

**ORDER FOR SUPPLIES OR SERVICES**

PAGE OF PAGES  
1 26

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

BPA NO.

1. DATE OF ORDER <b>9-7-2010</b>		2. CONTRACT NO. (if any) GS23F0110M		6. SHIP TO:	
3. ORDER NO. NRC-DR-04-10-130		4. REQUISITION/REFERENCE NO.		a. NAME OF CONSIGNEE U.S. Nuclear Regulatory Commission	
5. ISSUING OFFICE (Address correspondence to) U.S. Nuclear Regulatory Commission Div. of Contracts Attn: Mail Stop: TWB-01-B10M Washington, DC 20555				b. STREET ADDRESS One White Flint North 11555 Rockville Pike	
7. TO:		c. CITY Rockville		d. STATE MD	e. ZIP CODE 20852
a. NAME OF CONTRACTOR ENERGY RESEARCH, INC.				f. SHIP VIA DESTINATION	
b. COMPANY NAME				8. TYPE OF ORDER	
c. STREET ADDRESS 6189 EXECUTIVE BLVD				<input type="checkbox"/> a. PURCHASE <input checked="" type="checkbox"/> b. DELIVERY 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 208523901		
9. ACCOUNTING AND APPROPRIATION DATA BB&R#:060-15-111-203;JC:N6976; BOC:252A; APP.#:31X0200.060 OBLIGATED AMOUNT:\$94,000.00 DUNS:621211259				10. REQUISITIONING OFFICE RES RES/DRA/PRAB	

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

17. SCHEDULE (See reverse for Rejections)      See CONTINUATION Page

ITEM NO. (a)	SUPPLIES OR SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
CLIN 001	Executive Labor rate valid from 09/01/2010 through 12/31/2010	[REDACTED]	Hours	[REDACTED]	[REDACTED]	[REDACTED]
CLIN 002	Executive Engineer Labor rate valid from 09/01/2010 through 12/31/2010	[REDACTED]	Hours	[REDACTED]	[REDACTED]	[REDACTED]
CLIN 003	Senior Engineer/Scientist Labor rate valid from 09/01/2010 through 12/31/2010	[REDACTED]	Hours	[REDACTED]	[REDACTED]	[REDACTED]
CLIN 004	Engineer/Scientist Labor rate valid from 09/01/2010 through 12/31/2010	[REDACTED]	Hours	[REDACTED]	[REDACTED]	[REDACTED]
CLIN 005	Executive Labor rate valid from 01/01/2011 through 08/15/2011	[REDACTED]	Hours	[REDACTED]	[REDACTED]	[REDACTED]
CLIN 006	Executive Engineer Labor rate valid from 01/01/2011 through 08/15/2011	[REDACTED]	Hours	[REDACTED]	[REDACTED]	[REDACTED]
CLIN 007	Senior Engineer/Scientist Labor rate valid from 01/01/2011 through 08/15/2011	[REDACTED]	Hours	[REDACTED]	[REDACTED]	[REDACTED]
CLIN 008	Engineer/Scientist Labor rate valid from 01/01/2011 through 08/15/2011	[REDACTED]	Hours	[REDACTED]	[REDACTED]	[REDACTED]

SEE BILLING INSTRUCTIONS ON REVERSE	18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.		\$117,420.62			
	21. MAIL INVOICE TO:								\$117,420.62	17(h) TOTAL (Cont. pages)
	a. NAME Department of Interior / NBC NRCPayments@nbc.gov								117,420.62	17(i). GRAND TOTAL
	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							

22. UNITED STATES OF AMERICA BY (Signature) 	23. NAME (Typed) William A. Adams Contracting Officer TITLE: CONTRACTING/ORDERING OFFICER
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**TEMPLATE - ADM001**

**SUNSI REVIEW COMPLETE**

SEP 22 2010

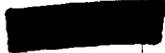
**ADM002**

**ORDER FOR SUPPLIES OR SERVICES  
SCHEDULE - CONTINUATION**

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

DATE OF ORDER	CONTRACT NO. GS23F0110M	ORDER NO. NRC-DR-04-10-130
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ITEM NO. (A)	SUPPLIES OR SERVICES (B)	QUANTITY ORDERED (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)	QUANTITY ACCEPTED (G)
CLIN 009	Other Direct Costs (ODC's)					
CLIN 010	Travel					
<p>All tasks are to be completed in accordance with the Statement of Work (see attached SOW)</p>						

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$117,420.62

## **CONSIDERATION AND OBLIGATION**

(a) The total cost to the Government for full performance under this contract is \$117,420.62

(b) This contract is incrementally funded in the amount of \$94,000.00 with \$23,420.62 subject to the availability of funds.

