-34	PAYMENT BY ELECTRONIC FUNDS TRANSFER-- OTHER THAN CENTRAL CONTRACTOR REGISTRATION	MAY 1999
52.233-3	PROTEST AFTER AWARD ALTERNATE I (JUN 1985)	AUG 1996
52.233-4	APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM	OCT 2004
52.242-1	NOTICE OF INTENT TO DISALLOW COSTS	APR 1984
52.242-3	PENALTIES FOR UNALLOWABLE COSTS	MAY 2001
52.242-13	BANKRUPTCY	JUL 1995
52.243-2	CHANGES--COST REIMBURSEMENT ALTERNATE V (APR 1984)	AUG 1987
52.244-2A	SUBCONTRACTS ALTERNATE I (JAN 2006)	JAN 2006
52.244-5	COMPETITION IN SUBCONTRACTING	DEC 1996
52.244-6	SUBCONTRACTS FOR COMMERCIAL ITEMS	FEB 2006

52.245-9	AND COMMERCIAL COMPONENTS USE AND CHARGES	AUG 2005
52.246-23	LIMITATION OF LIABILITY	FEB 1997
52.246-25	LIMITATION OF LIABILITY--SERVICES	FEB 1997
52.249-5	TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (EDUCATIONAL AND OTHER NONPROFIT INSTITUTIONS)	SEP 1996
52.253-1	COMPUTER GENERATED FORMS	JAN 1991

I.2 52.216-7 ALLOWABLE COST AND PAYMENT (DEC 2002)

(a) Invoicing. (1) The Government will make payments to the Contractor when requested as work progresses, but (except for small business concerns) not more often than once every 2 weeks, in amounts determined to be allowable by the Contracting Officer in accordance with Federal Acquisition Regulation (FAR) subpart 31.3 in effect on the date of this contract and the terms of this contract. The Contractor may submit to an authorized representative of the Contracting Officer, in such form and reasonable detail as the representative may require, an invoice or voucher supported by a statement of the claimed allowable cost for performing this contract.

(2) Contract financing payments are not subject to the interest penalty provisions of the Prompt Payment Act. Interim payments made prior to the final payment under the contract are contract financing payments, except interim payments if this contract contains Alternate I to the clause at 52.232-25.

(3) The designated payment office will make interim payments for contract financing on the 30TH day after the designated billing office receives a proper payment request.

In the event that the Government requires an audit or other review of a specific payment request to ensure compliance with the terms and conditions of the contract, the designated payment office is not compelled to make payment by the specified due date.

(b) Reimbursing costs. (1) For the purpose of reimbursing allowable costs (except as provided in paragraph (b)(2) of the clause, with respect to pension, deferred profit sharing, and employee stock ownership plan contributions), the term "costs" includes only--

(i) Those recorded costs that, at the time of the request for reimbursement, the Contractor has paid by cash, check, or other form of actual payment for items or services purchased directly for the contract;

(ii) When the Contractor is not delinquent in paying costs of contract performance in the ordinary course of business, costs incurred, but not necessarily paid, for--

(A) Supplies and services purchased directly for the contract and associated financing payments to subcontractors, provided payments determined due will be made--

(1) In accordance with the terms and conditions of a subcontract or invoice; and

(2) Ordinarily within 30 days of the submission of the Contractor's payment request to the Government;

(B) Materials issued from the Contractor's inventory and placed in the production process for use on the contract;

(C) Direct labor;

(D) Direct travel;

(E) Other direct in-house costs; and

(F) Properly allocable and allowable indirect costs, as shown in the records maintained by the Contractor for purposes of obtaining reimbursement under Government contracts; and

(iii) The amount of financing payments that have been paid by cash, check, or other forms of payment to subcontractors.

(2) Accrued costs of Contractor contributions under employee pension plans shall be excluded until actually paid unless-

(i) The Contractor's practice is to make contributions to the retirement fund quarterly or more frequently; and

(ii) The contribution does not remain unpaid 30 days after the end of the applicable quarter or shorter payment period (any contribution remaining unpaid shall be excluded from the Contractor's indirect costs for payment purposes).

