UNIVERSITY OF MISSOURI

REQUEST FOR QUALIFICATIONS

RFQ # 23101

Design and development of the next generation University of Missouri Research Reactor

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Managed and administered by the University of Missouri System

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I. PROJECT OVERVIEW

A. Overview

The University of Missouri – Columbia (hereinafter referred to as "University") recently announced an initiative to build a new, larger research reactor that will expand critical cancer-fighting research and medical isotope production at the University. The new project, NextGen MURR, will build on the internationally recognized excellence of the existing MU Research Reactor (MURR) which has been a leader in developing and producing nuclear medicine isotopes for over 50 years, a capability unrivalled anywhere else in the nation.

NextGen MURR is foreseen as an approximately 20 MW research reactor providing a world-class environment for education, research, development, and realization of major advances in nuclear science, medicine and engineering. It will be specifically designed and constructed to produce critical short-lived medical radioisotopes for use in diagnostic and therapeutic radiopharmaceuticals and to support ongoing research and education programs at the University. NextGen MURR's novel design, higher power and isotope production capacity will ensure national security of supply for existing health care products and serve as a reliable research platform for innovation of new cancer drugs and life sciences innovations.

B. Objective & Scope of Work

The Curators of the University of Missouri, a public organization, on behalf of the University, wishes to qualify and contract with a single project team (hereinafter referred to as "Project Team"), comprised of one or more firms, experienced in providing design, licensing, environmental and development services, in accordance with the provisions and requirements as described herein, to build the University's next generation research reactor. An award does not guarantee a commitment to proceed with fabrication of the reactor, however, the Project Team selected for the award will be given an exclusive right of first refusal for the fabrication of the reactor once all design and licensing work contemplated herein is complete and bids for fabrication have been received.

To allow for broad participation, the University will conduct a two-step Project Team selection process:

- Step One - Request for Qualifications RFQ
- Step Two - Request for Proposals RFP

Each project team responding to this request for qualifications should consist of a member or members capable of executing the following scope of work:

Reactor Design and Development (RD&D)

- Will lead the project team and be the prime respondent to the RFQ/RFP.
- Will design the reactor as well as the control rooms, primary safety systems, and any ancillary nuclear infrastructure plus development of new reactor software codes.
- Will serve as U.S. Nuclear Regulatory Commission (NRC) "Design Authority" for the reactor and all associated nuclear infrastructure.
- Will prepare the Functional Specification (FS) and Preliminary Safety Analysis Report (PSAR) for NextGen MURR.
- Will develop an estimated cost for reactor fabrication and associated nuclear infrastructure.

- Upon University approval, will prepare an application for a construction permit suitable for the University to obtain a site construction permit from the NRC.

Architectural and Engineering (A/E)

- Will complete the architectural and engineering design services for the reactor building(s) plus any ancillary non-nuclear infrastructure.
- Will also prepare the land survey, geotechnical report, environmental assessment, security assessment and any other site related due diligence.

Preconstruction Services (PCS)

- Will develop detailed project costs, project schedules, and advanced work plans for the project.
- Will provide value-engineering consultation, constructability and coordination reviews and assist with ongoing scope refinements, identification of bidding alternates, site logistics & scheduling, procurement strategy and quality assurance program development for the design and construction of the facility.

Environmental Impact Review (EIR)

- Will review the proposed reactor construction site at Discovery Ridge and evaluate the environmental risks and postulated impacts on the surrounding environment from siting NextGen MURR at that location. The site evaluation should be conducted in a way that follows the guidelines of the NRC non-power licensing process, such that the NRC can prepare and publish an Environmental Impact Statement concurrent within the overall review process of issuing a reactor construction permit.

C. University Background

The University of Missouri has provided teaching, research, and service to Missouri since 1839. It was the first publicly supported institution of higher education established in the Louisiana Purchase territory. As a flagship, land-grant institution, the University of Missouri is one of only 64 universities across the U.S. and Canada to be a member of the prestigious Association of American Universities. For more information, visit missouri.edu.

D. MURR Background

For more than 50 years MURR has been engaged in research and development, education and training (*more information on research and education at MURR can be found in Appendix A*). MURR is used by a variety of researchers, faculty, students, and others. It has consistently promoted groundbreaking research and developed life-saving radiopharmaceuticals, providing benefits to people across the country and around the world. MURR is the highest-power university research reactor in the United States, operating at 10 megawatts, 6.5 days a week and 52 weeks a year.

