

**ORDER FOR SUPPLIES OR SERVICES**

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

1. DATE OF ORDER 09/22/2023		2. CONTRACT NO. (If any) 31310020D0002		6. SHIP TO:	
3. ORDER NO. 31310023F0140		4. REQUISITION/REFERENCE NO. RES-23-0348		a. NAME OF CONSIGNEE NUCLEAR REGULATORY COMMISSION	
5. ISSUING OFFICE (Address correspondence to) US NRC - HQ ACQUISITION MANAGEMENT DIVISION MAIL STOP TWFN-07B20M WASHINGTON DC 20555-0001				b. STREET ADDRESS 11555 ROCKVILLE PIKE	
				c. CITY ROCKVILLE	e. ZIP CODE 20852-2738
7. TO: [REDACTED]				f. SHIP VIA	
a. NAME OF CONTRACTOR ENERGY RESEARCH INC				8. TYPE OF ORDER	
b. COMPANY NAME				<input type="checkbox"/> a. PURCHASE	
c. STREET ADDRESS PO BOX 2034				REFERENCE YOUR:  Please furnish the following on the terms and conditions specified on both sides of this order and on the attached sheet, if any including delivery as indicated.	
d. CITY ROCKVILLE				e. STATE MD	f. ZIP CODE 208472034
9. ACCOUNTING AND APPROPRIATION DATA See Schedule				10. REQUISITION NG OFFICE OFF OF NUCLEAR REG RESEARCH	

11. BUSINESS CLASSIFICATION (Check appropriate box(es))				12. F.O.B. POINT	
<input checked="" type="checkbox"/> a. SMALL	<input 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		
13. PLACE OF		14. GOVERNMENT B/L NO.		15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date) 06/30/2023	
a. INSPECTION Destination	b. ACCEPTANCE Destination			16. DISCOUNT TERMS 30	

**17. SCHEDULE (See reverse for Rejections)**

ITEM NO. (a)	SUPPLIES OR SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	Accounting Info: 2023-X0200-FEEBASED-60-60D003-60B301-1147-17-6-161-252A-17-6-161-1147 Period of Performance: 09/22/2023 to 01/31/2025					

SEE BILLING INSTRUCTIONS ON REVERSE	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	17(i) GRAND TOTAL
	b. STREET ADDRESS (or P.O. Box) ADMIN TRAINING GROUP AVERY STREET A3-G BUREAU OF THE FISCAL SERVICE PO BOX 1328						\$749,858.34	
c. CITY PARKERSBURG		d. STATE WV	e. ZIP CODE 26106-1328					

22. UNITED STATES OF AMERICA BY (Signature)		09/22/2023	23. NAME (Typed) JEFFREY R. MITCHELL TITLE: CONTRACTING/ORDER NG OFFICER
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**B - Supplies or Services/Prices**

**B.1 NRC SPECIFIC INFORMATION (AUG 2023)**

CONTRACTOR ACCEPTANCE OF TASK ORDER 31310020D0002 \_ 31310023F0140

Acceptance of Task Order No: 31310023F0140 should be made by having an official, authorized to bind your organization.

\_\_\_\_\_ Name

\_\_\_\_\_ Title

\_\_\_\_\_ Date

**B.2 BRIEF PROJECT TITLE AND WORK DESCRIPTION**

(a) The title of this project is: Assessment of TRACE in Predicting Phenomena Relevant to the NuScale Plant Design.

(b) Summary work description: To assess the performance of TRACE in the gap areas, the NRC has identified sources of experimental data against which TRACE predictions can be compared. This experimental data comes from experiments (some of which are decades old) performed by several different investigators using different experimental facilities. Therefore, the overall objective is to have the contractor develop TRACE models for each of the identified experiments, use the TRACE models to perform TRACE simulations of the experiments, then compare the results from the TRACE simulations with the applicable test data.

**B.3 TYPE OF CONTRACT (JULY 2020)**

The contract type for this award is cost plus fixed fee.

**B.4 CONSIDERATION AND OBLIGATION—COST-PLUS-FIXED-FEE ALTERNATE I (AUG 2023)**

(h) The base and all option(s) value (total contract value) is: \$749,858.34 of which the sum of \$ [redacted] represents the estimated reimbursable costs, and of which \$ [redacted] represents the fixed- fee.

(i) The base and exercised option(s) value is N/A of which the sum of N/A represents the estimated reimbursable costs, and of which N/A represents the fixed- fee.

(j) There shall be no adjustment in the amount of the Contractor's fixed fee.

(k) The amount currently obligated by the Government with respect to this contract is \$ [redacted], of which the sum of \$ [redacted] represents the estimated reimbursable costs, and of which [redacted] represents the fixed- fee.

(l) This is an incrementally-funded contract and FAR 52.232-22 - "Limitation of Funds" applies.

(m) In accordance with FAR 52.216-8 - Fixed Fee, it is the policy of the NRC to withhold payment of fee after payment of 85 percent of the fee has been paid in order to protect the Government's interest. The amount of fixed-fee withheld from the contractor will not exceed 15 percent of the total fee or \$100,000, whichever is less. Accordingly, the maximum amount of fixed-fee that may be held in reserve is \$ [REDACTED].

(n) There shall be no adjustment in the amount of the Contractor's fixed fee.

**B.5 PRICE/COST SCHEDULE**

CLIN	DESCRIPTION	ESTIMATED COST	FIXED FEE	TOTAL ESTIMATED COST
0001	Assessment of Trace in Predicting Phenomena Relevant to the NUSCALE Plant Design	[REDACTED]	[REDACTED]	\$749,858.34

## **C - Description/Specifications**

### **C.1 STATEMENT OF WORK**

#### **1. PROJECT TITLE**

Assessment of TRACE in Predicting Phenomena Relevant to the NuScale Plant Design

#### **2. BACKGROUND**

The Office of Nuclear Regulatory Research (RES) has developed a plan to assist the Office of Nuclear Reactor Regulation (NRR) in reviewing specific design basis accidents and anticipated operational occurrences (AOOs) considered for licensing in the NuScale Design Certification Application (DCA) review. As part of this plan, RES envisions extensive use of the TRACE computer code as part of a suite of reactor analysis tools to perform a series of confirmatory analyses. The extent of TRACE use, however, depends on a determination of the code's range of applicability in simulating key components and phenomena relevant to the NuScale design. Previous assessments have identified gaps in TRACE applicability in several key areas. This statement of work (SOW) aims to address those gaps by providing technical assistance for the assessment of TRACE in predicting the important phenomena in the key gap areas. These assessments will help determine the extent to which TRACE can be used as one of the analysis tools for NuScale licensing.

#### **3. PROJECT DESCRIPTION AND OBJECTIVE(S)**

To assess the performance of TRACE in the gap areas, RES has identified sources of experimental data against which TRACE predictions can be compared. This experimental data comes from experiments (some of which are decades old) performed by several different investigators using different experimental facilities. Therefore, the overall objective of this SOW is to have the contractor develop TRACE models for each of the identified experiments, use the TRACE models to perform TRACE simulations of the experiments, then compare the results from the TRACE simulations with the applicable test data. For each assessment, a description of the TRACE model is to be documented in a calculation notebook, and an analysis of the results is to be documented in a letter report.

#### **4. STATEMENT OF WORK TASKS**

##### **Task 1: Assess TRACE Capability to Predict Tube-Side and Shell-side Heat Transfer**

##### **Task 1.1 Assess TRACE Capability to Predict Tube-Side Heat Transfer in Helically Coiled Tubes**

The contractor shall, using as a guide the experimental matrix and procedures described in the work of Papini et. al (Item 1 in Section 5 below), assess the capability of TRACE to predict within helically coiled steam generator tubes the heat transfer under oscillatory flow conditions, i.e., over a range of single- and two-phase flow conditions, the instability threshold dependence on system parameters, such as operating pressure, flow rate, inlet subcooling, and inlet throttling.

To accomplish this assessment, the contractor shall develop, using the Symbolic Nuclear Analysis Package (SNAP), a TRACE model of the experimental apparatus that was built and operated at SIET (sperimentiamo le tue idee) Labs in Piacenza, Italy. Additionally, as was done with RELAP5 in the Papini paper, the contractor shall consider in the TRACE model, to the extent possible, the same approximations adopted for the refinement of the Papini analytical model. A report containing a description of the SIET test facility will be provided by the USNRC.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the optimal number of nodes to include in the helically coiled tubes and riser region in the TRACE model to produce the best results.

