

THE U.S. NUCLEAR REGULATORY COMMISSION (NRC) is issuing this Sources Sought Synopsis as a means of conducting market research or as a market survey to determine the availability of potential qualified vendors with the technical capability to provide all management, supervision, administration, and labor for support conducting small-scale experiments, acquiring data, and developing and implementing new or improved physical models and correlations for the TRACE code or other systems analysis codes. Specific activities include: acquiring experimental data for model development or testing, development of new or improved constitutive models and correlations, implementation of the developed models within either the TRACE code or other systems analysis code, and consulting and peer-review for physical model development and testing. Services are to be provided to the NRC Office of Nuclear Regulatory Research (RES), in Rockville, Maryland. The applicable North American Industry Classification System (NAICS) code assigned to this procurement is 541712 – Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology).

THERE IS NO SOLICITATION AT THIS TIME. This request for sources and vendor information does not constitute a request for proposal; submission of any information in response to this market survey is purely voluntary; the Government assumes no financial responsibility for any costs incurred.

REQUIRED CAPABILITIES (if applicable):

The NRC is seeking to identify commercial organizations capable of providing experimental and modeling assistance in support of the development of the TRACE thermal-hydraulic code and other systems analysis codes. Specific capabilities would include extensive expertise in research in thermal hydraulics and reactor safety analysis involving studies of two-phase flow, heat transfer, phase change, coolant channel dynamics, and various other phenomena related to reactor safety, and the existing laboratory facilities necessary to support this research. The organization may be requested to provide, design, and/or manufacture experimental equipment, perform experiments related to certain phenomena needed by the agency, and provide the tests results of those experiments. These advanced experiments would require engineering expertise to design and manufacture test equipment with advanced instrumentation, extract test results, assess and validate quality of test data, use that information to build or enhance existing models in the code, and provide code benchmarks of tests to show the improvement in code performance.

The organization shall possess a broad technical expertise that would facilitate the performance of thermal-hydraulics nuclear reactor safety research for the NRC. Specific areas of expertise within the organization include the following.

- The principal investigator(s) shall possess a PhD in science, engineering, or technology.
- The organization shall possess the technical competence necessary to participate in technical discussions and respond to questions during periodic Advisory Committee on Reactor Safeguards (ACRS) reviews and presentations.
- The organization shall possess in-depth knowledge of current and advanced BWR, PWR, small modular, and non-LWR reactor system designs and issues.
- The organization shall possess technical capability to compile and validate the test results, characterize experimental uncertainties, and use experimental results to develop analytical models and modify TRACE or assist in the development of other safety analysis codes.

The organization shall have extensive research experience and demonstrated knowledge of historical and current nuclear reactor thermal-hydraulic related systems code issues in order to independently identify and resolve issues. Specific areas of expertise shall include:

- familiarity with modern two-phase fluid code architectures and languages,
- knowledge and understanding of advanced two-phase fluid numerical methods and two-phase fluid model construction,
- experience with code constitutive models and correlations, graphical user interfaces, multiphase computational fluid dynamics, and developing apps using the Multiphysics Object-Oriented Simulation Environment (MOOSE) framework.

The organization also shall have existing laboratories that have the necessary equipment and are capable of providing results of various reactor system behaviors.

Requirements for the laboratory facilities include:

- experimental loops with the ability to replicate various full-plant reactor systems or subsystems, capable of simulating adiabatic flow as well as two-phase boiling flow with the potential to reach dryout conditions,
- advanced calibrated instrumentation systems supported by integrated computer data acquisition systems designed for studying nuclear thermal-hydraulics and the complexities of two-phase flow,
- adequately-designed and robust instrumentation for monitoring and safe control of the thermal-hydraulic processes,
- flow visualization via high speed video and/or other specialized instruments to characterize and validate the desired phenomena,

- test loops available, or developed to be capable, of performing two-phase flow and film boiling experiments at pressures from 3.5 to 7 MPa,
- capability to provide safe handling, storage, and use of radionuclides for imaging studies, such as gamma densitometry or tomography,
- the support of, or ready access to, shop facilities.

The purpose of this announcement is to provide potential sources the opportunity to submit information regarding their capabilities to perform work for the NRC free of conflict of interest (COI). For information on NRC COI regulations, visit NRC Acquisition Regulation Subpart 2009.5 (<http://www.nrc.gov/about-nrc/contracting/48cfr-ch20.html>).