II. PROJECT DESCRIPTION

A. Overview

NextGen MURR will be tank-in-pool, low temperature reactor utilizing low enriched uranium (LEU) fuel. It will be designed to be licensed under U.S. NRC 10 CFR Part 50 sub section 50.21 as a 104(c) facility. Those respondents selected to proceed to Step Two of the selection process,

will be required to propose reactor design(s) that comply with the following design, performance, and operating objectives.

B. Design Objectives

- Tank-in-pool type reactor
- Non-pressurized, low-temperature operation
- LEU fuel, arrangements utilizing an existing qualified fuel design are preferred.
- Foreseen as approximately 20 Mw thermal power output.
- Reactor design must be suitable for a U.S. NRC 104c license.
- Proposed construction site at Discovery Ridge Research Park (DRRP), Columbia, Missouri (*more information on DRRP can be found in Appendix B*)

C. Performance Objectives

- Peak thermal neutron flux available for target irradiations of 5 X 10^{14} to 1 X 10^{15} n/cm2/sec
- Multiple reconfigurable target irradiation facilities situated throughout the reactor core, and the neutron reflector regions. Proposed reactor designs should optimize this criteria.
- Target placement and retrieval on-power desired for in-core positions, mandatory for reflector irradiation positions.
- Integrated underwater target handling systems communicating with receiving hot cells and compatible with the licensed transport packages identified by the University.
- Modular systems and replaceable reactor components designed for a 75-year overall plant life.
- Designs should maximize the reactor total overall target irradiation volume, where the thermal neutron flux is a minimum of 1 X 10^{14} n/cm2/sec or higher.

D. Operating Objectives

- 52 weeks per year, with a minimum of 145 hours per week of operation
- Reactor designs should require infrequent and/or short planned outages to facilitate modular component changeouts.
- Spacious pool layout to accommodate target handling operations, fuel replacement activities and spent fuel element primary storage.
- Operating plans should minimize the number of fuel changes required per annum.

III. PROJECT TEAM RESPONSIBILITIES

A. Mandatory Qualifications

The following qualifications are mandatory requirements of all respondents. Affirmation that the project team meets each criterion is mandatory to proceed to Step Two.

- Nuclear Reactor Experience
  The project team must have relevant experience in planning, designing, manufacturing and/ or performing maintenance on a nuclear reactor.

- Nuclear Reactor Facilities Experience
  The project team must have relevant experience planning and designing nuclear reactor facilities.

B. Desired Criteria

The following are desirable criteria for all respondents that will be considered in the selection of the project teams that will proceed to Step Two.

- Equal Opportunity Employer
  The University is an equal opportunity employer, pursuant to federal and state law and regulations, and all respondents shall be an equal opportunity employer in compliance with federal and state laws.

- Supplier Diversity Participation
  The Supplier Diversity participation goal for this project is 15% MBE, 10% WBE/Veteran/DBE and 3% SDVE of the awarded contract price for the work performed. The project team is responsible for obtaining information regarding the certification status of each diverse firm. Each project team should indicate its level of commitment to meet or exceed these diverse goals. An official Supplier Diversity Compliance Evaluation Form will be completed by all project teams who are invited to provide a response to Step Two-RFP.

C. Desired Qualifications

The following are desirable qualifications of all respondents that will be considered in the selection of the project teams that will proceed to Step Two.

- Department of Energy (DOE) and NRC
  Credibility with DOE and NRC and demonstrated experience working with public entities and securing federal contracts/funding.

- Domestic and Missouri Firms
  Domestic firms, preferably Missouri firms.

- Demonstrated Reputation and Values
  Firms with reputations and values consistent with the University.

IV. PROCESS / SUBMITTAL / QUESTIONS

A. Pre-submittal Conference

A pre-submittal meeting will be held on April 17, 2023, at 10:00 a.m. via Zoom. Participation is not mandatory but is encouraged. Participants will have an opportunity to ask questions about the RFQ/P process. Please RSVP to Kristen Meade at meadek@umsystem.edu no later than April 14, 2023, by 5:00 p.m. CT to attain a link to access the meeting.