TRACE simulations are to be performed in accordance with the experimental matrix and procedures described in the paper, and the simulation results (e.g., channel mass flow, inlet pressure, and differential pressure vs. time) shall be provided that are comparable to the figures shown in the paper and that form a the basis for a conclusive determination.

**Deliverable:** The contractor shall provide the following deliverables:

- TRACE model of the Papini SIET test apparatus in SNAP (\*.med) format
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and an analysis of the simulation results

### **Task 1.2 Assess TRACE Capability to Predict Shell-Side Heat Transfer from Horizontal Tubes**

Within the context of shell-side heat transfer as it relates to the operation of the steam generators in the NuScale reactor, the contractor shall, in consultation with NRC staff, review available literature on the subject, make recommendations to the NRC about the relevant experiments upon which the TRACE assessment can be based, then perform the recommended TRACE assessment. The literature review shall include all available information pertaining to condensation on the exterior of smooth, helically coiled or horizontal tubes and shall conclude with a recommendation to the NRC for the most feasible experiment upon which to base the TRACE assessment. After the contractor and the NRC agree on the experiment to use, the contractor shall, using as a guide the experimental matrix and procedures described in the report documenting the experiment, assess the capability of TRACE to predict vapor condensation on horizontal tube banks.

To accomplish this assessment, the contractor shall develop, using SNAP, a TRACE model of the test apparatus used in the agreed upon experiment.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the number of nodes to include in the key components in the TRACE model to achieve adequate results.

TRACE simulations are to be performed in accordance with the experimental matrix and procedures described in the paper, and the simulation results shall be evaluated to form a conclusive determination.

**Deliverable:** The contractor shall provide the following deliverables:

- A letter report identifying the most feasible experiments upon which to base the TRACE

assessment and the rationale to support the recommendations.

- TRACE model of the test apparatus used in the agreed upon experiment, in SNAP (\*.med) format.
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and an analysis of the simulation results

## **Task 2: Assess TRACE for Containment Gas Mixing and Condensation Effects**

### **Task 2.1: Assess TRACE Against the Nuclear Power Engineering Corporation (NUPEC) M-8-1 and M-8-2 Mixing Tests**

The contractor shall, using the experimental procedures described in NUREG/CR-6119, Volume 3 for Test M-8-1 and M-8-2 (Item 3 in Section 5 below), assess the capability of TRACE to predict the response of a containment volume to the injection of steam and helium.

To accomplish this assessment, the contractor shall use SNAP to develop, starting with a MELCOR model of the NUPAC facility supplied by the USNRC, a TRACE model of the NUPAC facility.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the optimal number of nodes/compartments to use in the TRACE model to produce the best results.

TRACE simulations shall be performed in accordance with the experimental procedures for tests M-8-1 and M-8-2 described in NUREG/CR-6119, Volume 3, to assess the performance of TRACE in the areas of pressure response, temperature distribution and stratification, and hydrogen mixing. The results shall be displayed and described as in the NUREG/CR and form the basis for a conclusive determination.

**Deliverable:** The contractor shall provide the following deliverables:

- TRACE model of the NUPAC facility in SNAP (\*.med) format.
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and an analysis of the simulation results

### **Task 2.2: Assess TRACE Against the PANDA PE-4 Data**

The contractor shall, using the experimental procedures described in the Test Report for Test PE4 Heat Source Test (Item 4 in Section 5 below), assess the capability of TRACE to model stratification and mixing of a gas mixture in a containment volume.

To accomplish this assessment, the contractor shall use SNAP to develop a TRACE model of the PANDA facility.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the optimal number of nodes/compartments to use in the TRACE model to produce the best results.

TRACE simulations shall be performed in accordance with the experimental procedures described in the PANDA report, and the results shall be displayed and described as in the report to form the basis for a conclusive determination.

**Deliverable:** The contractor shall provide the following deliverables:

- TRACE model of the PANDA facility in SNAP (\*.med) format
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and an analysis of the simulation results

### **Task 3: Assess TRACE Capability to Predict Flow Mixing and Flow Reversal**

#### **Task 3.1 Use ROCOM Test 2.2 to Assess TRACE Capability to Simulate Mixing in Internal Vessel Regions**

The contractor shall perform an updated assessment of ROCOM Test 2.2. The USNRC shall supply a TRACE model of the ROCOM facility and a report documenting the previously performed TRACE assessment of ROCOM Test 2.2. The contractor shall update this assessment by investigating the effects of higher-order numerical methods (e.g., Lax-Wendroff) and nodalization refinement of the TRACE model on the mixing results.

**Deliverable:** The contractor shall provide the following deliverables:

- Updated TRACE model of the ROCOM test facility in SNAP (\*.med) format.
- A calculation notebook describing the updated TRACE ROCOM model
- A letter report documenting the simulation results and describing the effects of the higher-order numerical scheme and revised nodalization.

#### **Task 3.2 Perform Oscillating Manometer Test in TRACE**

The contractor shall use SNAP to create a TRACE model of the fundamental oscillating manometer problem and evaluate the effects, particularly numerical diffusion, of higher-order numerical schemes on the solution. Numerical diffusion resulting from small flow reversals or oscillations may result in non-physical and significantly increased boron mixing.

The contractor shall use as guides the description of the oscillating manometer problem provided in the TRACE Theory Manual and the paper "Numerical Benchmark Test No. 2.2: Oscillating Manometer" (Item 6 in Section 5 below).

**Deliverable:** The contractor shall provide the following deliverables:

- TRACE model of the oscillating manometer problem, in SNAP (\*.med) format.
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and an analysis of the simulation results

### **Task 4: Assess TRACE Capability to Predict Two-Phase Internal Circulation**

**Task 4.1 Use the Large-Scale Investigation of Natural Circulation and Mixing (LINX) to Assess TRACE Capability to Predict Internal Recirculation Flow Patterns**

The contractor shall use SNAP to create a TRACE model of the LINX test facility and perform simulations of the recirculation test that was conducted as part of the Advanced Three-Dimensional Two-Phase Flow Simulation Tools for Application to Reactor Safety (ASTAR) Project. LINX is a large-scale containment test facility located at the Paul Scherrer Institute (PSI), where, as part of the ASTAR Project, a recirculation test in which two-phase conditions were simulated by bubbling air through the central region of the LINX vessel. The resulting flow patterns are like those expected to arise in the NuScale core region within the riser shroud due to of vapor generation from boiling in the core during the long-term cooling phase.

The USNRC shall provide a LINX facility description and test specifications.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the optimal number of nodes/compartments to use in the TRACE containment model to produce the best results.

**Deliverable:** The contractor shall provide the following deliverables:

- TRACE model of the LINX facility in SNAP (\*.med) format.
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and an analysis of the simulation results.

**Task 4.2 Use Air/Water Tests Performed at Rensselaer Polytechnic Institute (RPI) to Assess TRACE Capability to Predict Internal Recirculation Resulting from Voiding**

The contractor shall use SNAP to create a TRACE model of the air/water testing apparatus described in NUREG/CR-3577 (Item 7 in Section 5 below) and perform the simulations that examine the flow patterns in the air/water environment and capture the effects of voiding on internal recirculation.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the optimal number of nodes/compartments to use in the TRACE containment TRACE model to produce the best results.

The TRACE simulations are to be performed in accordance with the experimental procedures described in NUREG/CR-3577.

**Deliverable:** The contractor shall provide the following deliverables:

- TRACE model of the RPI air/water test apparatus in SNAP (\*.med) format.
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and the simulation results

**Task 4.3 Assess TRACE Capability to Predict Free Convective Heat Transfer in a Gas-Filled Vertical Cavity**

Develop a TRACE model of the experimental apparatus and follow the testing procedures described in the paper by Keyhani et.al. (Item 8 in Section 8 below) to assess the capability of TRACE to predict heat transfer and flow patterns characteristic of annular internal recirculation.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the optimal number of nodes in key components to produce the best results.