## **DURATION OF CONTRACT PERIOD**

The period of performance is from 7 September, 2010 through 6 August, 2011.

## **CONTACTS**

Your contact for contractual matters is:

William A. Adams, Sr. Contract Specialist  
301-492-3641 or William.adams@nrc.gov

ATTACHMENT 1

Please indicate your acceptance of this contract by having an official who is authorized to bind your organization execute three copies of this document in the spaces provided below. Please send a fax of the signed document to 301-492-3438, so that this may be executed as soon as possible. One signed original should be retained for your records. In addition, please send the other two signed originals to NRC Headquarters via overnight delivery and use the following street

ACCEPTED:

*Moham Patel - RU*

Name

*President*

Title

*9/7/10*

Date

(4)

(5)

(6)

U.S. Nuclear Regulatory Commission			
NRC RFQ: RES-10-130, "Level 1 PRA Success Criteria MELCOR Input Deck"			
<b>TRAVEL BREAKDOWN</b>			
Kickoff meeting, two days, at NRC HQ (local travel, parking \$15/day)			
Site visit, three days, two people at location TBD (for example, Commanche Peak)*			
Handoff meeting, two days, at NRC HQ (local travel, parking \$15/day)			
<b>TOTAL TRAVEL COST</b>			<b>\$3,106.00</b>

\* Airfare Person 1  
 Airfare Person 2  
 Total Per Diem, Person 1 (\$116x3 days)  
 Total Per Diem, Person 2  
 Local Transportation for both  
 TOTAL

  
 \$3,046.00

## **A.1 NRC Acquisition Clauses - (NRCAR) 48 CFR Ch. 20**

### **A.2 52.202-1 DEFINITIONS (JUL 2004)**

(a) When a solicitation provision or contract clause uses a word or term that is defined in the Federal Acquisition Regulation (FAR), the word or term has the same meaning as the definition in FAR 2.101 in effect at the time the solicitation was issued, unless--

(1) The solicitation, or amended solicitation, provides a different definition; (2) The contracting parties agree to a different definition; (3) The part, subpart, or section of the FAR where the provision or clause is prescribed provides a different meaning; or (4) The word or term is defined in FAR Part 31, for use in the cost principles and procedures.

(b) The FAR Index is a guide to words and terms the FAR defines and shows where each definition is located. The FAR Index is available via the Internet at <http://www.acqnet.gov> at the end of the FAR, after the FAR Appendix.

### **A.3 2052.204.70 SECURITY (MAR 2004)**

(a) Contract Security and/or Classification Requirements (NRC Form 187). The policies, procedures, and criteria of the NRC Security Program, NRC Management Directive (MD) 12 (including MD 12.1, "NRC Facility Security Program;" MD 12.2, "NRC Classified Information Security Program;" MD 12.3, "NRC Personnel Security Program;" MD 12.4, "NRC Telecommunications Systems Security Program;" MD 12.5, "NRC Automated Information Systems Security Program;" and MD 12.6, "NRC Sensitive Unclassified Information Security Program"), apply to performance of this contract, subcontract or other activity. This MD is incorporated into this contract by reference as though fully set forth herein. 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 Restricted Data or National Security Information or matter, access to sensitive unclassified information (e.g., Safeguards), access to sensitive Information Technology (IT) systems or data, unescorted access to NRC controlled buildings/space, or unescorted access to protected and vital areas of nuclear power plants.

(b) It is the contractor's duty to protect 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 protecting 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, upon completion or termination of this contract, 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. If retention by the contractor of any classified matter is required after the completion or termination of the contract and the retention is approved by the contracting officer, the contractor shall complete a certificate of possession to be furnished to the Commission specifying the classified matter to be retained. 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, safeguards information, 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 shall ensure that information protected from public disclosure is maintained as required by NRC regulations and policies, as cited in this contract or as otherwise provided by the NRC. The contractor will not directly or indirectly duplicate, disseminate, or disclose the information in whole or in part to any other person or organization except as may be 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 (DFS) and the Contracting Officer. These changes will be under the authority of the FAR Changes clause referenced in this document.

The contractor agrees to comply with the security requirements set forth in NRC Management Directive 12.1, NRC Facility Security Program which is incorporated into this contract by reference as though fully set forth herein. Attention is directed specifically to the section titled "Infractions and Violations," including "Administrative Actions" and "Reporting Infractions."

