

ORDER FOR SUPPLIES OR SERVICES


PAGE OF PAGES
1 6

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

BPA NO. NRC-DR-04-U9-141

| | | | | | |
|--|--|---|--|--|--------------------------|
| 1. DATE OF ORDER AUG 05 2009 | | 2. CONTRACT NO. (if any) GS23FD100X | | 6. SHIP TO: | |
| 3. ORDER NO. NRC-T001 | | MODIFICATION NO. | | a. NAME OF CONSIGNEE US Nuclear Regulatory Commission | |
| 4. REQUISITION/REFERENCE NO. 04-09-141T001 | | b. STREET ADDRESS Attn: Inez Madri Mail Stop: C2A07M | | | |
| 8. ISSUING OFFICE (Address correspondence to) US Nuclear Regulatory Commission Attn: Adelia M Rodriguez, 301-492-3623 Mail Stop: TWB-01-B10M Washington DC 20555 | | c. CITY Washington | | d. STATE DC | e. ZIP CODE 20555 |
| 9. NAME OF CONTRACTOR ENERGY RESEARCH, INC. | | 7. TO: | | | |
| b. COMPANY NAME | | c. CITY ROCKVILLE | | d. STATE MD | e. ZIP CODE 208523901 |
| c. STREET ADDRESS 6189 EXECUTIVE BLVD | | 10. REQUISITIONING OFFICE RES | | | |
| 9. ACCOUNTING AND APPROPRIATION DATA Obligate: 0200,000 B&R; 960-15-171-172 Job: N6B73 BOC: 252A Approp.: 11X0200,960 FFS; RES-C09-688 DUNS: 521627407 | | 11. BUSINESS CLASSIFICATION (Check appropriate box(es)) | | | |
| <input checked="" type="checkbox"/> a. SMALL <input type="checkbox"/> d. WOMEN-OWNED | | <input type="checkbox"/> b. OTHER THAN SMALL <input type="checkbox"/> e. HUBZone | | <input type="checkbox"/> c. DISADVANTAGED <input type="checkbox"/> f. EMERGING SMALL BUSINESS | |
| 13. PLACE OF | | 14. GOVERNMENT BR. NO. | | 12. F.O.B. POINT Destination | |
| a. INSPECTION Destination | | b. ACCEPTANCE Destination | | 15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date) | |
| 16. DISCOUNT TERMS | | | | | |

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) |
|-----------------|---|-------------------------|-------------|-------------------|---------------|--------------------------|
| | The contractor shall provide the services in the attached statement of work in accordance with the terms and conditions of the BPA and this order. Total Order Ceiling: \$203,303.40 Total Obligated amount: \$200,000.00 Period of Performance: Award date - February 28, 2010. Acceptance:  Sign/Cure Date: 8/5/2009 | | | | | |

| | | | | | |
|---|--|---------------------------|---------------------------|---|--------------------------|
| 18. SHIPPING POINT | | 19. GROSS SHIPPING WEIGHT | | 20. INVOICE NO. | |
| 21. MAIL INVOICE TO: | | | | | |
| a. NAME Department of Interior National Business Center | | | | | |
| b. STREET ADDRESS (or P.O. Box) Attn: Fiscal Services Branch - D2770 7301 W. Mansfield Avenue | | | | | |
| c. CITY Denver | | d. STATE CO | e. ZIP CODE 80235-2230 | | 17(h) TOTAL (Cont. Page) |
| 22. UNITED STATES OF AMERICA BY (Signature) | | | | 23. NAME (Typed) Heriberto Colon Jr. Contracting officer TITLE: CONTRACTING/ORDERING OFFICER | |
| | | | | 17(i) GRAND TOTAL \$200,000.00 | |