**Deliverable:** The contractor shall provide the following deliverables:

- TRACE model of the Keyhani test apparatus, in SNAP (\*.med) format.
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and an analysis of the simulation results

#### **Task 4.4 Assess TRACE Capability to Predict Free Convective Heat Transfer in a Liquid-Filled Vertical Cavity**

Develop a TRACE model of the experimental apparatus and follow the testing procedures described in the paper by Prasad et.al. (Item 9 in Section 5 below) to assess the capability of TRACE to predict heat transfer and flow patterns characteristic of annular internal recirculation.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the optimal number of nodes in key components to produce the best results.

**Deliverable:** The contractor shall provide the following deliverables:

- TRACE model of the Prasad test apparatus, in SNAP (\*.med) format.
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and an analysis of the simulation results

#### **Task 5: Assess TRACE Capability to Predict Geysering**

##### **Task 5.1 Perform Tong Geysering Assessment**

Using the work performed by Tong, et al. (Item 10 in Section 5 below) as a guide, assess the capability of TRACE to predict geysering, the explosion of vapor due to overheated liquid, in a vertical channel.

To accomplish this assessment, the contractor shall use SNAP to develop a TRACE model of the “intermittent flow and boiling in a heated channel vertical channel” (IFBHVC), the experimental apparatus used to perform the geysering tests. This apparatus is comprised of a long, circular, vertical tube above a set of heaters, which is like the NuScale arrangement of the riser section and core. The range of temperatures and pressures studied in the experiment correspond well with NuScale long-term cooling conditions.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the optimal number of nodes/compartments to use in the TRACE model to produce the best results.

TRACE simulations shall be performed in accordance with the experimental procedures described in the report by Tong, et al., and the results shall be displayed and described as in the

report to form the basis for a conclusive determination.

**Deliverable:** The contractor shall provide the following deliverables:

- TRACE model of the IFBHVC experimental apparatus in SNAP (\*.med) format.
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and an analysis of the simulation results

### **Task 5.2 Perform PUMA-NSU Assessment**

The contractor shall, using the descriptions of the experimental apparatus and test procedures provided in the report titled “Nuclear-Coupled Instability Study for Natural Circulation BWR Startup in PUMA Facility, “(Item 11 in Section 5 below), assess the capability of TRACE to predict the geysering that was observed in these tests at low pressure.

To accomplish this assessment, the contractor shall use SNAP to develop a TRACE model of the PUMA test loop used in the nuclear startup (NSU) tests to study flow instability. This apparatus is comprised of a tall vessel with a heater representing the core. It operates with natural circulation flow provided by the density difference between the downcomer water and the voided region above the core in the chimney section.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the optimal number of nodes/compartments to use in the TRACE model to produce the best results.

TRACE simulations shall be performed in accordance with the experimental procedures described in the PUMA-NSU test report, and the results shall be displayed and described as in the report to form the basis for a conclusive determination.

**Deliverable:** The contractor shall provide the following deliverables:

- TRACE model of the PUMA-NSU facility, in SNAP (\*.med) format.
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and an analysis of the simulation results.

## **Task 6: Assess TRACE Predictions of Boron Mixing and Stratification**

### **Task 6.1 Perform TRACE Assessment Using Data from the University of California Santa Barbara -Vertical Mixing Regime (UCSB-VMR) Test Facility**

The contractor shall, using the experimental apparatus and test procedures specified in NUREG/CR-5951 (Item 12 in Section 5), assess the capability of TRACE to predict boron mixing and stratification.

To accomplish this assessment, the contractor shall use SNAP to develop two TRACE models, one with cylindrical flow obstructions representing full-scale control rod guide tubes (CRGTs) and one with half-scale CRGTs. The full-scale test focuses more on the vertical mixing,

whereas the half-scale experiment provides more information about the radial mixing between CRGTs. Result comparisons to both test series will allow assessment of TRACE mixing in, essentially, a one-dimensional and a two-dimensional configuration.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the optimal number of nodes/compartments to use in the TRACE model to produce the best results.

TRACE simulations shall be performed in accordance with the experimental procedures described in NUREG/CR-5951, and the results shall be displayed and described as in the report to form the basis for a conclusive determination.

**Deliverable:** The contractor shall provide the following deliverables:

- Two TRACE models, one with full-scale CRGTs and one with half-scale CRGTs, of the UCSB-VMR test facility in SNAP (\*.med) format.
- A calculation notebook describing the TRACE models
- A letter report documenting the results of the nodalization study and an analysis of the simulation results

#### **Task 6.2 Perform TRACE Assessment Using Vallecitos Nuclear Center (VNC) Boron Remixing Data**

The contractor shall, using the experimental procedures described in General Electric's "Boron Remixing Tests" report, assess the capability of TRACE to simulate stratification and mixing.

To accomplish this assessment, the contractor shall use the GE report and test plan (both supplied by the USNRC) to develop using SNAP a TRACE model of the VNC test facility.

Once the TRACE model is complete, the contractor shall perform a nodalization study to determine the optimal number of nodes/compartments to use in the TRACE containment model to produce the best results.

TRACE simulations are to be performed in accordance with the experimental procedures described in the GE report. The results shall be displayed and described as in the report to form the basis for a conclusive determination.

**Deliverable:** The contractor shall provide the following deliverables:

- TRACE model of the VNC test facility in SNAP (\*.med) format.
- A calculation notebook describing the TRACE model
- A letter report documenting the results of the nodalization study and an analysis of the simulation results

## **5. APPLICABLE DOCUMENTS AND STANDARDS**

The following documents shall be referenced for the completion of this task order:

1. Papini, D., et al., "Experimental and Theoretical Studies on Density Wave Instabilities in Helically Coiled Tubes," *International Journal of Heat and Mass Transfer* (**68**), 2014. (Task 1.1)
2. NUREG/CR-6119, Volume 3 (Task 2.1)
3. Mignot, G., et al., "Test Report for Test PE4 Heat Source Test," ERCOSAM / WP3 / P3.7D / 2012-13, August 2012 (Task 2.2)
4. Test Report – ROCOM Test 2.2 (Test 3.1)
5. Numerical Benchmark Test No. 2.2, Ransom (Test 3.2)
6. NUREG/CR-3577 (Test 4.2)
7. Keyhani, M., Kulacki, F., and Christensen, R., "Free Convection in a Vertical Annulus with Constant Heat Flux on the Inner Wall," *Journal of Heat Transfer* (105), August 1983 (Test 4.3)
8. Prasad, N., and Kulacki, F., "Free Convective Heat Transfer in a Liquid-Filled Vertical Annulus," *Journal of Heat Transfer* (107), 1985 (Test 4.4)
9. Tong, L., et al., "Visualization Experiments on the Geyser Boiling-induced Instability in Vertical Circular Tube at Low-pressures," *Annals of Nuclear Energy* (77), December 2014 (Test 5.1)
10. PUMA-NSU Test Report (Task 5.2)
11. NUREG/CR-5951 (Task 6.1)

These documents shall be furnished by the USNRC.

## **6. DELIVERABLES AND DELIVERY SCHEDULE/REPORTING REQUIREMENTS**

The contractor shall provide the deliverables stated in the table below in electronic format unless otherwise directed by the COR. The electronic format shall be provided using a Microsoft-based product, (e.g., Outlook, Word, Excel, PowerPoint) unless the COR and the contractor specifically agree on another format. All deliverables, except for the Monthly Letter Status Report (MLSR) shall be in the format of draft version, revision version with redline/strikeout with a change-control appendix, and a revised version which shall become the final version. The contractor shall maintain appropriate version control in an electronic format. The contractor shall explicitly state in its submittal(s) that the product provided is the deliverable for Task/Subtask "XX", as further described below.

The Contractor shall submit the following deliverables to the task order COR. Unless otherwise directed by the COR or the Contracting Officer (CO), the contractor must provide all deliverables except the MLSR as draft products. The COR will review all draft deliverables (and coordinate any internal NRC staff review, if needed) and provide comments back to the contractor. The contractor shall revise the draft deliverable based on the comments provided by the COR and then deliver a revised version of the deliverable, which will then be considered the Final Version. When mutually agreed upon between the contractor and the COR, the contractor may submit preliminary or partial drafts to help gauge the contractor's understanding of the particular work requirement. More than one round of drafts may be needed if the contractor does not successfully incorporate the COR's comments on the previous draft.

