

ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES

1 16

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

1. DATE OF ORDER 09/23/2018		2. CONTRACT NO. (If any) NRC-HQ-25-14-E-0005		6. SHIP TO: a. NAME OF CONSIGNEE NUCLEAR REGULATORY COMMISSION	
3. ORDER NO. 31310018F0140		4. REQUISITION/REFERENCE NO. RES-18-0219		b. STREET ADDRESS NUCLEAR REGULATORY COMMISSION	
5. ISSUING OFFICE (Address correspondence to) US NRC - HQ ACQUISITION MANAGEMENT DIVISION MAIL STOP TWFN-07B20M WASHINGTON DC 20555-0001				c. CITY WASHINGTON	
				d. STATE DC	e. ZIP CODE 20555-0001
7. TO: a. NAME OF CONTRACTOR ENERGY RESEARCH INC				f. SHIP VIA	
b. COMPANY NAME				8. TYPE OF ORDER	
c. STREET ADDRESS 6189 EXECUTIVE BLVD				<input type="checkbox"/> a. PURCHASE	<input checked="" type="checkbox"/> b. DELIVERY
d. CITY ROCKVILLE				e. STATE MD	f. ZIP CODE 208523901
9. ACCOUNTING AND APPROPRIATION DATA See Schedule				10. REQUISITION NG OFFICE OFF OF NUCLEAR REG RESEARCH	

11. BUSINESS CLASSIFICATION (Check appropriate box(es)) <input type="checkbox"/> a. SMALL <input checked="" type="checkbox"/> b. OTHER THAN SMALL <input type="checkbox"/> c. DISADVANTAGED <input type="checkbox"/> d. WOMEN-OWNED <input type="checkbox"/> e. HUBZone <input type="checkbox"/> f. SERVICE-DISABLED VETERAN-OWNED <input type="checkbox"/> g. WOMEN-OWNED SMALL BUSINESS (WOSB) ELIGIBLE UNDER THE WOSB PROGRAM <input type="checkbox"/> h. EDWOSB				12. F.O.B. POINT	
13. PLACE OF a. INSPECTION Destination		14. GOVERNMENT B/L NO.		15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date) 11/04/2020	16. DISCOUNT TERMS 30
b. ACCEPTANCE Destination					

17. SCHEDULE (See reverse for Rejections)

ITEM NO. (a)	SUPPLIES OR SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	Task Order entitled, "Jet Imprimement Model Evaluation and Development," under Enterprise-Wide Contract NRC-HQ-25-14-E-0005 Total Obligated Amount: \$100,000.00 Total Task Order Ceiling: \$240,387.12 Continued ...					

18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.		17(h) TOTAL (Cont. pages)
21. MAIL INVOICE TO:						
a. NAME FISCAL ACCOUNTING PROGRAM						\$0.00
b. STREET ADDRESS (or P.O. Box) ADMIN TRAINING GROUP AVERY STREET A3-G BUREAU OF THE FISCAL SERVICE PO BOX 1328						\$240,387.12
c. CITY PARKERSBURG		d. STATE WV	e. ZIP CODE 26106-1328			17(i) GRAND TOTAL

22. UNITED STATES OF AMERICA BY (Signature)		09/23/2018		23. NAME (Typed) MONIQUE B. WILLIAMS TITLE: CONTRACTING/ORDER NG OFFICER	
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**ORDER FOR SUPPLIES OR SERVICES
SCHEDULE - CONTINUATION**

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

DATE OF ORDER 09/23/2018	CONTRACT NO. NRC-HQ-25-14-E-0005	ORDER NO. 31310018F0140
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ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	<p>Contracting Officer's Representative (COR):</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>					
	<p>ERI Authorized Official _____ Date _____</p> <p>Accounting Info:</p> <p>2018-X0200-FEEBASED-60-60D003-60B301-1032-17-6-161-252A-17-6-161-1032</p> <p>Period of Performance: 09/24/2018 to 11/04/2020</p>					

TOTAL CARR ED FORWARD TO 1ST PAGE (ITEM 17(H))

\$0.00

TASK ORDER – Unrestricted EWC IDIQ for Energy Research, Inc.

SECTION B – Supplies or Services and Price/Costs

B.1 BRIEF PROJECT TITLE AND WORK DESCRIPTION

(a) Jet Impingement Model Evaluation and Development.