(3) Notwithstanding the audit and adjustment of invoices or vouchers under paragraph (g) below, allowable indirect costs under this contract shall be obtained by applying indirect cost rates established in accordance with paragraph (d) below.

(4) Any statements in specifications or other documents incorporated in this contract by reference designating performance of services or furnishing of materials at the Contractor's expense or at no cost to the Government shall be disregarded for purposes of cost-reimbursement under this clause.

(c) Small business concerns. A small business concern may receive more frequent payments than every 2 weeks.

(d) Final indirect cost rates. (1) Final annual indirect cost rates and the appropriate bases shall be established in accordance with Subpart 42.7 of the Federal Acquisition Regulation (FAR) in effect for the period covered by the indirect cost rate proposal.

(2)(i) The Contractor shall submit an adequate final indirect cost rate proposal to the Contracting Officer (or cognizant Federal agency official) and auditor within the 6-month period following the expiration of each of its fiscal years. Reasonable extensions, for exceptional circumstances only, may be requested in writing by the Contractor and granted in writing by the Contracting Officer. The Contractor shall support its proposal with adequate supporting data.

(ii) The proposed rates shall be based on the Contractor's actual cost experience for that period. The appropriate Government representative and the Contractor shall establish the final indirect cost rates as promptly as practical after receipt of the Contractor's proposal.

(3) The Contractor and the appropriate Government representative shall execute a written understanding setting forth the final indirect cost rates. The understanding shall specify (i) the agreed-upon final annual indirect cost rates, (ii) the bases to which the rates apply, (iii) the periods for which the rates apply, (iv) any specific indirect cost items treated as direct costs in the settlement, and (v) the affected contract and/or subcontract, identifying any with advance agreements or special terms and the applicable rates. The understanding shall not change any monetary ceiling, contract obligation, or specific cost allowance or disallowance provided for in this contract. The understanding is incorporated into this contract upon execution.

(4) Failure by the parties to agree on a final annual indirect cost rate shall be a dispute within the meaning of the Disputes clause.

(A) Specified claims stated in exact amounts; or in estimated amounts when the exact amounts are not known;

(B) Claims (including reasonable incidental expenses) based upon liabilities of the Contractor to third parties arising out of the performance of this contract; provided, that the claims are not known to the Contractor on the date of the execution of the release, and that the Contractor gives notice of the claims in writing to the Contracting Officer within 6 years following the release date or notice of final payment date, whichever is earlier; and

(C) Claims for reimbursement of costs, including reasonable incidental expenses, incurred by the Contractor under the patent clauses of this contract, excluding, however, any expenses arising from the Contractor's indemnification of the Government against patent liability.

I.3 52.217-9 OPTION TO EXTEND THE TERM OF THE CONTRACT (MAR 2000)

(a) The Government may extend the term of this contract by written notice to the Contractor within 60 days; provided that the Government gives the Contractor a preliminary written notice of its intent to extend at least 30 days before the contract expires. The preliminary notice does not commit the Government to an extension.

(b) If the Government exercises this option, the extended contract shall be considered to include this option clause.

(c) The total duration of this contract, including the exercise of any options under this clause, shall not exceed 3 years.

I.4 52.232-25 PROMPT PAYMENT (OCT 2003)

Notwithstanding any other payment clause in this contract, the Government will make invoice payments under the terms and conditions specified in this clause. The Government considers payment as being made on the day a check is dated or the date of an electronic funds transfer (EFT). Definitions of pertinent terms are set forth in sections 2.101, 32.001, and 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see paragraph (a)(4) of this clause concerning payments due on Saturdays, Sundays, and legal holidays.)

(a) Invoice payments--

(1) Due date.

(i) Except as indicated in paragraphs (a)(2) and (c) of this clause, the due date for making invoice payments by the designated payment office is the later of the following two events:

(A) The 30th day after the designated billing office receives a proper invoice from the Contractor (except as provided in paragraph (a)(1)(ii) of this clause).

(B) The 30th day after Government acceptance of supplies delivered or services performed. For a final invoice, when the payment amount is subject to contract settlement actions, acceptance is deemed to occur on the effective date of the contract settlement.

(ii) If the designated billing office fails to annotate the invoice with the actual date of receipt at the time of receipt, the invoice payment due date is the 30th day after the date of the Contractor's invoice, provided the designated billing office receives a proper invoice and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(2) Certain food products and other payments.