The contractor shall develop, maintain, and control data, files, information, and deliverables pursuant to this task order.

### **Deliverable Schedule**

Tasks	Delivery Dates		Deliverables
	Preliminary Deliverables	Final Deliverables	
1.1	2 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide the assessment of TRACE capability to predict tube-side heat transfer in helically coiled tubes, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.
1.2	To be decided	1 month after receipt of NRC comments on each of the draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will perform a literature review & prepare a letter report containing recommendation for selection of experiment(s) for condensation on helical/horizontal tubes. Based on discussion with the NRC, ERI will proceed to provide the assessment of TRACE capability for condensation on the exterior of horizontal tubes, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.
2.1	5 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide the assessment of TRACE against NUPEC mixing test data, which include the SNAP engineering template, all associated TRACE models, and a letter report, for review and comment after the delivery of preliminary and final deliverables.
2.2	5 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide an assessment of TRACE against PANDA PE-4 data, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.
3.1	8 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide an updated assessment of TRACE in simulating the ROCOM Test 2.2, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.

3.2	5 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide an assessment of TRACE capability to simulate the oscillating manometer problem, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.
4.1	8 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide an assessment of TRACE capability to predict internal recirculation using LINX data, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.
4.2	11 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide an assessment of TRACE capability to predict internal recirculation due to voiding using RPI air / water data, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.
4.3	6 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide an assessment of TRACE capability to predict free convective heat transfer in a gas-filled vertical cavity, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.
4.4	6 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide an assessment of TRACE capability to predict free convective heat transfer in a liquid-filled vertical cavity, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.
5.1	11 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide an assessment of TRACE capability to predict geysering using data produced by Tong, et al., which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.
5.2	12 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide an assessment of TRACE capability to predict geysering using data produced in the PUMA-NSU facility, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.

6.1	11 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide an assessment of TRACE capability to predict boron mixing and stratification using data from UCSBVMR, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.
6.2	11 months after receipt of any missing information from NRC COR	1 month after receipt of NRC comments on Draft deliverables, but no later than the last date of the period of performance.	Energy Research, Inc. will provide an assessment of TRACE capability to predict boron mixing and stratification using VNC boron remixing data, which shall include the TRACE models, calculation notebook, and a letter report for review and comment after the delivery of preliminary and final deliverables.
MLSR	20 <sup>th</sup> of the following month	N/A	Monthly Letter Status Report (MSLR) per the Base Contract

The above deliverables shall be submitted to the task order Contracting Officer (CO) and task order COR. Unless otherwise directed by the COR or the CO, the contractor must provide all deliverables except the Monthly Letter Status Reports (MLSR) as draft products. The COR will review all draft deliverables (and coordinate any internal NRC staff review, if needed) and provide comments back to the contractor. The contractor shall revise the draft deliverable based on the comments provided by the COR and then deliver a revised version of the deliverable, which will then be considered the Final Version. When mutually agreed upon between the contractor and the COR, the contractor may submit preliminary or partial drafts to help gauge the contractor’s understanding of the particular work requirement. More than one round of drafts may be needed if the contractor does not successfully incorporate the COR’s comments on the previous draft.

**Monthly Letter Status Report (MLSR)**

Each month, the contractor will provide a Monthly Letter Status Report (MLSR) per the IDIQ Parent Contract. This report is due no later than the 20th of the following month. If no work was performed during the prior month, the contractor shall not prepare and submit an MLSR. Copies of the MLSRs are to be sent to the COR the Alternate COR with a copy provided to the Contracting Officer.

**7. REQUIRED LABOR CATEGORIES**

Labor Category	Minimum Qualification Requirement
Project Manager (PM)/Executive	The PM/Executive must have managed the completion and delivery of at least three projects involving TRACE model development and assessment.
Senior Level Engineer (SLE)	The SLE/Corporate Engineer must have at least a BS in Mechanical Engineering (ME) or Nuclear Engineering (NE), at least eight instances of demonstrated knowledge and experience in the areas of thermal/hydraulics (thermodynamics,

	fluid flow, and heat transfer) and two-phase flows, and at least eight instances of demonstrated knowledge and experience using SNAP to create TRACE models and performing TRACE simulations.
Engineer/Scientist	The Engineer/Scientist must have at least a BS in ME or NE, at least four instances of demonstrated knowledge and experience in the areas of thermal/hydraulics (thermodynamics, fluid flow, and heat transfer) and two-phase flows, and at least four instances of demonstrated knowledge and experience using SNAP to create TRACE models and performing TRACE simulations.

**8. GOVERNMENT-FURNISHED INFORMATION**

The following items shall be provided to the contractor:

- Report describing SIET facility used by Papini et al.
- MELCOR model of the NUPEC test facility
- ROCOM Test 2.2 test report
- ROCOM Test Data, EXCEL file
- ROCOM TRACE model
- LINX/ASTAR test report
- IFBHVC facility description
- Dotson, J.M., Peterson, G.E., General Electric Company, "Boron Remixing Tests," March 1982 (Task 6.2)
- TRACE V5.0, Patch 8
- SNAP Version 4.0.1 or later
- AptPlot Version 8.0.0 or later

**9. PLACE OF PERFORMANCE**

The work to be performed under this task order shall be performed at the Contractor's facility.

**10. SPECIAL CONSIDERATIONS**

**TRAVEL/MEETINGS**

Travel is not anticipated on this Task Order.

**SECURITY**

Personnel working on this contract will require an IT level II access. Work on this task order may involve the handling of documents that contain PROPRIETARY information. The contractor shall safeguard documents containing proprietary information against unauthorized disclosure. After completion of work, the contractor must either destroy

the documents or return them to the NRC. If they are destroyed, please confirm this in an email to the COR with a copy to the CO and include the date and manner in which the documents were destroyed.

### **LICENSE FEE RECOVERY**

All work under this task order is not license fee recoverable.

### **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 hereby incorporated by reference and made a part of this contract/order.

## **11. SECTION 508 - INFORMATION AND COMMUNICATION TECHNOLOGY ACCESSIBILITY**

### **11.1 Introduction**

In December 2000, the Architectural and Transportation Barriers Compliance Board (Access Board) pursuant to Section 508(2)(A) of the Rehabilitation Act Amendments of 1998, established electronic and information technology (EIT) accessibility standards for the federal government.

The Standards for Section 508 of the Rehabilitation Act (codified at 36 CFR § 1194) were revised by the Access Board, published on January 18, 2017 and minor corrections were made on January 22, 2018, effective March 23, 2018.

The revised 508 standards have replaced the term EIT with ICT (Information and Communication Technology). ICT is information technology (as defined in [40 U.S.C. 11101\(6\)](#)) and other equipment, systems, technologies, or processes, for which the principal function is the creation, manipulation, storage, display, receipt, or transmission of electronic data and information, as well as any associated content. Examples of ICT include but are not limited to: Computers and peripheral equipment; information kiosks and transaction machines; telecommunications equipment; customer premises equipment; multifunction office machines; software; applications; Web sites; videos; and, electronic documents.

The text of the Standards for Section 508 of the Rehabilitation Act can be found in 36 CFR § 1194.1 and in Appendices A, C and D to Part 1194 (<https://www.ecfr.gov/current/title-36/chapter-XI/part-1194?toc=1>).

### **11.2 General Requirements**

To help the NRC comply with Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794d) (Section 508), the Contractor shall ensure that its deliverables (both products and services) within the scope of this contract/order are:

1. in conformance with, and

2. support the requirements of the Standards for Section 508 of the Rehabilitation Act, as set forth in 36 CFR § 1194.1 and in Appendices A, C and D to Part 1194.

### 11.3 Applicable Provisions of the Standards for Section 508 of the Rehabilitation Act

The following is an outline of the standards that identifies what provisions are always applicable and which ones may be applicable.