All interested parties, including all categories of small businesses (small businesses, small disadvantaged businesses, 8(a) firms, women-owned small businesses, service-disabled veteran-owned small businesses, and HUBZone small businesses) are invited to submit a response. The capabilities package submitted by a vendor should demonstrate the firm's ability, capability, and responsibility to perform the principal components of work listed below. The package should also include past performance/experience regarding projects of similar scope listing the project title, general description, the dollar value of the contract, and name of the company, agency, or government entity for which the work was performed.

Organizations responding to this market survey should keep in mind that only focused and pertinent information is requested. If significant subcontracting or teaming is anticipated in order to deliver technical capability, organizations should address the administrative and management structure of such arrangements. Submission of additional materials such as glossy brochures or videos is discouraged.

HOW TO RESPOND TO THIS SOURCES SOUGHT NOTICE

If your organization has the capability and capacity to perform, as a prime contractor, one or more of the services described in this notice, then please respond to this notice and provide written responses to the following information. **Please do not include any proprietary or otherwise sensitive information in the response, and do not submit a proposal. Proposals submitted in response to this notice will not be considered.**

1. Organization name, address, emails address, Web site address and telephone number.
2. What size is your organization with respect to NAICS code identified in this notice (i.e., "small" or "other than small")? If your organization is a small business under the aforementioned NAICS code, what type of small business (i.e., small

disadvantaged business, woman-owned small business, economically disadvantaged woman-owned small business, veteran-owned small business, service-disabled veteran-owned small business, 8(a), or HUBZone small business)? Specify all that apply.

3. Although no geographic restriction is anticipated, if responding organizations are located outside the Washington Metropolitan area (Maryland, Virginia, and the District of Columbia), indicate how the organization would coordinate with the NRC program office located in Rockville, Maryland to provide the support services.
4. Separately and distinctly describe which of the required capabilities listed above that your organization possesses and indicate your organization's role (prime contractor, first tier subcontractor, and/or supplier) in related contracts. Please also provide the contract number, contract type, customer name, address and point of contact phone number and email address, contract value, thorough description of supplies and services included in the scope of that contract, indication of how they differ from the required capabilities described in this notice, period of performance (for services) or delivery date (for products), and any other relevant information.
5. For Electronic and Information Technology (EIT) product offerings relevant to this requirement provide completed Voluntary Product Accessibility templates or other documentation that addresses compliance with the applicable standards (add website link) for those products. For any federal customers that your agency has provided information technology services within the required capabilities areas, indicate how your company complies with applicable Section 508 standards (see buyaccessible.gov).
6. For any federal customers that your agency has for the required capabilities, indicate how your company complies with applicable environmental laws and Federal regulations (See NRC's Green Purchasing Plan at: <http://pbadupws.nrc.gov/docs/ML1219/ML12191A130.pdf>).
7. Indicate whether your organization offers any of the required capabilities described in this notice on one or more of your company's own Federal Government contracts (i.e., GSA Federal Supply Schedule contract or Government wide Acquisition Contracts) that the NRC could order from and, if so, which services are offered. Also, provide the contract number(s) and indicate what is currently available for ordering from each of those contract(s).
8. Provide a standard, non-proprietary commercial price list or similar standard non-proprietary commercial pricing information for how your company sells, as a prime contractor, required capabilities described in this notice that your organization has experience providing. Also, indicate what is included in that pricing.

9. Is your organization currently performing or have in the past performed same or similar services as those listed above for any of the licensees regulated by the NRC? If so, which licensees? See <http://www.nrc.gov/about-nrc/regulatory/licensing.html> for more information on NRC licensing.
10. Has your organization previously faced organizational conflict of interest issues with NRC? If so, what were they and how were they mitigated or resolved?

Interested organizations responding to this Sources Sought Synopsis are encouraged to structure capability statements in the order of the area of consideration noted above. All capability statements sent in response to this notice must be submitted electronically, via e-mail, to Sharon Lim at Sharon.lim@nrc.gov, either MS Word or Adobe Portable Document Format (PDF), within 30 calendar days of publication of this notice. Responses shall be no more than 20 pages in length.

DISCLAIMER AND NOTES: Any organization responding to this notice should ensure that its response is complete and sufficiently detailed to allow the Government to determine the organization's potential capability and capacity to perform the subject work. Respondents are advised that the Government is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted. After a review of the responses received, a pre-solicitation synopsis and solicitation may be published in Federal Business Opportunities. However, responses to this notice will not be considered adequate responses to a solicitation.