(e) Definition of National Security Information. The term National Security Information, as used in this clause, 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. The term Restricted Data, as used in this clause, 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 pursuant to Section 142 of the Atomic Energy Act of 1954, as amended.

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

(h) Definition of Safeguards Information. Sensitive unclassified information that specifically identifies the detailed security measures of a licensee or an applicant for the physical protection of special nuclear material; or security measures for the physical protection and location of certain plant equipment vital to the safety of production of utilization facilities. Protection of this information is required pursuant to Section 147 of the Atomic Energy Act of 1954, as amended.

(i) **Security Clearance.** 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.

(j) **Criminal Liabilities.** It is understood that 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.)

(k) **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.

(l) In performing the 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 hereunder involving the origination or generation of classified documents, material, and equipment must provide that the subcontractor or supplier assign classification to all documents, material, and equipment in accordance with guidance furnished by the contractor.

#### **A.4 Other Applicable Clauses**

See Addendum for the following in full text (if checked)

52.216-18, Ordering

52.216-19, Order Limitations

52.216-22, Indefinite Quantity

52.217-6, Option for Increased Quantity

52.217-7, Option for Increased Quantity Separately Priced Line Item

52.217-8, Option to Extend Services

52.217-9, Option to Extend the Term of the Contract

## **A.5 SEAT BELTS**

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

## **A.6 WHISTLEBLOWER PROTECTION FOR NRC CONTRACTOR AND SUBCONTRACTOR EMPLOYEES (JULY 2006)**

(a) The U.S. Nuclear Regulatory Commission (NRC) contractor and its subcontractor are subject to the Whistleblower Employee Protection public law provisions as codified at 42 U.S.C. 5851. NRC contractor(s) and subcontractor(s) shall comply with the requirements of this Whistleblower Employee Protection law, and the implementing regulations of the NRC and the Department of Labor (DOL). See, for example, DOL Procedures on Handling Complaints at 29 C.F.R. Part 24 concerning the employer obligations, prohibited acts, DOL procedures and the requirement for prominent posting of notice of Employee Rights at Appendix A to Part 24.

(b) Under this Whistleblower Employee Protection law, as implemented by regulations, NRC contractor and subcontractor employees are protected from discharge, reprisal, threats, intimidation, coercion, blacklisting or other employment discrimination practices with respect to compensation, terms, conditions or privileges of their employment because the contractor or subcontractor employee(s) has provided notice to the employer, refused to engage in unlawful practices, assisted in proceedings or testified on activities concerning alleged violations of the Atomic Energy Act of 1954 (as amended) and the Energy Reorganization Act of 1974 (as amended).

(c) The contractor shall insert this or the substance of this clause in any subcontracts involving work performed under this contract.

## **A.7 AUTHORITY TO USE GOVERNMENT PROVIDED SPACE AT NRC HEADQUARTERS (JUL 2007)**

Prior to occupying any government provided space at NRC HQs in Rockville Maryland, the Contractor shall obtain written authorization to occupy specifically designated government space, via the NRC Project Officer, from the Chief, Space Design Branch, ADSPC. Failure to obtain this prior authorization can result in one, or a combination, of the following remedies as deemed appropriate by the Contracting Officer.

- (1) Rental charge for the space occupied will be deducted from the invoice amount due the Contractor
- (2) Removal from the space occupied
- (3) Contract Termination

## **A.8 OPTION PERIODS - TASK ORDER/DELIVERY ORDER UNDER A GSA FEDERAL SUPPLY SCHEDULE CONTRACT (MARCH 2007)**

The Period of Performance (PoP) for this requirement may extend beyond the Offeror's current PoP on their GSA Schedule. Offerors may submit proposals for the entire PoP as long as their current GSA Schedule covers the requested PoP, or their GSA Schedule contains GSA's "Evergreen Clause" (Option to Extend the Term of the Contract), which covers the requested PoP if/when the option(s) are exercised. Offerors are encouraged to submit accurate/realistic pricing for the requirement's entire PoP, even if the proposed GSA Schedule does not include pricing for the applicable option years, etc.

For proposal evaluation purposes, the NRC assumes that applicable Evergreen Clause Option(s) will be exercised and the NRC will apply price analysis, as applicable. It is in the best interest of the Offeror to explain major deviations in escalation, proposed in any Evergreen Clause option years. Resulting GSA task/delivery order option years subject to the Evergreen Clause will be initially priced utilizing the same rates proposed under the last GSA-priced year of the subject GSA Schedule. Upon GSA's exercise of the GSA Schedule option year(s) applicable to the Evergreen Clause, the NRC will modify the awarded task/delivery order to incorporate either the proposed pricing for the option years or the GSA-approved pricing (whichever is lower).