(b) Summary work description: The purpose of this task order is to obtain technical support for the assessment of the ANSI/ANS 58.2-1988 and NUREG/CR-2913 models, especially with respect to the non-conservatism in Appendix A of SRP 3.6.2, and the development of modeling guidance to address the potential non-conservatism. Specifically, technical assistance is required to:

- Perform a literature review of jet impingement experiments, jet impingement phenomena, and jet impingement models.
- Evaluate the ANSI/ANS 58.2-1988 and the NUREG/CR-2913 jet models to determine whether these models are acceptable for determining the dynamic effects of postulated pipe ruptures, especially with respect to the potential non-conservatism listed in Appendix A of SRP 3.6.2.
- Provide conservative guidance on jet force modeling. This objective may include the development of a new or a revised jet model, if necessary.
- Document the findings from the first three objectives in a NUREG.
- Provide related technical support

(End of clause)

B.2 CONSIDERATION AND OBLIGATION-TASK ORDERS

(a) The ceiling of this order for services is **\$240,387.12** [REDACTED] in fixed-fee).

(b) This order is subject to the minimum and maximum ordering requirements set forth in the contract.

(c) The amount presently obligated with respect to this order is **\$100,000.00** [REDACTED]. [REDACTED] The obligated amount shall, at no time, exceed the order ceiling as specified in paragraph (a) above. When and if the amount(s) paid and payable to the Contractor hereunder shall equal the obligated amount, the Contractor shall not be obligated to continue performance of the work unless and until the Contracting Officer shall increase the amount obligated with respect to this order, in accordance with FAR Part 43 - Modifications. Any work undertaken by the Contractor in excess of the obligated amount specified above is done so at the Contractor's sole risk and may not be reimbursed by the Government.

(d) The Contractor shall comply with the provisions of FAR 52.232-22 - Limitation of Funds, for incrementally-funded delivery orders or task orders.

(e) Fixed Fee Holdback Amount: [REDACTED]

(End of clause)

B.3 PRICE/COST SCHEDULE

TOTAL					\$240,387.12

DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK

TASK ORDER STATEMENT OF WORK

1. PROJECT TITLE

Jet Impingement Model Evaluation and Development

2. BACKGROUND

Prior to 2008, the nuclear industry commonly used the jet impingement model described in the appendices of the American National Standard Institute (ANSI)/American Nuclear Society (ANS) Standard 58.2-1988 to calculate the jet geometry (zone of influence), pressure distribution (jet strength), and the corresponding loads on neighboring structures, systems, and components (SSCs) during high energy pipe rupture events. Since 2008, following discussions with the Advisory Committee on Reactor Safeguards (ACRS), NRC staff determined that there are potential non-conservatisms in the ANSI/ANS Standard jet model with respect to the (a) strength, (b) zone of influence, (c) space and time-varying nature of the loading effects of postulated pipe ruptures on SSCs. Staff identified the initial blast wave following pipe ruptures and potential resonance and feedback amplification effects as the key space and time-varying phenomena not addressed by the jet model. See Appendix A of Standard Review Plan (SRP) 3.6.2 (ML14230A035) for additional information.

There is not a known viable alternative to the ANSI/ANS 58.2-1988 jet model. The NUREG/CR-2913 jet model, a predecessor to the ANSI/ANS jet model, also does not address that potential space and time-varying non-conservatisms. Currently, NRC staff review jet load modeling for new reactor design certification applications on a case by case basis.

3. OBJECTIVE(S)

The objective of this Task Order is to obtain technical support for the assessment of the ANSI/ANS 58.2-1988 and NUREG/CR-2913 models, especially with respect to the non-conservatisms in Appendix A of SRP 3.6.2, and the development of modeling guidance to address the potential non-conservatisms. Specifically, technical assistance is required to:

1. Perform a literature review of jet impingement experiments, jet impingement phenomena, and jet impingement models.
2. Evaluate the ANSI/ANS 58.2-1988 and the NUREG/CR-2913 jet models to determine whether these models are acceptable for determining the dynamic effects of postulated pipe ruptures, especially with respect to the potential non-conservatisms listed in Appendix A of SRP 3.6.2.
3. Provide conservative guidance on jet force modeling. This objective may include the development of a new or a revised jet model, if necessary.
4. Document the findings from the first three objectives in a NUREG.
5. Provide related technical support for Task 1 to Task 4.

4. STATEMENT OF WORK TASKS

This work is divided into five individual tasks. The Contractor shall provide all resources necessary to accomplish the tasks and provide deliverables described in this Statement of Work (SOW).