B. Two-step RFQ/P Submittal Process

The University may select a Project Team based on a two-step RFQ/P submission process.

- Step One - Request for Qualifications RFQ
  In Step One-RFQ, the University will evaluate responsive project teams based on qualifications, relevant experience, conceptual work plan and management framework and financial capacity. Each response will be separately evaluated by the University's selection

team, comprised of University of Missouri and University of Missouri System professional staff, administrators, and consultants.

- Step Two - Request for Proposals RFP
  Up to five (5) respondents selected by the selection committee in Step One-RFQ will be invited to submit a detailed proposal in the Step Two-RFP phase. In the RFP Step, the University will evaluate and compare the specific proposals, preliminary reactor designs, and financial structure to choose the response, if any, that conforms most closely to the requirements of the RFP and is the most advantageous to the University. The University reserves the right to negotiate final terms with the project team. The final contract must be approved by the Board of Curators of the University of Missouri.

The University reserves the right to waive informalities in project team responses and to reject any and all proposals.

C. Submittal Contents

The Step One submittal should contain information and materials to demonstrate the project team's capabilities, qualifications, and experience in the design, licensing, fabrication and development of nuclear reactors and facilities. The submittals should state whether relevant reactor experience were pre-certified design or custom design reactor(s). All responses should include, at a minimum, the following elements for each project team organized in the following order:

1. Executive Summary
   Provide an executive summary that includes a brief description of the:
   - proposed project team;
   - approach to the project;
   - experience in similar projects with universities or other public institutions;
   - understanding of the University's goals and objectives of the project including the project team's understanding of the key considerations unique to this project.

2. Project Team Qualifications
   For each firm involved in the RFQ response, furnish an organizational chart showing all persons who will be involved with this project and their roles and responsibilities. Identify the key individuals at each firm who will be assigned to the project and provide a comprehensive resume for each, specifically listing his/her name, education, experience, time with the company and experience with projects of similar scope and complexity. For sub-contractors, describe their role in the project and provide background information as to their qualifications to perform on a project of this scale. Include a graphic illustrating the timing, duration and percent FTE of each individual. Resumes submitted in this element of the RFQ shall be for the actual individuals that will directly supervise the work. These individuals are to be maintained in their respective roles for the durations indicated in the graphic.

   No change in the proposed key team members will be considered unless such changes are directed by the University or extenuating circumstances exist that merit such consideration. Under any circumstance, no changes will be allowed without the consent of the University. Personnel proposed as a replacement for any staff member submitted with the response to the

RFQ shall have similar qualifications and experience as that staff member proposed for replacement.

All responses should include, at a minimum, information related to the following members of each project team:

- Identity and experience of key team members including but not limited to:
  - Project Executive
  - Project Manager
  - Project Engineer [each discipline]
  - Project Architect
  - Sub consultants
  - Key team members for each discipline

3. Project Team Relevant Experience
   Provide a statement describing the project team's relevant experience.
   - Provide examples of the project team's capacity to successfully undertake the project. Provide a detailed description of projects of similar scope, use and/or complexity. Examples should include project identification (client name), a detailed description of the project team's specific role in the project, the project's timeline, the project's budget, and the project's final cost.
   - Demonstrate ability of the project team to provide accurate cost estimates, design within budgets and meet proposed schedules.
   - Demonstrate ability of the project team to produce cost effective design, follow the University building codes, and follow the University standards for design and construction.
   - Demonstrate ability of the project team to apply value analysis and life-cycle costing methods in the design process.
   - Demonstrate the project team's experience with the Nuclear Regulatory Commission (NRC) licensing and construction requirements and processes.

4. Conceptual Work Plan and Management Framework
   Provide a statement describing the planning and design process proposed for this project.
   - Describe the project team's management framework for organizing the work of the various firms comprising the project team. Describe the team's methodology for project controls.
   - Consultant reporting structure.
   - Approach for coordination of design disciplines included necessary for this project.
   - Previous working relationships between team members and firms.
   - Provide the location of the principal offices from which the work is to be executed.

5. Financial Capacity
   Provide a statement describing the project team's financial capacity.
   - Provide each firm's most recent audited financial statements in a separate sealed envelope or electronic file.