It is incumbent upon the Offeror to provide sufficient documentation (GSA-signed schedule, schedule modifications, etc.) that shows both the effective dates, pricing and terms/conditions of the current GSA Schedule, as well as Evergreen Clause terms/conditions (as applicable). Failure to provide this documentation may result in the Offeror's proposal being found unacceptable.

## CONTINUATION PAGE

**STATEMENT OF WORK**

TITLE: Level 1 PRA Success Criteria MELCOR Input Deck

**BACKGROUND**

The MELCOR computer program has historically been used for performance of deterministic light-water reactor severe accident analysis. Recently, MELCOR has been used for a number of other purposes including high-temperature gas reactor analysis, spent fuel pool analysis, and light-water reactor design-basis confirmatory analysis. In addition, MELCOR has recently been employed for Level 1 probabilistic risk assessment (PRA) success criteria analysis, both at the NRC and elsewhere.

The NRC's recent activities in Level 1 PRA success criteria analysis have been inhibited by the availability of state-of-the-art MELCOR input decks. To date, these activities have focused on the conduct of analysis for a Mark I boiling water reactor (BWR) and a 3-loop Westinghouse pressurized water reactor (PWR) with a sub-atmospheric containment, since these were the two readily available state-of-the-art input models. To provide additional capabilities, this project seeks to develop a flexible Level 1 (i.e., pre-core damage) input model for a specified 4-loop Westinghouse plant with a large-dry containment. The availability of such a model will allow for a broader spectrum of the operating fleet to be covered by the success criteria analysis. This will in turn: (i) facilitate maintenance and upgrade of a broader spectrum of the Standardized Plant Analysis Risk (SPAR) models; (ii) provide a broader set of analyses to pull from when supporting the Senior Risk Analysts (SRAs) with emergent issues under the Significance Determination Process (SDP); and (iii) allow for continued support of the program office (NRR) on specific success criteria analyses such as those called for in item 1.d of User Need Request (UNR) 2008-007.

To accomplish this work, the contractor will start with the Surry (3-loop Westinghouse plant with sub-atmospheric containment) input model developed during the NRC's State-of-the-Art Reactor Consequence Analysis (SOARCA) project. The partially-completed Sequoyah (4-loop Westinghouse plant with an ice condenser containment) will also be made available. These models, in conjunction with plant-specific documentation (e.g., the emergency operating procedures (EOPs), Technical Specifications (TS), Final Safety Analysis Report (FSAR)), will form the basis for the new input deck development. Interaction with plant engineering staff will be facilitated to the extent practicable. The contractor will also perform shake-down testing of the input deck using readily available comparative studies as a benchmark. The end result will be an input model ready for use in success criteria analysis for a broad (but not comprehensive) range of scenarios.

## OBJECTIVE

The objective of this project is a developed, tested, and thoroughly documented MELCOR input deck for a plant-specific 4-loop Westinghouse plant with a large-dry containment, ready for use in performing Level 1 PRA success criteria analysis.

## SCOPE OF WORK

The following tasks shall be completed by the contractor, in close coordination with the NRC technical project manager.

### Task 1 – Review of Supporting Material

At the start of the project, the NRC technical project manager will identify the specific plant (site and unit) to be used for development of the model, and provide relevant plant-specific documentation for that unit. As of this writing, the plant is expected to be one of the following:

- Braidwood Unit 1 or 2
- Byron Unit 1 or 2
- Callaway
- Comanche Peak Unit 1 or 2
- Vogtle Unit 1 or 2

The contractor shall review the input models and documentation for the Surry and Sequoyah input decks and the plant specific documentation for the plant to be modeled (e.g., EOPs, TS, FSAR).

At the end of this review, the contractor shall provide a summary of the information reviewed and identify any needed and missing information that has been identified, such that the technical project manager can obtain this information from the licensee or other sources.

Estimated level-of-effort: 200 hours

Estimated completion date: 2 months after award of contract

### Task 2 – Development of Initial Input Model and Calculation Notebook

If feasible, the technical project manager will coordinate a site visit or teleconference with plant engineering and operations staff to ensure that the contractor has a sound understanding of the plant design and operation. If for some reason this is not feasible, the technical project manager will coordinate information exchanges between the contractor and the (i) licensee, (ii) licensee's corporate engineering group or consultant firm, and/or (iii) cognizant NRC SRA. The resources associated with this task include those necessary to support these interactions (but travel expenses are addressed separately).