Task 1: Literature Review of Jet Impingement Experiments, Phenomena, and Models

The contractor shall review the jet impingement literature. Specifically the contractor shall research all publically available literature on the current state of the art and developments with respect to the potential non-conservatisms found in Appendix A of SRP 3.6.2. The review shall include jet impingement experiments, jet impingement phenomena, and jet impingement models. The 2012 NRC report "Comparisons of Jet Calculations to Test Data" (ML121010475) shall be reviewed as a useful starting point for this task. The NRC report compares the jet models to Marviken test data, but does not address the potential space and time-varying non-conservatisms listed in the SRP. This task will inform the model assessment and guidance development under Tasks 2 and 3 of this statement of work.

This task shall begin with the contractor performing a preliminary literature survey to determine the scope of the review and support for a kickoff meeting to discuss the review plan and scope. The contractor shall prepare and submit an email to the Contracting Officer's Representative (COR) detailing the issues found during the preliminary literature survey, if any. Specifically, the contractor shall identify areas of the literature review for which there are few reliable sources, issues with obtaining literature sources, or other impediments to performing a thorough literature review. The contractor shall provide recommendations to overcome deficiencies in the literature.

After submission of the email, the contractor shall participate in a kick-off meeting with the COR and other NRC technical staff via teleconference. The Contractor shall prepare a written summary of the meeting that includes, at a minimum, the following information: (1) identification of meeting participants from the NRC and Contractor, (2) minutes of the meeting that clearly describe the substance of the meeting, and (3) any action items and decisions from the meeting.

The contractor shall prepare a literature review report as the final deliverable for this task. The report shall describe the current state of the literature and summarize references related to jet impingement experiments, jet impingement phenomena, and jet models. The report shall include the reference citations.

The contractor shall prepare a draft literature review report. The COR will provide the contractor comments on the draft report within 30 calendar days of delivery. The contractor shall prepare a final literature review report that addresses all comments from the COR.

Task 2: Jet Model Assessment

The contractor shall assess the ANSI/ANS 58.2-1988 and NUREG/CR-2913 jet models. The assessment shall address potential non-conservatisms listed in Appendix A of SRP 3.6.2: jet impingement pressure distribution, zone of influence, blast wave effects, and resonance and feedback amplification effects. The models shall be assessed by comparing ANSI/ANS

58.2-1988 and NUREG/CR-2913 jet model calculations to experimental data obtained from the literature review. The ANSI/ANS 58.2-1988 jet model is available as a FORTRAN code developed by NRC staff. The NUREG/CR-2913 jet model is a series of look-up tables and plots.

The contractor shall prepare a draft report to document and provide analysis of the jet model calculations compared to experimental data, especially with respect to the non-conservatisms listed in Appendix A of SRP 3.6.2. The COR will provide comments on the draft report within 30 calendar days of delivery. The contractor shall prepare a final report that addresses all comments from the COR.

Task 3: Jet Model Development and Guidance

For Task 3, the contractor shall develop jet force modeling guidance and, if necessary, model revisions or a new model to address the pressure distribution, zone of influence, blast wave, and resonance and feedback amplification potential non-conservatisms stated in Appendix A of SRP 3.6.2. The contractor, COR, and other NRC staff shall meet (teleconference is acceptable) during this task to discuss if model revisions or a new model are necessary. NRC staff will decide if model revisions or a new model are necessary following the meeting. As required by the COR, the contractor shall develop a new model or revise a current model, and assess the new or updated model as in Task 2. This task shall be based on the results from Task 1 and 2.

The deliverable for this task is a report detailing the model guidance and model development effort. The contractor shall prepare a draft report that documents their technical perspective, including if they believe model development is necessary to address the non-conservatisms in SRP 3.6.2. The report shall also document their modeling guidance and potential model development recommendations. The COR will provide comments on the draft report within 30 calendar days of delivery. The contractor shall prepare a final report that addresses all comments from the COR.

Task 4: Develop NUREG Series Manuscript

This task consists of documenting the work performed in Tasks 1-3 in a NUREG publication. Any recommended changes to regulatory positions on jet modeling, along with appropriate basis for the recommended changes, shall be included in the NUREG.

The deliverable for this task is a report in the NUREG series. The contractor shall prepare a draft NUREG. The COR will provide comments on the draft NUREG report within 30 calendar days of delivery. The contractor shall prepare a final NUREG Report that address all comments from the COR.

Task 5: Related Technical Support for Task 1 to Task 4

The contractor shall provide related technical support on an as-needed basis upon written direction of the COR, that may include the following:

1. Support for ACRS meetings on the topics in Task 1 to Task 4, which may include preparation for and participation in the ACRS meeting, providing technical support during the ACRS meeting, and assisting the COR to address ACRS comments and/or questions that arise during the course of the meetings.