AUTHORIZED FOR LOCAL REPRODUCTION
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TEMPLATE - ADM001

OPTIONAL FORM 347 (REV. 4/2008)
PRESCRIBED BY GSA/FPMR 41 CFR 101-11.6

SUNSI REVIEW COMPLETE

AUG 13 2009

ADM002

TASK ORDER TERMS AND CONDITIONS

A.1 PRICE SCHEDULE

Award date - December 31, 2009

| Labor category | Labor Rate | Est. hours | Total |
|-------------------------------|------------|------------|---------------------|
| Executive | [REDACTED] | [REDACTED] | [REDACTED] |
| Executive Engineer Scientist | [REDACTED] | [REDACTED] | [REDACTED] |
| Senior Engineer / Scientist | [REDACTED] | [REDACTED] | [REDACTED] |
| Engineer / Scientist | [REDACTED] | [REDACTED] | [REDACTED] |
| System Analyst | [REDACTED] | [REDACTED] | [REDACTED] |
| Support Staff | [REDACTED] | [REDACTED] | [REDACTED] |
| Senior Consulting Engineer | [REDACTED] | [REDACTED] | [REDACTED] |
| Executive Consulting Engineer | [REDACTED] | [REDACTED] | [REDACTED] |
| Total Labor | | | \$143,347.60 |
| Other direct costs | | | [REDACTED] |
| Travel | | | [REDACTED] |
| TOTAL | | | \$145,347.60 |

January 1, 2009-end of year 1 (est. August 4, 2010)

| Labor category | Labor Rate | Est. hours | Total |
|-------------------------------|------------|------------|--------------------|
| Executive | [REDACTED] | [REDACTED] | [REDACTED] |
| Executive Engineer Scientist | [REDACTED] | [REDACTED] | [REDACTED] |
| Senior Engineer / Scientist | [REDACTED] | [REDACTED] | [REDACTED] |
| Engineer / Scientist | [REDACTED] | [REDACTED] | [REDACTED] |
| System Analyst | [REDACTED] | [REDACTED] | [REDACTED] |
| Support Staff | [REDACTED] | [REDACTED] | [REDACTED] |
| Senior Consulting Engineer | [REDACTED] | [REDACTED] | [REDACTED] |
| Executive Consulting Engineer | [REDACTED] | [REDACTED] | [REDACTED] |
| Total Labor | | | \$54,955.80 |
| Other direct costs | | | [REDACTED] |
| Travel | | | [REDACTED] |
| TOTAL | | | \$57,955.80 |

Task 1 Summary

| Labor category | Labor Rate | Est. hours | Total |
|-------------------------------|------------|------------|----------------------|
| Executive | | | [REDACTED] |
| Executive Engineer Scientist | | | [REDACTED] |
| Senior Engineer / Scientist | | | [REDACTED] |
| Engineer / Scientist | | | [REDACTED] |
| System Analyst | | | [REDACTED] |
| Support Staff | | | [REDACTED] |
| Senior Consulting Engineer | | | [REDACTED] |
| Executive Consulting Engineer | | | [REDACTED] |
| Total Labor | | | \$ 198,303.40 |
| Other direct costs | | | [REDACTED] |
| Travel | | | [REDACTED] |
| TOTAL | | | \$203,303.40 |

A.2 CONSIDERATION AND OBLIGATION - LABOR HOUR CONTRACT

- (a) The total not to exceed cost to the Government for full performance of this contract is \$203,303.40.
- (b) The amount currently obligated by the Government with respect to this contract is \$200,000.00. The contractor shall not exceed this obligated amount at any time.
- (c) It is estimated that the amount currently allotted will cover performance through February 24, 2010.

**STATEMENT OF WORK
RES-09-141, Task Order No. 1**

TITLE: MELCOR NUSCALE INPUT DECK DEVELOPMENT AND ANALYSES

1.0 BACKGROUND

The United States Nuclear Regulatory Commission (NRC), Office of Nuclear Regulatory Research (RES), is providing support to the NRC's New Reactors Office (NRO) in the NuScale Power Module pre-application and design certification review activities. There are a number of unique features in the NuScale that are specifically designed to help mitigate the consequences of severe accidents. As part of this effort, NRC staff is planning to examine the severe accident and containment response behavior of the NuScale design under various postulated accident conditions.

2.0 OBJECTIVES

The primary objective of the planned activity is to develop and document a preliminary MELCOR 1.8.6 input model for NuScale that is consistent with the contemporary NRC MELCOR modeling approach for existing and advanced/evolutionary reactors (e.g., AP1000, ESBWR, EPR, etc.).