(i) Due dates on Contractor invoices for meat, meat food products, or fish; perishable agricultural commodities; and dairy products, edible fats or oils, and food products prepared from edible fats or oils are--

(A) For meat or meat food products, as defined in section 2(a)(3) of the Packers and Stockyard Act of 1921 (7 U.S.C. 182(3)), and as further defined in Pub. L. 98-181, including any edible fresh or frozen poultry meat, any perishable poultry meat food product, fresh eggs, and any perishable egg product, as close as possible to, but not later than, the 7th day after product delivery.

(B) For fresh or frozen fish, as defined in section 204(3) of the Fish and Seafood Promotion Act of 1986 (16 U.S.C. 4003(3)), as close as possible to, but not later than, the 7th day after product delivery.

(C) For perishable agricultural commodities, as defined in section 1(4) of the Perishable Agricultural Commodities Act of 1930 (7 U.S.C. 499a(4)), as close as possible to, but not later than, the 10th day after product delivery, unless another date is specified in the contract.

(D) For dairy products, as defined in section 111(e) of the Dairy Production Stabilization Act of 1983 (7 U.S.C. 4502(e)), edible fats or oils, and food products prepared from edible fats or oils, as close as possible to, but not later than, the 10th day after the date on which a proper invoice has been received. Liquid milk, cheese, certain processed cheese products, butter, yogurt, ice cream, mayonnaise, salad dressings, and other similar products, fall within this classification. Nothing in the Act limits this classification to refrigerated products. When questions arise regarding the proper classification of a specific product, prevailing industry practices will be followed in specifying a contract payment due date. The burden of proof that a classification of a specific product is, in fact, prevailing industry practice is upon the Contractor making the representation.

(ii) If the contract does not require submission of an invoice for payment (e.g., periodic lease payments), the due date will be as specified in the contract.

(3) Contractor's invoice. The Contractor shall prepare and submit invoices to the designated billing office specified in the contract. A proper invoice must include the items listed in paragraphs (a)(3)(i) through (a)(3)(x) of this clause. If the invoice does not comply with these requirements, the designated billing office will return it within 7 days after receipt (3 days for meat, meat food products, or fish; 5 days for perishable agricultural commodities, dairy products, edible fats or oils, and food products prepared from edible fats or oils), with the reasons why it is not a proper invoice. The Government will take into account untimely notification when computing any interest penalty owed the Contractor.

(i) Name and address of the Contractor.

(ii) Invoice date and invoice number. (The Contractor should date invoices as close as possible to the date of the mailing or transmission.)

(iii) Contract number or other authorization for supplies delivered or services performed (including order number and contract line item number).

(iv) Description, quantity, unit of measure, unit price, and extended price of supplies delivered or services performed.

(v) Shipping and payment terms (e.g., shipment number and date of shipment, discount for prompt payment terms). Bill of lading number and weight of shipment will be shown for shipments on Government bills of lading.

(vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).

(vii) Name (where practicable), title, phone number, and mailing address of person to notify in the event of a defective invoice.

(viii) Taxpayer Identification Number (TIN). The Contractor shall include its TIN on the invoice only if required elsewhere in this contract.

(ix) Electronic funds transfer (EFT) banking information.

(A) The Contractor shall include EFT banking information on the invoice only if required elsewhere in this contract.

(B) If EFT banking information is not required to be on the invoice, in order for the invoice to be a proper invoice, the Contractor shall have submitted correct EFT banking information in accordance with the applicable solicitation provision (e.g., 52.232- 38, Submission of Electronic Funds Transfer Information with Offer), contract clause (e.g., 52.232-33, Payment by Electronic Funds Transfer--Central Contractor Registration, or 52.232-34, Payment by Electronic Funds Transfer--Other Than Central Contractor Registration), or applicable agency procedures.

(C) EFT banking information is not required if the Government waived the requirement to pay by EFT.

(x) Any other information or documentation required by the contract (e.g., evidence of shipment).