2. Advise NRC staff on current licensing issues related to jet impingement. Deliverables may include emails detailing specific advice and guidance, brief technical reports, brief presentations or verbal guidance

Technical Directions

The task order COR may issue technical directions (TDs) from time-to-time throughout the duration of the scope of work. TDs must be within scope of the task order SOW and shall not constitute new assignments of work or changes of such a nature as to constitute an adjustment in cost or period of performance. Any modifications to the SOW, cost, or period of performance of this task order must be authorized by the task order Contracting Officer (CO) by a task order modification and will be coordinated with the COR. TDs may be issued in writing from time-to-time for the purpose of adjustments or clarifications to the timing and performance of the tasks, and the delivery schedule in this task order. In the event that the contractor believes that any TD constitutes a change in terms of the scope (SOW), cost, or period of performance of this task order, the contractor shall immediately inform the CO of this issue and request appropriate guidance prior to taking action on the TD in question.

5. APPLICABLE DOCUMENTS AND STANDARDS

The contractor will need to consult Appendix A of Standard Review Plan 3.6.2 (ML14230A035), the ANSI/ANS 58.2-1988 jet model, NUREG/CR-2913 (ML073510076), and NRC Report “Comparisons of Jet Calculations to Test Data” (ML121010475). These documents will be made available by the COR, as necessary.

6. DELIVERABLES AND DELIVERY SCHEDULE/REPORTING REQUIREMENTS

All items to be delivered or milestones to be achieved are listed in Table-1 below. The contractor may elect to provide the deliverables to the COR via e-mail, electronic media by mail, or through secure file transfer systems, such as the U.S. Army Aviation and Missile Research Development and Engineering Center (AMRDEC) Safe Access File Exchange (SAFE) application. The Monthly Letter Status Report (MLSR) shall be submitted to the COR and the CO electronically. The contractor shall provide deliverables consisting of reports in Microsoft WORD and Adobe Acrobat format. Presentations shall be provided in Microsoft PowerPoint format. NUREG series publications will follow the guidance of NUREG-0650 (ML041050294).

The contractor shall submit all raw and processed data and worksheet and/or input files used in assessing jet impingement models to the COR.

Table-1. Milestone, Deliverables and Schedules applicable for each task

Task No.	Task	Milestone/Deliverable	Due Date
1	Literature Review of Impingement, Experiments, Phenomena, and Models	An e-mail to the COR detailing the issues found, if any, during the preliminary literature survey during familiarization with the material	Two weeks after Task Order award.
		Kick-off Meeting Summary Email	7 calendar days after

Task No.	Task	Milestone/Deliverable	Due Date
			completion of Kick-off Meeting
		Draft Literature Review Report detailing the review of the jet impingement literature.	Six month after Task Order award.
		Final Literature Report addressing comments from the COR	30 calendar days following receipt of NRC comments
2	Jet Model Assessment	Draft Report detailing the jet model assessment effort.	12 months after Task Order award
		Final Report addressing comments from the COR.	30 calendar days following receipt of NRC comments
3	Jet Model Development and Guidance	Draft Report detailing the model guidance and development effort and assessment of any model revisions or new model	20 months after Task Order award
		Final Report addressing comments from the COR	30 calendar days following receipt of NRC comments
4	Develop NUREG Series Manuscript	Draft NUREG series report detailing recommended changes to regulatory positions, along with appropriate basis for the recommended changes.	22 months after Task Order award
		Final NUREG series report addressing comments from the COR.	30 calendar days following receipt of NRC comments
5	Related Technical Support for Jet Model Evaluation and Assessment	Guidance, input or other information as requested by the COR commensurate with the issue being addressed and the needs of the COR. Specific deliverables may include brief presentations, brief technical reports, email and verbal guidance on jet impingement issues, and ACRS meeting support.	As determined by the COR
6	All	*MLSR per Section F.3 of the Base Contract	20 th Calendar day of the following month

*If no work was performed during the prior month, the contractor shall not prepare and submit an MLSR.

7. LABOR QUALIFICATIONS

The Contractor shall provide individuals who have the required educational background and work experience to meet the objectives of the work specified in this task order. The contractor shall provide a contract project manager (PM) to oversee the effort and ensure the timely submittal of quality deliverables so that all information is accurate and complete.