Using the material provided in the above exchanges, and the supporting material provided in Task 1, the contractor shall develop a plant-specific MELCOR input model using the best practices codified in Volume II of the SOARCA study for all systems, structures, and

components needed for general purpose Level 1 PRA success criteria use. This includes scenarios covered in the August 2009 Success Criteria report, available at ML091890792 (e.g., loss of all AC power, loss-of-coolant accidents). Automatic plant responses (e.g., automatic reactor and turbine trips, automatic feedwater control) shall be included in the model. The general level of modeling is expected to be commensurate with that of the Surry model (as invoked in the August 2009 report). Regarding MELCOR's severe accident modeling capabilities, the BUR and RN packages only need to be invoked to the extent they are needed to model the accident progression and fission product release up until the time of localized fuel relocation. Inputs for the CAV, CND, FDI, and PAR packages are not needed.

Estimated level-of-effort: 480 hours

Estimated completion date: 6 months after award of contract

#### Task 3 – Input Model and Calculation Notebook Quality Assurance Review

The model and calculation notebook shall be reviewed, in detail, by a qualified member of the contractor staff who was not primarily involved with the development of the model and documentation. Errors shall be corrected, and the documentation shall be updated.

Estimated level-of-effort: 120 hours

Estimated completion date: 8 months after award of contract

#### Task 4 – Conduct and Documentation of Model Shakedown Analysis

The contractor shall formulate a calculation matrix, in consultation with the NRC project manager, to perform (and document) shakedown testing of the model. Results shall be compared to similar sequences in the August 2009 report, the Westinghouse EOP bases documentation, and/or other industry/NRC reports. From a resource planning standpoint, it should be assumed that the calculation matrix will be comprised of 15 sequences covering 5 initiating events. The documentation of this analysis shall be commensurate with the analysis documentation in the August 2009 report (main report and Appendix A).

Estimated level-of-effort: 240 hours

Estimated completion date: 9 months after award of contract

#### Task 5 – Final Input Model / Documentation and Technical Assistance

The final input models, calculation notebook, and shakedown analysis documentation shall be transmitted to the NRC project manager via CD or DVD. This task also includes a small amount of resources for responding to inquiries and participating in meetings related to the development and use of the model.

Estimated level-of-effort: 80 hours

Estimated completion date: 11 months after award of contract

## RESEARCH QUALITY

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

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

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

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

## TECHNICAL AND OTHER SPECIAL QUALIFICATIONS REQUIRED

The contractor shall have expertise in nuclear power plant design and operation, nuclear power plant accident analysis, development of MELCOR nuclear power plant input models, and use of MELCOR for nuclear power plant accident analysis.

The contractor staff will need to complete the NRC's site access training. The NRC PM will facilitate this training completion, along with attaining the necessary site access authorization for escorted nuclear power plant access.

## LEVEL OF EFFORT

The estimated level of effort for this project is 1120 staff hours.

## PERIOD OF PERFORMANCE

The period of performance for this contract is 11 months from the time of contract award.

## REPORTING REQUIREMENTS

Required deliverables are outlined in the "DELIVERABLES/SCHEDULES AND/OR MILESTONES" section below. All letter reports shall be reviewed by a first-level supervisor prior to submittal. All deliverables shall be submitted electronically, via email, to the NRC project manager. No more than two hardcopies of any deliverable shall be submitted.

Monthly Letter Status Report.

A Monthly Letter Status Report (MLSR) is to be submitted to the NRC Project Manager by the 20<sup>th</sup> of the month following the month to be reported with copies provided to the following:

RESDRAMLSR.Resource@nrc.gov

The MLSR will identify the title of the project, the job code, the Principal Investigator, the period of performance, the reporting period, summarize each month's technical progress, list monthly spending, total spending to date, and the remaining funds and will contain information as directed in NRC Management Directive 11.1. Any administrative or technical difficulties which may affect the schedule or costs of the project shall be immediately brought to the attention of the NRC project manager.