(4) Interest penalty. The designated payment office will pay an interest penalty automatically, without request from the Contractor, if payment is not made by the due date and the conditions listed in paragraphs (a)(4)(i) through (a)(4)(iii) of this clause are met, if applicable. However, when the due date falls on a Saturday, Sunday, or legal holiday, the designated payment office may make payment on the following working day without incurring a late payment interest penalty.

(i) The designated billing office received a proper invoice.

(ii) The Government processed a receiving report or other Government documentation authorizing payment, and there was no disagreement over quantity, quality, or Contractor compliance with any contract term or condition.

(iii) In the case of a final invoice for any balance of funds due the Contractor for supplies delivered or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.

(5) Computing penalty amount. The Government will compute the interest penalty in accordance with the Office of Management and Budget prompt payment regulations at 5 CFR part 1315.

(i) For the sole purpose of computing an interest penalty that might be due the Contractor, Government acceptance is deemed to occur constructively on the 7th day (unless otherwise specified in this contract) after the Contractor delivers the supplies or performs the services in accordance with the terms and conditions of the contract, unless there is a disagreement over quantity, quality, or Contractor compliance with a contract provision. If actual acceptance occurs within the constructive acceptance period, the Government will base the determination of an interest penalty on the actual date of acceptance. The constructive acceptance

requirement does not, however, compel Government officials to accept supplies or services, perform contract administration functions, or make payment prior to fulfilling their responsibilities.

(ii) The prompt payment regulations at 5 CFR 1315.10(c) do not require the Government to pay interest penalties if payment delays are due to disagreement between the Government and the Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with the terms of the contract. The Government and the Contractor shall resolve claims involving disputes and any interest that may be payable in accordance with the clause at FAR 52.233-1, Disputes.

(6) Discounts for prompt payment. The designated payment office will pay an interest penalty automatically, without request from the Contractor, if the Government takes a discount for prompt payment improperly. The Government will calculate the interest penalty in accordance with the prompt payment regulations at 5 CFR part 1315.

(7) Additional interest penalty.

(i) The designated payment office will pay a penalty amount, calculated in accordance with the prompt payment regulations at 5 CFR part 1315 in addition to the interest penalty amount only if--

(A) The Government owes an interest penalty of \$1 or more;

(B) The designated payment office does not pay the interest penalty within 10 days after the date the invoice amount is paid; and

(C) The Contractor makes a written demand to the designated payment office for additional penalty payment, in accordance with paragraph (a)(7)(ii) of this clause, postmarked not later than 40 days after the invoice amount is paid.

(ii)(A) The Contractor shall support written demands for additional penalty payments with the following data. The Government will not request any additional data. The Contractor shall--

(1) Specifically assert that late payment interest is due under a specific invoice, and request payment of all overdue late payment interest penalty and such additional penalty as may be required;

(2) Attach a copy of the invoice on which the unpaid late payment interest is due; and

(3) State that payment of the principal has been received, including the date of receipt.

(B) If there is no postmark or the postmark is illegible--

(1) The designated payment office that receives the demand will annotate it with the date of receipt, provided the demand is received on or before the 40th day after payment was made; or

(2) If the designated payment office fails to make the required annotation, the Government will determine the demand's validity based on the date the Contractor has placed on the demand, provided such date is no later than the 40th day after payment was made.

(iii) The additional penalty does not apply to payments regulated by other Government regulations (e.g., payments under utility contracts subject to tariffs and regulation).

(b) Contract financing payment. If this contract provides for contract financing, the Government will make contract financing payments in accordance with the applicable contract financing clause.

(c) Fast payment procedure due dates. If this contract contains the clause at 52.213-1, Fast Payment Procedure, payments will be made within 15 days after the date of receipt of the invoice.

(d) Overpayments. If the Contractor becomes aware of a duplicate contract financing or invoice payment or that the Government has otherwise overpaid on a contract financing or invoice payment, the Contractor shall immediately notify the Contracting Officer and request instructions for disposition of the overpayment.

I.5 52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER--CENTRAL CONTRACTOR REGISTRATION (OCT 2003)

(a) Method of payment. (1) All payments by the Government under this contract shall be made by electronic funds transfer (EFT), except as provided in paragraph (a)(2) of this clause. As used in this clause, the term "EFT" refers to the funds transfer and may also include the payment information transfer.