Labor Type	Qualification Requirements
Project Manager (PM)	<p>Minimum Qualifications Requirement</p> <p>1) Bachelor's Degree in Engineering or a related Scientific Field</p> <p style="text-align: center;">and</p> <p>2) Minimum 5 years of regulatory research project management and oversight experience for projects of similar nature and complexity</p>
Technical Staff	<p>Minimum Qualifications Requirement</p> <p>1) Bachelor's Degree in Engineering or a related Scientific Field</p> <p style="text-align: center;">and</p> <p>2) Individual Technical Staff, or team of Technical Staff as a whole performing work described herein must have a combined minimum 5 years' experience with Regulatory analysis and review, specifically:</p> <ul style="list-style-type: none"> • Demonstrated experience with light water reactor (LWR) systems and Loss-of-Coolant Accident (LOCA) responses • Demonstrated experience with the application of thermal hydraulic and fluid dynamic models and analysis to LWR systems <p>Qualifications that are not Required, but Desired for this Task Order Requirement:</p> <p>In-depth technical experience and/or knowledge in jet impingement modeling</p>

8. GOVERNMENT-FURNISHED PROPERTY

None

9. PERIOD OF PERFORMANCE

See SECTION F – NRCF030A PERIOD OF PERFORMANCE ALTERNATE I

10. PLACE OF PERFORMANCE

All work shall be performed at the contractor's site, except for travel described in Section 11.0.of the SOW.

11. SPECIAL CONSIDERATIONS

11.1 TRAVEL/MEETINGS

The following travel may be required under this task order:

Tasks 1-4: One, 2-person, 1-day meeting at the NRC Rockville headquarters

Task 5: One, 1-person, 1-day meeting at the NRC Rockville headquarters

Contractor will be authorized travel expenses consistent with the Federal Travel Regulations (FTR) and the limitation of funds specified in this task order.

Travel will be reimbursed in accordance with FAR 31.205-46, "Travel costs" and the General Services Administration's Federal Travel Regulations at:
<http://www.gsa.gov/portal/content/104790>

All travel requires prior written approval from the COR.

11.2 LICENSE FEE RECOVERY

No work under this task order is license fee recoverable.

11.3 SECURITY

The work will be UNCLASSIFIED.

11.4 DATA RIGHTS

The NRC shall have unlimited rights to and ownership of all deliverables provided under this contract/order, including reports, recommendations, briefings, work plans and all other deliverables. All documents and materials, to include the source codes of any software, produced under this contract/order are the property of the Government with all rights and privileges of ownership/copyright belonging exclusively to the Government. These documents and materials may not be used or sold by the contractor without written authorization from the CO. All materials supplied to the Government shall be the sole property of the Government and may not be used for any other purpose. This right does not abrogate any other Government rights. The definition of "unlimited rights" is contained in

Federal Acquisition Regulation (FAR) 27.401, "Definitions." FAR clause at FAR 52.227-14, "Rights in Data-General," is incorporated by reference under the base contract.

11.4 KEY PERSONNEL

See Section H – 2052.215-70 KEY PERSONNEL

SECTION F - Deliveries or Performance

NRCF030A PERIOD OF PERFORMANCE ALTERNATE I

This order shall commence on September 24, 2018 and will expire on November 4, 2020. (See FAR 52.216-18 - Ordering).

(End of Clause)

SECTION G - Contract Administration Data

G.1 ONTRACTING OFFICER'S REPRESENTATIVE

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

NRC COR:



(b) Performance of the work under this contract is subject to the technical direction of the NRC COR. 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 or changes to specific travel identified in the Statement of Work), fills in details, or otherwise serves to accomplish the contractual statement of work.

(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, approve 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 COR or must be confirmed by the COR 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 COR's authority under the provisions of this clause.

(f) If, in the opinion of the contractor, any instruction or direction issued by the COR is within one of the categories 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 that 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 COR 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 to the instruction or direction 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.

(End of Clause)

G.2 2052.215-78 TRAVEL APPROVALS AND REIMBURSEMENT (OCT 1999) - ALTERNATE I (OCT 1999)

- (a) Total expenditure for travel may not exceed [REDACTED] without the prior approval of the contracting officer.
- (b) 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 prior to the commencement of travel.
- (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 FAR Limitations of Cost clause of this contract when, at any time, the contractor learns that travel expenses will cause the contractor to exceed the travel ceiling amount identified in paragraph (a) of this clause.
- (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.

(End of Clause)

SECTION H - Special Contract Requirements

2052.215-70 KEY PERSONNEL. (JAN 1993)

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

NAME	LABOR CATEGORY/POSITION
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[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.

(End of Clause)

SECTION J - List of Documents, Exhibits and Other Attachments

Attachments:

Billing Instructions for Cost-Reimbursement Type Contracts (March 2018)