Applicable to the Contract/Order?	Provision of 36 CFR Part 1194
Yes	1) Revised 508 Standards
Yes	a) <a href="#">Appendix A to Part 1194 – Section 508 of the Rehabilitation Act: Application and Scoping Requirements</a>
Yes	i) 508 Chapter 1: Application and Administration-sets forth general application and administration provisions
Yes	ii) 508 Chapter 2: Scoping Requirements - containing scoping requirements (which, in turn, prescribe which ICT – and, in some cases, how many – must comply with the technical specifications)
Yes (as adjusted in the Exceptions section below)	(1) E202 General Exceptions
No	(2) E203.2 User Needs
Yes (as adjusted in the Accessibility of Electronic Content section below)	(3) E205 Electronic Content
See below	b) <a href="#">Appendix C to Part 1194 – Functional Performance Criteria and Technical Requirements</a>
Maybe	i) Chapter 3: Functional Performance Criteria– applies to ICT where required by 508 Chapter 2 (Scoping Requirements) and where otherwise referenced in any other chapter of the Revised 508 Standards
No	ii) Chapter 4: Hardware
Maybe	iii) Chapter 5: Software
Maybe	iv) Chapter 6: Support Documentation and Services (applicable to, but not limited to, help desks, call centers, training services, and automated self-service technical support)
Yes	v) Chapter 7: Referenced Standards - the standards referenced here apply to ICT where required by Section 508 Chapter 2 (Scoping Requirements) and where referenced in any other chapter of the Revised 508 Standards
No (see the Legacy ICT section below)	2) <a href="#">Appendix D to Part 1194 – Electronic and Information Technology Accessibility Standards as Originally Published on December 21, 2000</a>

Refer to 508 Chapter 2 (Scoping Requirements) first to confirm what provisions in Appendix C apply in a particular case.

## **11.4 Exceptions to the Standards**

### **11.4.1 Legacy ICT**

Unless a deliverable of this contract/order is identified in this contract/order as Legacy ICT, use by the Contractor of the *Legacy ICT* general exception (section E202.2 of 36 CFR § 1194) shall only be permitted on a case-by-case basis for applicable legacy ICT and with advance written approval from the COR.

### **11.4.2 National Security Systems**

Based on the definition at [40 U.S.C. 11103\(a\)](#), the *National Security Systems* general exception (section E202.3 of 36 CFR § 1194) is not applicable to this contract/order.

### **11.4.3 Incidental ICT**

ICT acquired by the Contractor incidental to this contract/order shall not be required to conform to the revised 508 standards.

Note: This only applies when the Contractor is procuring the ICT, only the Contractor personnel will access or use the ICT, and ownership of the ICT will remain with the Contractor upon completion of the contract/order.

### **11.4.4 ICT Functions Located in Maintenance or Monitoring Spaces**

The Contractor shall confirm with the COR that an ICT deliverable of this contract/order will be located in maintenance or monitoring spaces before assuming that the *ICT Functions Located in Maintenance or Monitoring Spaces* general exception (section E202.5 of 36 CFR § 1194) applies.

Note that this exception does not apply to features of the ICT (such as Web interfaces) that can be accessed remotely, outside the maintenance or monitoring space where the ICT is located.

### **11.4.5 Undue Burden**

The *Undue Burden* general exception (section E202.6 of 36 CFR § 1194) is not expected to be applicable to work performed by the Contractor. If there are questions about potential application of this exception, please discuss with the CO.

### **11.4.6 Fundamental Alteration or Best Meets**

If the Contractor wishes to use the *Fundamental Alteration* (section E202.6 of 36 CFR § 1194) or *Best Meets* (section E202.7 of 36 CFR § 1194) general exceptions the Contractor shall do the following:

1. provide the COR with information necessary to support the agency's documentation requirements, as identified in sections E202.6.2 and E202.7.1 of 36 CFR § 1194, respectively
2. request and obtain written approval from the COR for development and/or use, as applicable to the scope of the contract/order, of an alternative means for providing individuals with disabilities access to and use of the information and data, as specified in sections E202.6.3 and E202.7.2 of 36 CFR § 1194, respectively.

## **11.5 Additional Accessibility Requirements**

### **11.5.1 Notification Due to Impact from NRC Policies, Procedures, Tools and/or ICT Infrastructure**

If and when 1) the Contractor is dependent upon NRC policies, procedures, tools and/or ICT infrastructure for standards-conformant delivery of any of the products or services under this acquisition, and 2) the Contractor is aware that conformance of products or services will be negatively impacted by capability gaps in NRC policies, procedures, tools and/or ICT infrastructure, the Contractor shall inform the COR so that the NRC can both be aware and take corrective action.

### **11.5.2 Accessibility of Electronic Content**

For electronic content (as defined in section E103 of 36 CFR § 1194) deliverables of this contract/order:

1. If a deliverable is either *Public Facing* or *Agency Official Communication* (as defined in sections E103 and E205.3 of 36 CFR § 1194, respectively) and therefore required to be conformant with section E205.4 of 36 CFR § 1194 then
  1. The NRC may choose, for its own reasons, to take responsibility for the final conformance of the deliverable or its class of deliverables by explicitly identifying the deliverable or class of deliverables through one of the following means:

- i. **Identified in this contract/order, or**
- ii. **Identified in writing to the Contractor by the COR, with a**

**copy to the CO.**

2. Otherwise, the NRC may still have a requirement that the deliverable be conformant with section E205.4 of 36 CFR § 1194, but only if the deliverable is explicitly identified in this contract/order as having that requirement.

### **11.5.3 Other**

It is desirable that the Contractor address the applicable provisions of the Revised 508 Standards throughout product and service lifecycles rather than only performing a conformance check toward the end of a process.

If and when the Contractor provides custom ICT development services pursuant to this acquisition, the Contractor shall ensure the ICT products and services fully support the applicable provisions of the Revised 508 Standards prior to delivery and before final acceptance.

If and when the Contractor provides installation, configuration or integration services for ICT products (equipment and/or software) pursuant to this acquisition, the Contractor shall not install, configure or integrate the ICT equipment and software in a way that reduces the level of conformance with the applicable provisions of the Revised 508 Standards.

If and when the scope of this contract/order includes work by the Contractor to collect, directly from NRC employees or the Public, requirements for the procurement, development, maintenance or use of ICT the Contractor shall identify the needs of users with disabilities in conformance to section E203.2.

### **11.6 ICT Accessibility Deliverables**

The Contractor shall provide the following ICT accessibility deliverables, when within the scope

of this contract/order.

#### **11.6.1 Accessibility Conformance Report (ACR)**

This report shall be submitted for ICT products, systems or application deliverables. A written ACR shall be based on the Voluntary Product Accessibility Template (VPAT®), as specified at <https://www.itic.org/policy/accessibility/vpat> or provide equivalent information. This report has the purpose to document the state of conformance to the Revised 508 Standards for the subject product, system or application.

#### **11.6.2 Supplemental Accessibility Report (SAR)**

This report shall be submitted for ICT products, systems or application deliverables that have been custom developed or integrated by the Contractor to meet contract/order requirements. A written SAR shall contain:

- a) Description of evaluation methods used to produce the ACR, to demonstrate due diligence in supporting conformance claims;
- b) Information on core functions that can't be used by persons with disabilities; and,
- c) Information on how to configure and install the ICT item to support accessibility

#### **11.6.3 ICT Support Documentation**

This documentation shall be submitted for ICT products, systems or application deliverables. The support documentation shall include:

- a) Documentation of features that help achieve accessibility and compatibility with assistive technology for persons with disabilities (as required by section 602 of 36 CFR § 1194);
- b) For authoring tools that generate content (documents, reports, videos, multimedia, web content, etc.): Information on how the tool enables the creation of accessible electronic content that conforms to the Revised 508 Standards (see section 504 of 36 CFR § 1194), including the range of accessible user interface elements the tool can create;
- c) For platform software (as defined in section E103.4 of 36 CFR § 1194) and software tools that are provided by a platform developer: Documentation on the set of accessibility services that support applications running on the platform to interoperate with assistive technology, as required by section 502.3 of 36 CFR § 1194.

#### **11.6.4 ICT Support Documentation (Alternate Formats)**

Upon request, alternate formats for non-electronic support documentation shall be provided (as required by section 602.4 of 36 CFR § 1194).

#### **11.6.5 Communication to ICT Users**

When the Contractor is providing ICT support services (including, but not limited to help desks, call centers, training services, and automated self-service technical support), any communication to ICT users shall accommodate the communication needs of individuals with disabilities (see section 603.3 of 36 CFR § 1194) and include information on accessibility and compatibility features (see 603.2 of 36 CFR § 1194).