6. References
   - Provide at least three (3) project team references with contact names and phone numbers.
   - Briefly describe the services the firm has provided to each reference.

D. Submittal Format

Submittals should be prepared in an 8.5" x 11" paper format. The submittal package must include:

- Five (5) bound copies.
- One USB containing an electronic copy of the submittal. The USB should not be password protected or if a password is required, the password must be provided.

The cost of producing the RFQ response is borne solely by respondent. The University will not be responsible for any of the proposal production costs.

E. Submittal Address and Deadline

The five (5) bound copies and electronic copy of the Step-One, RFQ response must be delivered to:

University of Missouri System Procurement
2910 LeMone Industrial Blvd.
Columbia, MO 65201
Attn: Kristen Meade, Chief Procurement Officer

RFQ submittals must be received in a sealed envelope no later than 2:00 p.m. CT on June 9, 2023. Electronic or telefaxed copies of proposals are not considered responsive and will not be accepted. Project teams will be responsible for delivering submittals to the RFQ on or before the due dates listed in this document. Late responses will not be accepted.

F. Questions and Clarifications

Questions regarding the RFQ process should be directed to the following with RFQ in the subject line:

Kristen Meade, Chief Procurement Officer, meadek@umsystem.edu

All questions must be submitted in writing via email no later than May 30, 2023, by 5:00 p.m. CT. Questions should not be directed to any other university departments or staff. Substantive information or material provided to any interested party, as a result of questions received, will be provided to all interested parties in a manner deemed appropriate by the University.

V. SELECTION & SCHEDULE

A. Evaluation and Approval

The University will determine whether a respondent meets the mandatory qualifications as referenced in Section III, part A. Mandatory qualifications will be evaluated on a pass/fail basis. Only those respondents that meet all mandatory qualifications will be considered further in the subjective evaluation. If a respondent is unable to fulfill these qualifications, his/her proposal will not be considered any further.

The University will evaluate Step One-RFQ submittals in accordance with, but not limited to, the evaluation factors described below. Values in parentheses will be the value assigned by the University in evaluating proposals. The University anticipates that up to five (5) RFQ respondents receiving the most points will be interviewed by the owner's selection committee. At a minimum, the proposed key team members as described in Section IV, part C.2 shall attend the interview. The interview will include introductions with each proposed staff member summarizing their

responsibilities and experience, followed by a question-and-answer session conducted by the university. The questions will not be provided prior to the interview. No presentations will be allowed except for graphics the interviewee may present to illustrate their work plan.

To be selected to proceed to Step Two-RFP, the project team must demonstrate through a combination of their submission and interview that the team has the experience and capacity to successfully complete the proposed project objective and scope of work required by the University.

B. RFQ selection criteria

Responses to the RFQ will be evaluated based on the following criteria:

1. Project Team Qualifications (400 points)
   - Professional qualifications and credentials of the project team.
   - Supplier Diversity Participation

2. Project Team Relevant Experience (200 points)
   - Number and type of relevant projects of similar scope, use and/or complexity as the subject project.
   - Experience working with higher education or public institutions.

3. Performance Features (300 points)
   - Quality and feasibility of a proposed conceptual approach to meet the university's project goals and objectives including the project objectives and design criteria as outlined in the University's Project Description.
   - Quality and feasibility of the team's conceptual approach to project management.

4. Financial (100 points)
   - Project team's financial capacity to undertake and complete the project objective and scope of work.

C. Selection and Project Schedule

Step One-RFQ:

RFQ Issue Date	Monday, April 10, 2023
Pre-proposal Meeting	Monday, April 17, 2023
RFQ Submittal Deadline	Friday, June 9, 2023
RFQ Shortlist Selection	Friday, July 7, 2023
RFQ Interviews	M-F, July 17-21, 2023
RFQ Finalist Selection	**Tuesday, August 8, 2023**

Step Two-RFP (for invited respondents):

RFP Issue Date	Friday, August 11, 2023
RFP Due Date	Tuesday, October 10, 2023
Project Team Selection	**Tuesday, October 24, 2023**
Project Team BOC Approval	November 2023
Execution of Service Agreement(s)	Friday, March 15, 2024
Completion of design and licensing objectives	March 2026

Appendix A

Research and Education at MURR

Appendix B

Discovery Ridge Research Park Booklet