3.0 REQUIREMENTS

Task 1 Development of a Preliminary MELCOR Input Model for NuScale

The contractor shall extract the required design data from various submittals by NuScale Power Inc. for the NuScale Power Module (e.g., design documents, any applicant-developed input deck, etc.) to develop a MELCOR 1.8.6 input model consistent in terms of nodalization to other recently developed MELCOR input decks. The model shall include the integrated reactor vessel and large water pool, vertical helical tube steam generators that are integrated into the reactor vessel, air evacuated high pressure containment vessel, ECCS, decay heat removal system (DHRS), containment heat removal system (CHRS), and the feedwater system. There are no motor-operated pumps in the NuScale reactor system, which uses natural circulation to circulate water through the reactor during both normal operation and when the unit is shut down. In addition, models shall be developed for other features in this design that may be important to progression of severe accidents.

The input deck shall be supported by detailed calculation notes that can be readily submitted to an independent Quality Assurance (QA) review, if needed.

The initial input deck shall be tested under full-power (pre-accident) steady state conditions to verify that the key reactor and plant parameters hold close to nominal values, thus ensuring that the input parameters are consistent in the model.

Deliverable: Preliminary Input Deck and detailed calculation notes.

Task 1b Transient Testing of Preliminary Input deck and Documentation

The contractor shall test the preliminary input deck developed under Task 1a for reasonableness by performing preliminary sample transient/accident calculations and comparing the calculated trends to published data in the literature, where available. In areas where the existing MELCOR model is found to be deficient in representing a specific design feature, reasonable workarounds may become necessary, and shall be devised. Based on

this testing, the contractor shall update the preliminary input deck and prepare detailed documentation of the input model and sample calculations.

Deliverable: Updated Preliminary Input Deck and Documentation.

4.0 DELIVERABLES AND DELIVERY SCHEDULE

| Task | Deliverable | Due Date |
|-------------|---|---|
| 1a | Preliminary Input Deck and detailed calculation notes | +4.5 months after award date |
| 1b | Updated Preliminary Input Deck and Documentation | +2.5 months after completion of Task 1a |

The contractor shall review technical reports to ensure they are of high quality. The format of technical reports should follow generally accepted technical writing practices (see NUREG-650, Revision 2, "Publishing Documents in NUREG Series"). The authors must consider the audience who read the documents; link ideas in sentences and paragraphs to create an easy-to-follow logical transition; and ensure consistency of terminology, format, and style throughout. The reports should be well focused (i.e., they should not be too wordy and the prose should flow in logical manner). The authors must provide necessary information to avoid administrative, managerial, or fiscal information unsuitable for wide dissemination. They should not contain proposals for additional work and words should be carefully selected to avoid marketing of contractor capabilities.

5.0 PERSONNEL QUALIFICATIONS

The contractor shall provide a specialist with expertise and experience in severe accident and source term (fission product release and transport) analysis.

6.0 MEETINGS AND TRAVEL REQUIREMENTS

The contractor shall plan on attending meetings (up to four visits for one person, for one day) at the NRC Headquarters in Rockville, Maryland. For planning purposes, the contractor may attend one technical society meeting and present a paper and an additional trip to Corvallis, Oregon for three days for two people. Any domestic travel must be approved in advance by the NRC Project Manager.

7.0 PERIOD OF PERFORMANCE

The period of performance for this order is seven months (est. August 1, 2009 – February 28, 2010)

8.0 PLACE OF PERFORMANCE

All work performed under this contract shall be performed primarily at the contractor's site, except when the contractor needs to be on-site at NRC Headquarters in Rockville, MD, for meetings and discussions, and off-site locations designated by NRC Project Officer.

9.0 NRC-FURNISHED MATERIALS

The NRC will provide to the contractor information and design data for NuScale and any available input data that is provided by the applicant. Proprietary submitted documentation will be provided by the NRC in the form of CD-ROMs.

The contractor shall be responsible for the protection of all NRC documentation in its possession during the course of contract performance in accordance with the procedures as set forth in NRC's policy entitled, Sensitive Unclassified Non-Safeguards Information (SUNSI), Handling Requirements for Proprietary Information.

10.0 TECHNICAL AND OTHER SPECIAL QUALIFICATIONS REQUIRED

The contractor shall provide personnel that are experienced in thermal hydraulics, severe accident analyses, risk assessment, MELCOR input deck development, code assessment, and applications to Advanced LWRs.

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