(2) In the event the Government is unable to release one or more payments by EFT, the Contractor agrees to either--

(i) Accept payment by check or some other mutually agreeable method of payment; or

(ii) Request the Government to extend the payment due date until such time as the Government can make payment by EFT (but see paragraph (d) of this clause).

(b) Contractor's EFT information. The Government shall make payment to the Contractor using the EFT information contained in the Central Contractor Registration (CCR) database. In the event that the EFT information changes, the Contractor shall be responsible for providing the updated information to the CCR database.

(c) Mechanisms for EFT payment. The Government may make payment by EFT through either the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House Association, or the Fedwire Transfer System. The rules governing Federal payments through the ACH are contained in 31 CFR part 210.

(d) Suspension of payment. If the Contractor's EFT information in the CCR database is incorrect, then the Government need not make payment to the Contractor under this contract until correct EFT information is entered into the CCR database; and any invoice or contract financing request shall be deemed not to be a proper invoice for the purpose of prompt payment under this contract. The prompt payment terms of the contract regarding notice of an improper invoice and delays in accrual of interest penalties apply.

(e) Liability for uncompleted or erroneous transfers. (1) If an uncompleted or erroneous transfer occurs because the Government used the Contractor's EFT information incorrectly, the Government remains responsible for--

(i) Making a correct payment;

(ii) Paying any prompt payment penalty due; and

(iii) Recovering any erroneously directed funds.

(2) If an uncompleted or erroneous transfer occurs because the Contractor's EFT information was incorrect, or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and--

(i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Contractor is responsible for recovery of any erroneously directed funds; or

(ii) If the funds remain under the control of the payment office, the Government shall not make payment, and the provisions of paragraph (d) of this clause shall apply.

(f) EFT and prompt payment. A payment shall be deemed to have been made in a timely manner in accordance with the prompt payment terms of this contract if, in the EFT payment transaction instruction released to the Federal Reserve System, the date specified for settlement of the payment is on or before the prompt payment due date, provided the specified payment date is a valid date under the rules of the Federal Reserve System.

(g) EFT and assignment of claims. If the Contractor assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Contractor shall require as a condition of any such assignment, that the assignee shall register separately in the CCR database and shall be paid by EFT in accordance with the terms of this clause. Notwithstanding any other requirement of this contract, payment to an ultimate recipient other than the Contractor, or a financial institution properly recognized under an assignment of claims pursuant to subpart 32.8, is not permitted. In all respects, the requirements of this clause shall apply to the assignee as if it were the Contractor. EFT information that shows the ultimate recipient of the transfer to be other than the Contractor, in the absence of a proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of paragraph (d) of this clause.

(h) Liability for change of EFT information by financial agent. The Government is not liable for errors resulting from changes to EFT information made by the Contractor's financial agent.

(i) Payment information. The payment or disbursing office shall forward to the Contractor available payment information that is suitable for transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Contractor to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government shall mail the payment information to the remittance address contained in the CCR database.

I.6 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>

PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS**SECTION J - LIST OF ATTACHMENTS**

Attachment Number	Title
J.1	Billing Instructions – Cost Reimbursement
J.2	Contractor Spending Plan (CSP)

BILLING INSTRUCTIONS FOR
COST REIMBURSEMENT TYPE CONTRACTS (October 2003)

General: The contractor is responsible during performance and through final payment of this contract for the accuracy and completeness of the data within the Central Contractor Registration (CCR) database, and for any liability resulting from the Government's reliance on inaccurate or incomplete CCR data. The contractor shall prepare vouchers/invoices for reimbursement of costs in the manner and format described herein. **FAILURE TO SUBMIT VOUCHERS/INVOICES IN ACCORDANCE WITH THESE INSTRUCTIONS WILL RESULT IN REJECTION OF THE VOUCHER/INVOICE AS IMPROPER.**

Number of Copies: An original and three copies, including supporting documentation shall be submitted. A copy of all supporting documents must be attached to each copy of your voucher/invoice. Failure to submit all the required copies will result in rejection of the voucher/invoice as improper.