## **D - Packaging and Marking**

### **D.1 PACKAGING AND MARKING**

(a) 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 Surface Transportation Board, Uniform Freight Classification Rules, or regulations of other carriers as applicable to the mode of transportation.

(b) On the front of the package, the Contractor shall clearly identify the contract number under which the product is being provided.

(c) Additional packaging and/or marking requirements are as follows: N/A

### **D.2 BRANDING**

The Contractor is required to use the statement below in any publications, presentations, articles, products, or materials funded under this contract/order, to the extent practical, in order to provide NRC with recognition for its involvement in and contribution to the project. If the work performed is funded entirely with NRC funds, then the contractor must acknowledge that information in its documentation/presentation.

Work Supported by the U.S. Nuclear Regulatory Commission (NRC), Office of Nuclear Regulatory Research, under Contract/order number 31310023D0002 - 31310023F0140.

**E - Inspection and Acceptance**

**E.1 INSPECTION AND ACCEPTANCE BY THE NRC (SEP 2013)**

Inspection and acceptance of the deliverable items to be furnished hereunder shall be made by the NRC Contracting Officer's Representative (COR) at the destination, accordance with FAR 52.247-34 - F.o.b. Destination.

**F - Deliveries or Performance**

**F.1 PLACE OF DELIVERY-REPORTS**

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

a. Contracting Officer's Representative (COR)

Refer to Section G.1 2052.215-71 CONTRACTING OFFICER REPRESENTATIVE AUTHORITY. (OCT 1999)

b. Contracting Officer (CO) (1 electronic copy)  
(End of Clause)

**F.2 TASK/DELIVERY ORDER PERIOD OF PERFORMANCE (SEP 2013)**

This order shall commence on September 22, 2023 and will expire on January 31, 2025.

**G - Contract Administration Data**

**NRCAR Clauses Incorporated By Full Text**

**G.1 2052.215-71 CONTRACTING OFFICER REPRESENTATIVE AUTHORITY. (OCT 1999)**

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

Primary COR

[REDACTED]

Alternate COR

[REDACTED]

(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 (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 COR 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 COR 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 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 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 thereto is subject to 52.233-1 - Disputes.

(i) In addition to providing technical direction as defined in paragraph (b) of the section, the COR shall:

(1) Monitor the contractor's technical progress, including surveillance and assessment of performance, and recommend to the contracting officer changes in requirements.

(2) Assist the contractor in the resolution of technical problems encountered during performance.

(3) Review all costs requested for reimbursement by the contractor and submit to the contracting officer recommendations for approval, disapproval, or suspension of payment for supplies and services required under this contract.

(4) Assist the contractor in obtaining the badges for the contractor personnel.

(5) Immediately notify the Security Branch, Division of Facilities and Security (SB/DFS) (via e-mail) when a contractor employee no longer requires access authorization and return of any NRC issued badge to SB/DFS within three days after their termination.

(6) Ensure that all contractor employees that require access to classified Restricted Data or National Security Information or matter, access to sensitive unclassified information (Safeguards, Official Use Only, and Proprietary

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

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

(End of Clause)

## **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.

(End of Clause)

## **H - Special Contract Requirements**

### **NRC Local Clauses Incorporated by Full Text**

#### **H.1 SECURITY REQUIREMENTS FOR CONTRACTORS (JULY 2022)**

It has been determined that contractor personnel with access to information related to work on this contract/order are required to obtain IT Level II access or L clearance.

The Contractor shall ensure that all its applicants (i.e. employees, subcontractor employees or consultants) who are assigned to perform the work herein for contract performance are approved by the NRC. The NRC Contracting Officer's Representative (COR) shall make the final determination of the Building Access (BA), level of Information Technology (IT) Access (Level I or Level II), or the national security clearance level ("Q" or "L") required for all applicants working under this contract/task order using the following guidance. The Contractor should conduct a preliminary federal facilities security screening interview or prescreening review for each of its applicants and submit to the NRC only the names that have a reasonable probability of obtaining approval necessary for access to NRC's federal facilities.

The Contractor's pre-screening review, applicable to all access/clearance levels, should focus on the applicant's history regarding the following:

- (a) felony arrest in the last seven (7) years;
- (b) alcohol related arrest within the last five (5) years;
- (c) record of any military court-martial convictions in the past ten (10) years;
- (d) illegal use of narcotics or other controlled substances possession in the past year;
- (e) illegal purchase, production, transfer, or distribution of narcotics or other controlled substances in the last seven (7) years;
- (f) delinquency on any federal debts or bankruptcy in the last seven (7) years;
- (g) applicants with less than five (5) years permanent residency in the U.S. will not be approved for Building Access, IT Access, or a national security clearance;
- (h) non-U.S. citizens must provide official documentation to the DFS/PSB as proof of their permanent residency
- (i) foreign nationals (non-U.S. citizens) are not eligible for a national security clearance ("Q" or "L")

#### **SECURITY REQUIREMENTS FOR BUILDING ACCESS**

This is applicable when an applicant will require unescorted Building Access (BA) and a HSPD-12 PIV card (NRC badge). Temporary Building Access may be approved by the NRC based on a favorable NRC review and discretionary determination of the applicant's Building Access security forms. Final Building Access will be approved by the NRC based on favorably

adjudication of their background investigation completed by the Defense Counterintelligence and Security Agency (DCSA).

#### SECURITY REQUIREMENTS FOR IT LEVEL II (IT-II) ACCESS

An applicant will require IT-II Access if the applicant will need access to IT systems or sensitive information, including an NRC Local Area Network (LAN) account. IT-II Access includes all the access and responsibilities included under Building Access and requires an HSPD-12 PIV card (NRC badge) for logical system access. Temporary IT Access may be approved by the NRC based on a favorable NRC review and discretionary determination of the applicant's IT Access security forms. Final IT Access will be approved by the NRC based on favorably adjudication of their background investigation completed by the Defense Counterintelligence and Security Agency (DCSA).

#### SECURITY REQUIREMENTS FOR IT LEVEL I (IT-I) ACCESS

An applicant will require IT-I Access if the applicant will be responsible for the planning, direction, and implementation of a computer security program, and will have major responsibility for the direction, planning, and design of a computer system, including its hardware and software. IT-I access also includes the need to access a computer system during its operation or maintenance in such a way that could cause or that has a relatively high risk of causing grave damage to the agency. IT-I access also includes the applicant's capability to realize a significant personal gain from computer access. IT-I Access includes all the access and responsibilities under IT-II Access and Building Access and requires an HSPD-12 PIV card (NRC badge) for logical system access. Temporary IT Access may be approved by the NRC based on a favorable NRC review and discretionary determination of the applicant's IT Access security forms. Final IT Access will be approved by the NRC based on favorably adjudication of their background investigation completed by the Defense Counterintelligence and Security Agency (DCSA).

#### SECURITY REQUIREMENTS FOR L CLEARANCE

An applicant will be submitted for an "L Clearance" if the applicant is designated in a "non-critical-sensitive" position requiring access to, on a need-to-know basis, to Secret and Confidential National Security Information or Confidential Restricted Data (RD) not related to broad naval nuclear propulsion program policy or direction. A security orientation briefing must be given to the applicant by the NRC when the background investigation is completed and favorably adjudicated by the NRC. This briefing will normally be given by a representative of the NRC's Personnel Security Branch (PSB), or in a regional office by a regional security representative. Temporary IT-II Access may be approved based on a favorable NRC review and discretionary determination of the applicant's national security clearance security forms. A national security clearance will be granted by the NRC based on favorably adjudication of the applicant's background investigation completed by the Defense Counterintelligence and Security Agency (DCSA).

#### SECURITY REQUIREMENTS FOR Q CLEARANCE

An applicant will be submitted for a "Q Clearance" if the applicant is designated in a "critical-sensitive" position requiring access to, on a need-to-know basis, to Top-Secret, Top-Secret RD, Secret, Secret RD, Confidential, and Confidential RD. A security orientation briefing must be

given to the applicant by the NRC requiring national security clearance when the background investigation is completed and favorably adjudicated by the NRC. This briefing will normally be given by a representative of PSB, or in a regional office by a regional security representative. Temporary IT-II Access may be approved based on a favorable NRC review and discretionary determination of the applicant's national security clearance security forms. A national security clearance will be granted by the NRC based on favorably adjudication of their background investigation completed by the Defense Counterintelligence and Security Agency (DCSA).