PUBLICATIONS NOTE

RES encourages the publication of the scientific results from RES sponsored programs in refereed scientific and engineering journals as appropriate. If the laboratory proposes to publish in the open literature or present the information at meeting in addition to submitting the required technical reports, approval of the proposed article or presentation should be obtained from the NRC Project Manager. The RES Project Manager shall either approve the material as submitted, approve it subject to NRC suggested revisions, or disapprove it. In any event, the RES Project Manager may disapprove or delay presentation or publication of papers on information that is subject to Commission approval that has not been ruled upon or which has been disapproved. Additional information regarding the publication of NRC sponsored research is contained in NRC Management Directives 3.7, "NUREG Series Publications," and 3.9, "NRC Staff and Contractor Speeches, Papers, and Journal Articles on Regulatory and Technical Subjects."

If the presentation or paper is in addition to the required technical reports and the RES Project Manager determines that it will benefit the RES project, the Project Manager may authorize payment of travel and publishing costs, if any, from the project funds. If the Project Manager determines that the article or presentation would not benefit the RES project, the costs associated with the preparation, presentation, or publication will be borne by the contractor. For any publication or presentations falling into this category, the NRC reserves the right to require that such presentation or publication will not identify the NRC's sponsorship of the work.

DELIVERABLES/SCHEDULES AND/OR MILESTONES

<u>Task</u>	<u>Item</u>	<u>Date (or frequency)</u>
-	Monthly Letter Status Reports	(Once per month)
1	NRC PM identifies plant to be modeled and provides site-specific information resources	Within two weeks of contract award
	Contractor submits a few-page letter report providing a summary of the information reviewed and identification of any needed and missing information that has been identified	2 months after contract award

2	NRC PM coordinate a site visit or suitable surrogate information exchange	3 months after contract award
	Contractor submits a draft of the calculation notebook	6 months after contract award
3	Contractor submits a few page letter report documenting the quality assurance review process and findings, and confirming that all identified issues have been corrected	8 months after contract award
4	Contractor submits a letter report documenting the interim final shakedown analysis	9 months after contract award
5	NRC provides any significant comments on the shakedown analysis letter report or draft calculation notebook	10 months after contract award
	Contractor provides a CD or DVD containing all input models (organized in an easily identifiable manner), the final calculation notebook, and the final shakedown analysis report	11 months after contract award

**ORGANIZATIONAL CONFLICT OF INTEREST DISCLOSURE** (to be inserted by Division of Contracts)

**MEETINGS AND TRAVEL**

Three trips are anticipated, as follows:

1. Kickoff meeting / within two weeks of contract award / Rockville, MD / 2 contract staff / 2 days (including travel)
2. Site visit / approximately 3 months after contract award / location TBD / 2 contractor staff / 3 days (including travel)
3. Model demonstration and handoff meeting / at end of contract / Rockville, MD / 2 contractor staff / 2 days (including travel)

All other meetings and information exchanges are envisioned to be handled via teleconference.

**NRC-FURNISHED MATERIAL**

NRC will furnish plant-specific information (e.g., FSARs, TS, EOPs) necessary for the conduct of this project, at the start of the project.

**APPROPRIATE USE OF GOVERNMENT FURNISHED INFORMATION TECHNOLOGY (IT) EQUIPMENT AND/ OR IT SERVICES/ ACCESS (APRIL 2003)**

As part of contract performance the NRC may provide the contractor with information technology (IT) equipment and IT services or IT access as identified in the statement of work or subsequently as identified in the project. Government furnished IT equipment, or IT services, or IT access may include but is not limited to computers, copiers, facsimile machines, printers, pagers, software, phones, Internet access and use, and email access and use. The contractor (including the contractor's employees, consultants and subcontractors) shall use the NRC furnished IT equipment,

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and/or IT provided services, and/or IT access solely to perform the necessary efforts required under the contract. The contractor (including the contractor's employees, consultants and subcontractors) are prohibited from engaging or using the NRC IT equipment and government provided IT services or IT access for any personal use, misuse, abuses or any other unauthorized usage.

The contractor is responsible for monitoring its employees, consultants and subcontractors to ensure that NRC furnished IT equipment and/or IT services, and/or IT access are not being used for personal use, misused or abused. The NRC reserves the right to withdraw or suspend the use of its government furnished IT equipment, IT services and/or IT access arising from contractor personal usage, or misuse or abuse; and/or to disallow any payments associated with contractor (including the contractor's employees, consultants and subcontractors) personal usage, misuses or abuses of IT equipment, IT services and/or IT access; and/or to terminate the project arising from violation of this provision.