Designated Agency Billing Office: Vouchers/invoices shall be submitted to the following address:

U.S. Nuclear Regulatory Commission
Division of Contracts - T-7-I-2
Washington, DC 20555

HAND DELIVERY OF VOUCHERS/INVOICES IS DISCOURAGED AND WILL NOT EXPEDITE PROCESSING BY NRC. However, should you choose to deliver vouchers/invoices by hand, including delivery by any express mail services or special delivery services which use a courier or other person to deliver the voucher/invoice in person to the NRC, such vouchers/invoices must be addressed to the above Designated Agency Billing Office and will only be accepted at the following location:

U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike - Mail Room
Rockville, MD 20852

HAND-CARRIED SUBMISSIONS WILL NOT BE ACCEPTED AT OTHER THAN THE ABOVE ADDRESS.

Note that the official receipt date for hand-delivered vouchers/invoices will be the date it is received by the official agency billing office in the Division of Contracts.

Agency Payment Office: Payment will continue to be made by the office designated in the contract in Block 12 of SF 26 or Block 25 of SF 33, whichever is applicable.

Frequency: The contractor shall submit claims for reimbursement once each month, unless otherwise authorized by the Contracting Officer.

Format: Claims should be submitted in the format depicted on the attached sample form entitled "Voucher/Invoice for Purchases and Services Other than Personal" (see **Attachment 1**). The sample format is provided for guidance only. The format is not required for submission of a voucher/invoice. Alternate formats are permissible provided all requirements of the billing instructions are addressed. The instructions for preparation and itemization of the voucher/invoice are included with the sample form.

INVOICE/VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL**(SAMPLE FORMAT)****1. Official Agency Billing Office**

U.S. Nuclear Regulatory Commission
 Division of Contracts MS: T-7-I-2
 Washington, DC 20555-0001

2. Voucher Information

a. Payee's DUNS Number or DUNS+4. The Payee shall include the Payee's Data Universal Number (DUNS) or DUNS+4 number that identifies the Payee's name and address. The DUNS+4 number is the DUNS number plus a 4-character suffix that may be assigned at the discretion of the Payee to identify alternative Electronic Funds Transfer (EFT) accounts for the same parent concern.

b. Payee's Name and Address. Show the name of the Payee as it appears in the contract and its correct address. If the Payee assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Payee shall require as a condition of any such assignment, that the assignee shall register separately in the Central Contractor Registration (CCR) database at <http://www.ccr.gov> and shall be paid by EFT in accordance with the terms of this contract. See Federal Acquisition Regulation 52.232-33(g) Payment by Electronic Funds Transfer - Central Contractor Registration (October 2003).

c. Contract Number. Insert the NRC contract number.
 Task Order No. Insert the task order number (If Applicable).

d. Voucher/Invoice. The appropriate sequential number of the voucher/invoice, beginning with 001 should be designated. Contractors may also include an individual internal accounting number, if desired, in addition to the 3-digit sequential number.

e. Date of Voucher/Invoice. Insert the date the voucher/invoice is prepared.

f. Billing period. Insert the beginning and ending dates (day, month, year) of the period during which costs were incurred and for which reimbursement is claimed.

g. Direct Costs - Insert the amount billed for the following cost elements, adjustments, suspensions, and total amounts, for both the current billing period and for the cumulative period (from contract inception to end date of this billing period).

- (1) Direct Labor. This consists of salaries and wages paid (or accrued) for direct performance of the contract itemized as follows:

Labor	Hrs.	Cumulative
<u>Category</u>	<u>Billed</u> <u>Rate</u> <u>Total</u>	<u>Hrs.Billed</u>

- (2) Fringe Benefits. This represents fringe benefits applicable to direct labor and billed as a direct cost. Where a rate is used indicate the rate. Fringe benefits included in direct labor or in other indirect cost pools should not be identified here.

- (3) Capitalized Non Expendable Equipment. List each item costing \$50,000 or more and having a life expectancy of more than one year. List only those items of equipment for which reimbursement is requested. For each such item, list the following (as applicable): (a) the item number for the specific piece of equipment listed in the property schedule of the contract; or (b) the Contracting Officer's approval letter if the equipment is not covered by the property schedule.

- (4) Non-capitalized Equipment, Materials, and Supplies. These are equipment other than that described in (3) above, plus consumable materials, supplies. List by category. List items valued at \$500 or more separately. Provide the item number for each piece of equipment valued at \$500 or more.