#### REMOVING AN APPLICANT FROM A CONTRACT AND/OR TASK ORDER

The Contractor shall immediately notify the COR when an applicant will no longer support this NRC contract/order.

### H.2 GOVERNMENT FURNISHED EQUIPMENT/PROPERTY

(a) The NRC will provide the contractor with the following items for use under this contract:

Report describing SIET facility used by Papini et al.  
 Kutateladze reference for 1.2  
 MELCOR model of the NUPEC test facility  
 ROCOM Test 2.2 test report  
 ROCOM Test Data, EXCEL file  
 ROCOM TRACE model  
 LINX/ASTAR test report  
 IFBHVC facility description  
 Dotson, J.M., Peterson, G.E., General Electric Company, "Boron Remixing Tests," March 1982 (Task 6.2)  
 TRACE V5.0, Patch 8  
 SNAP Version 4.0.1 or later  
 AptPlot Version 8.0.0 or later

(b) Only the equipment/property listed above in the quantities shown will be provided by the Government. The contractor shall be responsible and accountable for all Government property provided under this contract and shall comply with the provisions of the FAR Government Property Clause under this contract and FAR Subpart 45.5, as in effect on the date of this contract. The contractor shall investigate and provide written notification to the NRC Contracting Officer (CO) and the NRC Division of Facilities and Security, Physical Security Branch of all cases of loss, damage, or destruction of Government property in its possession or control not later than 24 hours after discovery. The contractor must report stolen Government property to the local police and a copy of the police report must be provided to the CO and to the Division of Facilities and Security, Office of Administration.

(c) All other equipment/property required in performance of the contract shall be furnished by the Contractor.

### H.3 NRC INFORMATION TECHNOLOGY SECURITY TRAINING (MAY 2016)

NRC contractors shall ensure that their employees, consultants, and subcontractors with access to the agency's information technology (IT) equipment and/or IT services complete NRC's online initial and refresher IT security training requirements to ensure that their knowledge of IT threats, vulnerabilities, and associated countermeasures remains current. Both the initial and refresher IT security training courses generally last an hour or less and can be taken during the employee's regularly scheduled work day.

Contractor employees, consultants, and subcontractors shall complete the NRC's online annual, "Computer Security Awareness" course on the same day that they receive access to the agency's IT equipment and/or services, as their first action using the equipment/service. For those contractor employees, consultants, and subcontractors who are already working under this contract, the on-line training must be completed in accordance with agency Network Announcements issued throughout the year, within three weeks of issuance of this modification.

Additional annual required online NRC training includes but is not limited to the following:

- (1) Information Security (INFOSEC) Awareness
- (2) Continuity of Operations (COOP) Awareness
- (3) Defensive Counterintelligence and Insider Threat Awareness
- (4) No FEAR Act
- (5) Personally Identifiable Information (PII) and Privacy Act Responsibilities Awareness

Contractor employees, consultants, and subcontractors who have been granted access to NRC information technology equipment and/or IT services must continue to take IT security refresher training offered online by the NRC throughout the term of the contract. Contractor employees will receive notice of NRC's online IT security refresher training requirements through agency-wide notices.

Contractor Monthly Letter Status Reports (MLSR) must include the following information for all completed training:

- (1) the name of the individual completing the course;
- (2) the course title; and
- (3) the course completion date.

The MLSR must also include the following information for those individuals who have not completed their required training:

- (1) the name of the individual who has not yet completed the training;
- (2) the title of the course(s) which must still be completed; and
- (3) the anticipated course completion date(s).

The NRC reserves the right to deny or withdraw Contractor use or access to NRC IT equipment and/or services, and/or take other appropriate contract administrative actions (e.g., disallow

costs, terminate for cause) should the Contractor violate the Contractor's responsibility under this clause.

#### **H.4 DRUG FREE WORKPLACE TESTING: UNESCORTED ACCESS TO NUCLEAR FACILITIES, ACCESS TO CLASSIFIED INFORMATION OR SAFEGUARDS INFORMATION, OR PERFORMING IN SPECIALLY SENSITIVE POSITIONS (MARCH 2019)**

The following Contractor employees, subcontractor personnel, and consultants proposed for performance or performing under this contract shall be subject to pre-assignment, random, reasonable suspicion, and post-accident drug testing: (1) individuals who have access to classified information (National Security Information and/or Restricted Data); (2) individuals who have access to Safeguards information (section 147 of the Atomic Energy Act of 1954, as amended); (3) individuals who are authorized to carry firearms while performing work under this contract; (4) individuals who are required to operate government vehicles or transport passengers for the NRC; (5) individuals who are required to operate hazardous equipment at NRC facilities; (6) individuals who administer the agency's drug program or who have Employee Assistance Program duties; (7) individuals who have unescorted access to vital or protected areas of Nuclear Power Plants, Category 1 Fuel Cycle Facilities, or Uranium Enrichment Facilities; or (8) incident/emergency response personnel (including on-call).

#### **NRCAR Clauses Incorporated By Full Text**

#### **H.5 2052.204-70 SECURITY. (OCT 1999)**

(a) Security/Classification Requirements Form. The attached NRC Form 187 (See List of Attachments) furnishes the basis for providing security and classification requirements to prime contractors, subcontractors, or others (e.g., bidders) who have or may have an NRC contractual relationship that requires access to classified information or matter, access on a continuing basis (in excess of 90 or more days) to NRC Headquarters controlled buildings, or otherwise requires NRC photo identification or card-key badges.

(b) It is the contractor's duty to safeguard National Security Information, Restricted Data, and Formerly Restricted Data. The contractor shall, in accordance with the Commission's security regulations and requirements, be responsible for safeguarding National Security Information, Restricted Data, and Formerly Restricted Data, and for protecting against sabotage, espionage, loss, and theft, the classified documents and material in the contractor's possession in connection with the performance of work under this contract. Except as otherwise expressly provided in this contract, the contractor shall transmit to the Commission any classified matter in the possession of the contractor or any person under the contractor's control in connection with performance of this contract upon completion or termination of this contract.

(1) The contractor shall complete a certificate of possession to be furnished to the Commission specifying the classified matter to be retained if the retention is:

- (i) Required after the completion or termination of the contract; and
- (ii) Approved by the contracting officer.

(2) The certification must identify the items and types or categories of matter retained, the conditions governing the retention of the matter and their period of

retention, if known. If the retention is approved by the contracting officer, the security provisions of the contract continue to be applicable to the matter retained.

(c) In connection with the performance of the work under this contract, the contractor may be furnished, or may develop or acquire, proprietary data (trade secrets) or confidential or privileged technical, business, or financial information, including Commission plans, policies, reports, financial plans, internal data protected by the Privacy Act of 1974 (Pub. L. 93-579), or other information which has not been released to the public or has been determined by the Commission to be otherwise exempt from disclosure to the public. The contractor agrees to hold the information in confidence and not to directly or indirectly duplicate, disseminate, or disclose the information, in whole or in part, to any other person or organization except as necessary to perform the work under this contract. The contractor agrees to return the information to the Commission or otherwise dispose of it at the direction of the contracting officer. Failure to comply with this clause is grounds for termination of this contract.

(d) Regulations. The contractor agrees to conform to all security regulations and requirements of the Commission which are subject to change as directed by the NRC Division of Facilities and Security and the Contracting Officer. These changes will be under the authority of the FAR Changes clause referenced in Section I of this document.

(e) Definition of National Security Information. As used in this clause, the term National Security Information means information that has been determined pursuant to Executive Order 12958 or any predecessor order to require protection against unauthorized disclosure and that is so designated.

(f) Definition of Restricted Data. As used in this clause, the term Restricted Data means all data concerning design, manufacture, or utilization of atomic weapons; the production of special nuclear material; or the use of special nuclear material in the production of energy, but does not include data declassified or removed from the Restricted Data category under to Section 142 of the Atomic Energy Act of 1954, as amended.

(g) Definition of Formerly Restricted Data. As used in this clause the term Formerly Restricted Data means all data removed from the Restricted Data category under Section 142-d of the Atomic Energy Act of 1954, as amended.