**TECHNICAL DIRECTION**

Technical direction will be provided by the Project Manager, Donald Helton, who can be reached at:

Mail Stop: CSB4-C7M  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555-0001

Phone: (301) 251-7594  
Fax: (301) 251-7435  
Email: Donald.Helton@nrc.gov

Express mail should be sent to:  
U. S. Nuclear Regulatory Commission  
Mail Stop: CSB4-C7M  
11545 Rockville Pike  
Rockville, MD 20852-2738

**ATTACHMENT 1**

Please indicate your acceptance of this contract by having an official who is authorized to bind your organization execute three copies of this document in the spaces provided below. Please send a fax of the signed document to 301-492-3438, so that this may be executed as soon as possible. One signed original should be retained for your records. In addition, please send the other two signed originals to NRC Headquarters via overnight delivery and use the following street

ACCEPTED:

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Name

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Title

---

Date

**ATTACHMENT 2**

**Billing Instructions**

**General:** During performance and through final payment of this contract, the contractor is responsible for the accuracy and completeness of data within the Central Contractor Registration (CCR) database and for any liability resulting from the Government's reliance on inaccurate or incomplete CCR data.

The contractor shall prepare vouchers/invoices for reimbursement of costs in the manner and format described herein. FAILURE TO SUBMIT VOUCHERS/INVOICES IN ACCORDANCE WITH THESE INSTRUCTIONS WILL RESULT IN REJECTION OF THE VOUCHER/INVOICE AS IMPROPER.

**Number of Copies:** A signed original and supporting documentation shall be submitted. If the voucher/invoice includes the purchase of any property with an initial acquisition cost of \$50,000 or more, a copy of the signed original is also required.

**Designated Agency Billing Office:** The preferred method of submitting vouchers/invoices is electronically to the Department of the Interior at [NRCPayments@nbc.gov](mailto:NRCPayments@nbc.gov)

If the voucher/invoice includes the purchase of capital property with an initial acquisition cost of \$50,000 or more, a copy of the signed original shall be electronically sent to: [Property@nrc.gov](mailto:Property@nrc.gov)

However, if you submit a hard-copy of the voucher/invoice, it shall be submitted to the following address:

Department of the Interior  
National Business Center  
Attn: Fiscal Services Branch - D2770  
7301 West Mansfield Avenue  
Denver, CO 80235-2230

If you submit a hard-copy of the voucher/invoice and it includes the purchase of capital property with an initial acquisition cost of \$50,000 or more, a copy of the signed original shall be mailed to the following address:

U.S. Nuclear Regulatory Commission  
NRC Property Management Officer  
Mail Stop: O-4D15  
Washington, DC 20555-0001

**HAND-CARRIED SUBMISSIONS WILL NOT BE ACCEPTED**

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

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

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

**Task Ordering Contracts:** If the contractor bills for more than one task order under a voucher/invoice, detailed cost information for each individual task order shall be submitted, together with a cumulative summary of all charges billed on the voucher/invoice. This includes all applicable cost elements discussed in paragraphs (a) through (n) of the attached instructions.

**Fee Recovery Billings:** Pursuant to the provisions of 10 CFR Part 170 and 171 on license fees, the NRC must recover the cost of work performed. Accordingly, the contractor must provide the total amount of funds billed during the period, fiscal year to date and the cumulative total for each task or task assignment by facility or report. The fee recovery billing reports shall be on a separate page, and shall be in the format provided (see Attachment 1). The billing period for fee recovery costs should be from the first day of each calendar month to the last day of the same month. Each separate fee billing report must be attached to the monthly invoice and cover the same period as the invoice.

Each report will contain a docket number or other unique identifier. The NRC will provide a unique identifier for all work performed. Costs should be reported as whole number to the nearest cent. For work that involves more than one facility at the same site, each facility should be listed separately and the costs should be split appropriately between the facilities. Common costs, as defined below, shall be identified as a separate line item in the fee recovery billing report each month.

Common costs are those costs that are not licensee unique and associated with the performance of an overall program that benefit all similar licensees covered under that program or that are required to satisfactorily carry out the program. Common costs include costs associated with the following: preparatory or start-up efforts to interpret and reach agreement on methodology, approach, acceptance criteria, regulatory position, or technical reporting requirements; efforts associated with the "lead plant" concept that might be involved during the first one or two plant reviews; meetings and discussions involving the above efforts to provide orientation, background knowledge or guidance during the course of a program; any technical effort applied to a docket or other unique identifier; and project management. Common costs must be reporting monthly for each docket or unique identifier. Common costs must be computed based on the proportion of direct costs incurred against each docket or unique identifier for the billing period.