- (5) **Premium Pay.** This enumeration in excess of the basic hourly rate. (Requires written approval of the Contracting Officer.)
- (6) **Consultants.** The supporting information must include the name, hourly or daily rate of the consultant, and reference the NRC approval (if not specifically approved in the original contract).
- (7) **Travel.** Total costs associated with each trip must be shown in the following format:

<u>Start Date</u>		<u>Destination</u>		<u>Costs</u>
From	To	From	To	\$

- (8) **Subcontracts.** Include separate detailed breakdown of all costs paid to approved subcontractors during the billing period.
- (9) **Other Costs.** List all other direct costs by cost element and dollar amount separately.

- h. **Indirect Costs (Overhead and General and Administrative Expense).** Cite the formula (rate and base) in effect in accordance with the terms of the contract, during the time the costs were incurred and for which reimbursement is claimed.
- i. **Fixed Fee.** If the contract provides for a fixed fee, it must be claimed as provided for by the contract. Cite the formula or method of computation. Include this information as it applies to individual task orders as well. The contractor may bill for fixed fee only up to 85% of total fee.
- j. **Total Amount Billed.** Insert the total amounts claimed for the current and cumulative periods.
- k. **Adjustments.** For cumulative amount, include outstanding suspensions.
- l. **Grand Totals.**

Further itemization of vouchers/invoices shall only be required for items having specific limitations set forth in the contract.

3. Sample Voucher Information

This voucher represents reimbursable costs for the billing period for the billing period from ____through____.

	<u>Amount Billed</u>
	<u>Current Period Cumulative</u>

- (a) **Direct Costs**
 - (1) Direct labor*
 - (2) Fringe benefits
(%, if computed as percentage).....
 - (3) Capitalized nonexpendable
equipment (\$50,000 or more -
see instructions)*
 - (4) Non-capitalized equipment,
materials, and supplies.....
 - (5) Premium pay (NRC approved overtime).....
 - (6) Consultants*
 - (7) Travel*
 - (8) Subcontracts*
 - (9) Other costs*

Total Direct Costs

- (b) Indirect Costs
 (A) Overhead ___ % of _____ (Indicate Base).....
 (B) General & Administrative Expense
 ___ % of Cost Elements Nos.
 Total Direct & Indirect Costs
- (c) Fixed-Fee (Cite Formula):
 (d) Total Amount Billed.....
 (e) Adjustments.....
 (f) Grand Totals.....
- * (Requires Supporting Information -- See Sample below)

SAMPLE SUPPORTING INFORMATION

1) Direct Labor - \$2400

<u>Labor Category</u>	<u>Hours</u>	<u>Billed</u>	<u>Rate</u>	<u>Cumulative</u>	
				<u>Total</u>	<u>Hrs. Billed</u>
Senior Engineer I	100		\$14.00	\$1400	975
Engineer	50		\$10.00	\$500	465
Computer Analyst	100		\$5.00	<u>\$500</u>	320
				<u>\$2400</u>	

3) Capitalized Non-Expendable Equipment

Prototype Spectrometer - item number 1000-01 \$60,000

4) Non-capitalized Equipment, Materials, and Supplies

10 Radon tubes @ \$110.00 = \$1100.00

6 Pairs Electrostatic gloves @ \$150.00 = \$900.00

\$2000.00

5) Premium Pay

Walter Murphy - 10 hours @ \$10.00 Per Hour = \$100
 (This was approved by NRC in letter dated 3/6/95).

6) Consultants' Fee

Dr. Carney - 1 hour @ \$100 = \$100

7)

<u>Travel</u>	<u>Destination</u>	<u>Costs</u>
<u>Start Date</u>		
3/1/89	Wash., DC	\$200

FEE RECOVERY BILLING REPORT

FIN:

Facility Name or Report Title:

TAC or Inspection Report Number:

(or other unique identifier)

Docket Number (if applicable):

Cost Categories	Period Amt.	Period Cost Incurred	Fiscal Year To Date Costs	Total Cumulative Costs
Labor				
Materials				
Subcontractor/ Consultant				
Travel				
Other (specify)				
Common Costs				
Total				
Remarks:				