(h) Security clearance personnel. The contractor may not permit any individual to have access to Restricted Data, Formerly Restricted Data, or other classified information, except in accordance with the Atomic Energy Act of 1954, as amended, and the Commission's regulations or requirements applicable to the particular type or category of classified information to which access is required. The contractor shall also execute a Standard Form 312, Classified Information Nondisclosure Agreement, when access to classified information is required.

(i) Criminal liabilities. Disclosure of National Security Information, Restricted Data, and Formerly Restricted Data relating to the work or services ordered hereunder to any person not entitled to receive it, or failure to safeguard any Restricted Data, Formerly Restricted Data, or any other classified matter that may come to the contractor or any person under the contractor's control in connection with work under this contract, may

subject the contractor, its agents, employees, or subcontractors to criminal liability under the laws of the United States. (See the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011 et seq.; 18 U.S.C. 793 and 794; and Executive Order 12958.)

(j) Subcontracts and purchase orders. Except as otherwise authorized, in writing, by the contracting officer, the contractor shall insert provisions similar to the foregoing in all subcontracts and purchase orders under this contract.

(k) In performing contract work, the contractor shall classify all documents, material, and equipment originated or generated by the contractor in accordance with guidance issued by the Commission. Every subcontract and purchase order issued under the contract that involves originating or generating classified documents, material, and equipment must provide that the subcontractor or supplier assign the proper classification to all documents, material, and equipment in accordance with guidance furnished by the contractor.

(End of Clause)

**H.6 2052.215-70 KEY PERSONNEL. (JAN 1993)**

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

**Project Manager (s):** [REDACTED]

**Senior Level Engineer (s):** [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)

## I - Contract Clauses

### NRCAR Clauses Incorporated By Full Text

#### I.1 2052.209-72 CONTRACTOR ORGANIZATIONAL CONFLICTS OF INTEREST. (JAN 1993)

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

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

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

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

(c) Work for others.

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

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

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

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

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

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

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

(d) Disclosure after award.

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

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

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

(e) Access to and use of information.

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

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

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

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

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

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

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

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

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

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

(i) Follow-on effort. The contractor shall be ineligible to participate in NRC contracts, subcontracts, or proposals therefor (solicited or unsolicited) which stem directly from the contractor's performance of work under this contract. Furthermore, unless so directed in writing by the contracting officer, the contractor may not perform any technical consulting

or management support services work or evaluation activities under this contract on any of its products or services or the products or services of another firm if the contractor has been substantially involved in the development or marketing of the products or services.

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

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

(End of Clause)

### **FAR Clauses Incorporated By Full Text**

#### **I.2 52.204-27 PROHIBITION ON A BYTEDANCE COVERED APPLICATION. (JUN 2023)**

(a) *Definitions.* As used in this clause-

*Covered application* means the social networking service TikTok or any successor application or service developed or provided by ByteDance Limited or an entity owned by ByteDance Limited.

*Information technology*, as defined in 40 U.S.C. 11101(6)-

(1) Means any equipment or interconnected system or subsystem of equipment, used in the automatic acquisition, storage, analysis, evaluation, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the executive agency, if the equipment is used by the executive agency directly or is used by a contractor under a contract with the executive agency that requires the use-

(i) Of that equipment; or

(ii) Of that equipment to a significant extent in the performance of a service or the furnishing of a product;

(2) Includes computers, ancillary equipment (including imaging peripherals, input, output, and storage devices necessary for security and surveillance), peripheral equipment designed to be controlled by the central processing unit of a computer, software, firmware and similar procedures, services (including support services), and related resources; but

(3) Does not include any equipment acquired by a Federal contractor incidental to a Federal contract.

(b) *Prohibition.* Section 102 of Division R of the Consolidated Appropriations Act, 2023 (Pub. L. 117-328), the No TikTok on Government Devices Act, and its implementing guidance under Office of Management and Budget (OMB) Memorandum M-23-13, dated February 27, 2023, "No TikTok on Government Devices" Implementation Guidance, collectively prohibit the presence or use of a covered application on executive agency information technology, including certain equipment used by Federal contractors. The Contractor is prohibited from having or using a covered application on any information technology owned or managed by the Government, or on any information technology used or provided by the Contractor under this contract, including equipment provided by the Contractor's employees; however, this prohibition does not apply if the Contracting Officer provides written notification to the Contractor that an exception has been granted in accordance with OMB Memorandum M-23-13.

(c) *Subcontracts.* The Contractor shall insert the substance of this clause, including this paragraph (c), in all subcontracts, including subcontracts for the acquisition of commercial products or commercial services.

(End of clause)

### **I.3 52.227-17 RIGHTS IN DATA--SPECIAL WORKS. (DEC 2007)**

(a) Definitions. As used in this clause--

Data means recorded information, regardless of form or the media on which it may be recorded. The term includes technical data and computer software. The term does not include information incidental to contract administration, such as financial, administrative, cost or pricing, or management information.

Unlimited rights means the rights of the Government to use, disclose, reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, in any manner and for any purpose, and to have or permit others to do so.

(b) Allocation of Rights. (1) The Government shall have--

- (i) Unlimited rights in all data delivered under this contract, and in all data first produced in the performance of this contract, except as provided in paragraph (c) of this clause.
- (ii) The right to limit assertion of copyright in data first produced in the performance of this contract, and to obtain assignment of copyright in that data, in accordance with paragraph (c)(1) of this clause.
- (iii) The right to limit the release and use of certain data in accordance with paragraph (d) of this clause.

(2) The Contractor shall have, to the extent permission is granted in accordance with paragraph (c)(1) of this clause, the right to assert claim to copyright subsisting in data first produced in the performance of this contract.

(c) Copyright--(1) Data first produced in the performance of this contract. (i) The Contractor shall not assert or authorize others to assert any claim to copyright subsisting

in any data first produced in the performance of this contract without prior written permission of the Contracting Officer. When copyright is asserted, the Contractor shall affix the appropriate copyright notice of 17 U.S.C. 401 or 402 and acknowledgment of Government sponsorship (including contract number) to the data when delivered to the Government, as well as when the data are published or deposited for registration as a published work in the U.S. Copyright Office. The Contractor grants to the Government, and others acting on its behalf, a paid-up, nonexclusive, irrevocable, worldwide license for all delivered data to reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, by or on behalf of the Government.

(ii) If the Government desires to obtain copyright in data first produced in the performance of this contract and permission has not been granted as set forth in paragraph (c)(1)(i) of this clause, the Contracting Officer shall direct the Contractor to assign (with or without registration), or obtain the assignment of, the copyright to the Government or its designated assignee.

(2) Data not first produced in the performance of this contract. The Contractor shall not, without prior written permission of the Contracting Officer, incorporate in data delivered under this contract any data not first produced in the performance of this contract and that contain the copyright notice of 17 U.S.C. 401 or 402, unless the Contractor identifies such data and grants to the Government, or acquires on its behalf, a license of the same scope as set forth in paragraph (c)(1) of this clause.

(d) Release and use restrictions. Except as otherwise specifically provided for in this contract, the Contractor shall not use, release, reproduce, distribute, or publish any data first produced in the performance of this contract, nor authorize others to do so, without written permission of the Contracting Officer.

(e) Indemnity. The Contractor shall indemnify the Government and its officers, agents, and employees acting for the Government against any liability, including costs and expenses, incurred as the result of the violation of trade secrets, copyrights, or right of privacy or publicity, arising out of the creation, delivery, publication, or use of any data furnished under this contract; or any libelous or other unlawful matter contained in such data. The provisions of this paragraph do not apply unless the Government provides notice to the Contractor as soon as practicable of any claim or suit, affords the Contractor an opportunity under applicable laws, rules, or regulations to participate in the defense of the claim or suit, and obtains the Contractor's consent to the settlement of any claim or suit other than as required by final decree of a court of competent jurisdiction; and these provisions do not apply to material furnished to the Contractor by the Government and incorporated in data to which this clause applies.

(End of clause)

**J - List of Documents, Exhibits and Other Attachments**

<b>Attachment Number</b>	<b>Title</b>	<b>Document Version</b>	<b>Date</b>	<b>Number of Pages</b>
1	Attachment No. 1 _ 31310023F0140 _ NRC Form187	BASE	09/11/2023	4