**Billing of Cost after Expiration of Contract:** If costs are incurred during the contract period and claimed after the contract has expired, you must cite the period during which these costs were incurred. To be considered a proper expiration voucher/invoice, the contractor shall clearly mark it "EXPIRATION VOUCHER" or "EXPIRATION INVOICE".

Final vouchers/invoices shall be marked "FINAL VOUCHER" or "FINAL INVOICE".

**Currency:** Billings may be expressed in the currency normally used by the contractor in maintaining his accounting records and payments will be made in that currency. However, the U.S. dollar equivalent for all vouchers/invoices paid under the contract may not exceed the total U.S. dollars authorized in the contract.

**Supersession:** These instructions supersede any previous billing instructions.

**1. Official Agency Billing Office**

Department of the Interior  
National Business Center  
Attn: Fiscal Services Branch - D2770  
7301 West Mansfield Avenue  
Denver, CO 80235-2230

**2. Voucher Information**

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

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

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

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

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

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

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

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

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

(3) Capitalized Non Expendable Equipment. List each item costing \$50,000 or more and having a life expectancy of more than one year. List only those items of equipment for which reimbursement is requested. For each such item, list the following (as applicable): (a) the item number for the specific piece of equipment

listed in the property schedule of the contract; or (b) the Contracting Officer's approval letter if the equipment is not covered by the property schedule.

(4) **Non-capitalized Equipment, Materials, and Supplies.** These are equipment other than that described in (3) above, plus consumable materials, supplies. List by category. List items valued at \$1,000 or more separately. Provide the item number for each piece of equipment valued at \$1,000 or more.

(5) **Premium Pay.** This enumeration in excess of the basic hourly rate. (Requires written approval of the Contracting Officer.)

(6) **Consultants.** The supporting information must include the name, hourly or daily rate of the consultant, and reference the NRC approval (if not specifically approved in the original contract).

(7) **Travel.** Total costs associated with each trip must be shown in the following format:

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

(8) **Subcontracts.** Include separate detailed breakdown of all costs paid to approved subcontractors during the billing period.

(9) **Other Costs.** List all other direct costs by cost element and dollar amount separately.

h. **Indirect Costs (Overhead and General and Administrative Expense).** Cite the formula (rate and base) in effect in accordance with the terms of the contract, during the time the costs were incurred and for which reimbursement is claimed.

i. **Fixed Fee.** If the contract provides for a fixed fee, it must be claimed as provided for by the contract. Cite the formula or method of computation. Include this information as it applies to individual task orders as well. The contractor may bill for fixed fee only up to 85% of total fee.

j. **Total Amount Billed.** Insert the total amounts claimed for the current and cumulative periods.

k. **Adjustments.** For cumulative amount, include outstanding suspensions.

l. **Grand Totals.**

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

**3. Sample Voucher Information**

This voucher represents reimbursable costs for the billing period from \_\_\_ through \_\_\_.

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

(a) **Direct Costs**

- (1) Direct labor\*.....
- (2) Fringe benefits ( % , if computed as percentage).....
- (3) Capitalized non-expendable equipment (\$50,000 or more - see instructions)\*.....
- (4) Non-capitalized equipment, materials, and supplies.....

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- (5) Premium pay (NRC approved overtime).....
- (6) Consultants\*.....
- (7) Travel\*.....
- (8) Subcontracts\*.....
- (9) Other costs\*.....

Total Direct Costs

(b) Indirect Costs

(A) Overhead \_\_\_ % of  
 \_\_\_\_\_ (Indicate Base).....

- (c) Fixed-Fee (Cite Formula):
- (d) Total Amount Billed.....
- (e) Adjustments.....
- (f) Grand Totals.....

\* (Requires Supporting Information -- See Sample below)

**SAMPLE SUPPORTING INFORMATION**

1) Direct Labor - \$2400

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

3) Capitalized Non-Expendable Equipment

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

4) Non-capitalized Equipment, Materials, and Supplies

10 Radon tubes @ \$110.00 = \$1100.00  
 6 Pairs Electrostatic gloves @ \$150.00 = \$900.00  
 \$2000.00

5) Premium Pay

Walter Murphy - 10 hours @ \$10.00 Per Hour = \$100  
 (This was approved by NRC in letter dated 6/1/08)

6) Consultants' Fee

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

7) Travel

Start Date  
6/1/08

Destination  
Wash., DC

Costs  
\$200

**4. FEE RECOVERY BILLING REPORT**

FIN:

Facility Name or Report Title:

TAC or Inspection Report Number:  
(or other unique identifier)

Docket Number (if applicable):

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

Remarks: