

**ADDENDUM I**  
**DATE: May 22, 2023**  
**FOR**  
**RFQ #23101**  
**DESIGN & DEVELOPMENT OF THE NEXT GENERATION**  
**UNIVERSITY OF MISSOURI RESEARCH REACTOR**  
**DATED: April 10, 2023**  
**TO**  
**THE CURATORS OF THE UNIVERSITY OF MISSOURI ON BEHALF OF UNIVERSITY OF MISSOURI SYSTEM**

The above-entitled specifications are modified as follows and except as set forth herein remain unchanged and in full force and effect:

The following are questions received as of Friday, May 19, 2023, and responses to each.

#	RFQ Topic	RFQ Section	Question or Comment	Response
1	Selection & Schedule	V(B)	The RFQ lists five items (plus an Executive Summary) for Submittal Content [Section IV(C)], but the weighted evaluation criteria list responses that will be evaluated against only 4 of those (“ <i>Conceptual Work Plan &amp; Management Experience</i> ” is not listed as an evaluation criteria). Please clarify if the above criterion will carry zero weight.	The evaluation of “Conceptual Work Plan & Management Framework” is included under Performance Features in the RFQ Selection Criteria.
2		V(C)	Do you expect the RFQ Interviews to be conducted in-person in Columbia, MO, via video-conference or in a hybrid setting? Will these interviews be just Q&A between the university team and the bidder’s team on the basis of their	The interviews will be conducted via video-conference. The interviews will include introductions with each proposed staff member summarizing their

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			submittals, or are bidders expected to make a presentation?	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.
3	Questions & Clarifications	IV(F)	The deadline for Q&A is 5/30/2023. We expect that we may be submitting questions and seeking clarifications well before this date. Can we expect to receive responses as questions are submitted, or only after the May 30 deadline has passed?	Answers will be shared as soon as possible. Depending on when questions are received, we may issue answers prior to May 30 <sup>th</sup> , or we may wait and group them together.
4	Submittal Format and Content	IV(C), (D)	<p>Please provide additional requirements on submittal format and content, if any. In particular:</p> <p>[1] Are there any page limits (overall or for each section) that are not to be exceeded, either for the whole submittal or for one or more sections? If so, please specify.</p> <p>[2] If there are, will certain sections of the submittal be exempt from this limit, e.g., resumes, financial statements, etc.?</p> <p>[3] RFQ only mentions the submittal format as 8.5" x 11" paper. Are there other format guidelines, such as page columns (1 or 2), line spacing, font size, graphics etc. which become important especially if there will be page limits.</p> <p>[4] Re: submittal of <u>audited financial statements</u> for each firm that is proposed member of the bidding team, please identify safeguards</p>	<p>For items 1-3: There is no page limit. We need comprehensive, yet useful information. Please use your best discretion when submitting your response.</p> <p>For #4: Part 1, the financial information will be distributed within the University on a "need-to-know" basis and shall be maintained in confidence to the extent allowed by applicable law, recognizing the University is a public institution and subject to legally required disclosures, including those under Missouri's Sunshine laws.</p>

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			<p>that will be in place for confidentiality for such submittals, especially for privately held companies that do not normally disclose financials. Are there any alternative submittals that a bidding team is allowed to provide?</p> <p>[5] On [4] above, please clarify "...most recent..."</p> <p>[6] It may be necessary to provide technical or business information in the RFQ response that a Project Team considers proprietary or confidential in nature. Please confirm that procedures will be in place to ensure - including the evaluation by members of the University's selection team - that such information is held in confidence by the University.</p>	<p>For #5: Most recent fiscal year end audited financial statements.</p> <p>For #6: The technical or business information will be distributed within the University on a "need-to-know" basis and shall be maintained in confidence to the extent allowed by applicable law recognizing the University is a public institution and subject to legally required disclosures, including those under Missouri's Sunshine laws.</p>
5	Project Team Qualifications	IV(C)	<p>Re: the statement "<i>No change in the proposed key team members will be considered ...</i>" please clarify what the University considers "<i>extenuating circumstances.</i>" For example, would retirement, resignations or other circumstances outside the control of the participating organization be considered as such?</p>	<p>The university considers retirement or resignation of key team members extenuating circumstances.</p>
6	Two-step RFQ/P Submittal Process	IV(B) <ul style="list-style-type: none"> <li>• Step Two</li> </ul>	<p>For the up-to five qualified bidders, the RFQ states that the Step Two-RFP phase proposals will require in part, presenting a "... <i>financial structure ...</i>" It is unclear what this means:</p> <p>[1] Please provide clarification and relevant details on what a bidder is expected to provide for the "<i>financial structure</i>" component of the proposal for the Step Two – RFP phase.</p>	<p>For #1: This information will be included in the Step Two–RFP phase.</p> <p>For #2: The funding for the entire project remains to be determined and will likely be from a combination of sources.</p>

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			<p>[2] To that end, please comment on the source of funding for the University’s next generation research reactor - i.e., publicly funded by the State of MO and/or federal funding, privately funded, public-private financing, or another funding mechanism?</p> <p>[3] What type of contract does the university intend for this procurement? FFP, CPFF or other?</p>	For #3: This information will be included in the Step Two–RFP phase.
7	Project Team Responsibilities/Desired Qualifications	III(C)	<p>Is there expected to be a “Buy American” component to bid, and if so, please elaborate. US based firms may want to look at international partners, who have recent and relevant experience designing and building facilities like NextGen   MURR, as “key team members.” Please confirm that a Project Team consortium bringing in major international partners from countries that are Generally Authorized under 10CFR810 will be treated equally, and not be rejected because of non-US ownership.</p>	Domestic firms, preferably Missouri firms, is a desirable but not mandatory qualification.
8	Project Description	II(B) & (C)	<p>The <b>Design Objectives</b> specify a 20 MWt reactor power, and the <b>Performance Objectives</b> specify a peak thermal flux of <math>5E14 - 1E15</math> n/cm<sup>2</sup>/s. Please clarify the following:</p> <p>[1] Which one is the controlling objective? Peak flux or thermal power? For example, if a proposed design can meet the peak thermal flux performance at a lower thermal power rating, is that acceptable?</p> <p>[2] Please confirm that this specified value of peak thermal flux is for one (or more) <u>in-core</u> target irradiation locations and not for any ex-core locations.</p>	For #1: Peak thermal flux is the controlling objective. The thermal power is a goal and bidders may propose other thermal power levels to meet the performance objectives. For #2-7: This information will be included in the Step Two–RFP phase.

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			<p>[3] Please specify whether all in-core irradiation facilities are required to meet a peak thermal flux in this specified range, or they will be grouped into different ranges which may have lower peak flux requirements.</p> <p>[4] Similarly, what are the nominal neutron flux requirements for the ex-core irradiation facilities</p> <p>[5] Do you expect any of the irradiation facilities to produce isotopes that require a fast neutron spectrum? If so, can you specify performance objectives, if any, on the fast flux for any irradiation facilities?</p> <p>[6] Please provide additional information on the number and nominal diameters of the target irradiation facilities, both in-core and ex-core.</p> <p>[7] Please confirm if the use of heavy water, either as moderator or reflector, is an acceptable feature of the reactor design.</p>	
9	Project Description	II(B)	<p>[1] The term “LEU fuel” is also used to refer to enrichments less than or equal to 5% U-235. In this case, please confirm that “LEU fuel” as used in the RFQ is meant to include “HALEU fuel”, i.e. fuel enrichments greater than 5% but less than 20% w/o U-235 would be acceptable.</p> <p>[2] As a university-owned RTR, please confirm that USDOE will be the supplier and owner of the low-enriched uranium as well as of the as-fabricated fuel leased to the university under the USDOE University Fuel Services Program, regardless of fuel design (e.g., plate or</p>	<p>For #1: It is expected that HALEU fuel will be required to achieve the reactor performance objectives (i.e. Enrichment between 5% - 20%). The primary requirement is to stay below 20% enrichment.</p> <p>For #2: This information will be included in the Step Two–RFP phase.</p>

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			<p>rodded fuel, U-ZrH, U-Si or U-Mo fuel matrix). To that end, please clarify what the responsibilities of the Project Team will be for the supply of fuel, other than providing a qualified fuel type?</p>	
10		II(C)	<p>[1] Please clarify if structures, systems and components external to the reactor needed as supporting facilities, like interfacing (receiving) hot cells and licensed transport casks, are included in the Project Team's scope.</p> <p>[2] Please also confirm if radioisotope processing hot cells and processing equipment are also in the scope of supply. If so, can the number of such hot cells and the radioisotopes be specified?</p> <p>[3] Please provide, if available, the university's thinking on number and type of irradiation facilities, such as minimum number and type of beam ports, minimum number and size of in-core and neutron reflector target placement regions. If not available at the RFQ stage, will such performance objectives details be specified at the RFP stage?</p>	<p>For #1: Neutron beam ports are not required/not essential for the reactor.</p> <p>For #2: This information will be included in the Step Two—RFP phase.</p> <p>For #2: This information will be included in the Step Two—RFP phase.</p>
11	Scope of Work	I.B	<p>The composition of the Project Team identified in Section I.B. does not identify Engineering, Procurement, Construction (EPC) services. It is our understanding from the pre-proposal meeting of 4/17 (Notes, #11), that the contracted 2-year scope from this RFQ/RFP is limited to design that can be submitted to USNRC for a Construction Permit. Please confirm our understanding that it</p>	<p>It is not necessary to identify EPC services as part of the project team.</p>

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			is not necessary to identify a Project Team member for EPC services.	
12	Scope of Work (RD&D)	I.B	<p>The Scope of Work for RD&amp;D mandates (Bullet 2) that the member of a team responsible for this scope carry out “... <i>development of new reactor software codes.</i>” Please clarify the following:</p> <p>a) Is it required that codes used be transferred to the University? If so, will you require source or executables? Vendor developed codes may be proprietary which makes it difficult to disseminate the source code.</p> <p>b) If not vendor proprietary codes, the RD&amp;D team may choose to use public domain codes, but may not have the right to disseminate. In this case, will the University obtain such codes directly?</p>	<p>The University does not require dissemination of reactor source codes. Presently MURR uses MCNP and RELAP codes among others as a licensed user, not as the source code developer. Any proposed reactor codes for operating NextGen MURR need to be approved by the USNRC.</p>
13	Scope of Work (RD&D)	I.B	<p>The Scope of Work for RD&amp;D mandates (Bullet 6) that the RD&amp;D team member “... <i>prepare an application for a construction permit suitable for the University to obtain a site construction permit from the NRC.</i>” To that end, please provide clarification on the following:</p> <p>a) Application for a CP (including submitting the PSAR and EIS) can only happen after completion of the Preliminary Design (March 2024 – March 2026). Prior to this submittal, does the University intend to engage with regulatory staff on pre-application engagement and if so, will the University submit a Regulatory Engagement Plan culminating in this application that would require vendor participation?</p>	<p>The Scope of work between 2024 – 2026 includes preliminary design of the new reactor to a level of detail sufficient to apply for a construction permit. This includes the PSAR, the EIS and any supplementary supporting documentation required by the USNRC.</p> <p>Details will be explored in the Step Two–RFP phase.</p>

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			Regulatory interactions during this 2-year period are not addressed in the RFQ. If such engagement is planned, numerous Topical Reports and White Papers will likely need to be prepared for NRC review and evaluation, including regular meetings with the NRC staff, starting well prior to a CP application. Do you consider these to be the contractor's responsibility? Will the vendor be responsible for responding to RAIs, both during pre-application and during the CP application review stage.	
14	Scope of Work (A/E)	I.B	The scope requires preparation of "... <i>land survey, geotechnical report...</i> " etc. Please clarify: a) If specific site/coordinates have been selected for the placement of the reactor facility in Discovery Ridge; b) What geological and meteorological data is currently available for the site, since it has been previously evaluated for the placement of a research reactor, e.g., expected peak ground acceleration and other met data. c) Would the A/E team's activities include collection of data from new seismic hazard analysis, site data from borings, setting up meteorologic stations etc.	A specific lot at Discovery Ridge has not been identified for the building of MURR NextGen.
15	Scope of Work (PCS)	I.B	The scope requires development of "... <i>detailed project costs, project schedules and advanced work plans ...</i> ". It is also stated In Section I(B) that an award is not a guarantee to proceed with fabrication. Please clarify: That the scope above is limited to the design, development and licensing (CP) of NEXTGEN	The scope of work during 2024 – 2026 includes preparation of detailed project costs and associated supporting documentation to build the proposed reactor design. The University will then decide if the



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			MURR, and does not include providing such data/estimates for reactor fabrication and facility construction.	construction phase will proceed or not.
16	Scope of Work (EIR)	I.B	Please confirm that the activity envisioned here is preparation of an EIR only for the new facility, and will not need to take into account other radiological facilities envisioned for Discovery Ridge, or other nearby existing facilities such as the existing MURR facility.	A specific lot at Discovery Ridge has not been identified for the building of MURR NextGen.
17	Project Description (Performance Objectives)	II.C	Overall plant life is expected to be 75 years. What are the University's expectations or requirements on the replacement cycle of structures, systems and components over this plant life?	Plant life details will be explored in the Step Two-RFP phase.
18	Project Description (Performance Objectives)	II.C	It is clear from the RFQ that RI production facilities are excluded from the scope. The identification of a licensed transport cask (from reactor to RI facility) should help define the interfaces, but more information will be needed to adequately design to meet University's expectations, such as pool top hot cells, transfer canals etc. Will any additional interface requirements be provided in the RFP, or is that an aspect of the design that the RD&D team has the leeway to propose its design.	Additional nuclear infrastructure such as RI production facilities will be explored in the Step Two-RFP phase.
19	Project Description (Operating Objectives)	II.D	Is the minimum operating time of 145 hours per week, 52 weeks per year, a goal or a requirement? Do you consider this objective to include required down times for refueling, necessary or mandatory maintenance, down time for regulatory inspections etc.?	145 operating hours per week, 52 weeks per year includes all necessary downtime for refueling and weekly maintenance. It does not include outages for periodic major inspections or special component replacement. MURR presently achieves this operating scenario.

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				It is desired, but not mandatory that NextGen MURR operate the same schedule.
20	Project Team Qualifications	IV.C.2	<p><i>(This question further expands on question #5 above).</i></p> <p>It is required that responses to the RFQ include identification and experience of multiple level individuals, from Project Executive to Subcontractors/Consultants. Further, no changes are permitted during the performance of the work (extenuating circumstances notwithstanding).</p> <p>a) Can this requirement for identifying multiple layers of key team members for each team member be relaxed for the RFQ stage and moved over to the RFP stage?</p> <p>b) Can the "...no change..." requirement be relaxed to require that all personnel replacements should have similar qualifications, and subject to University approval? We submit that personnel changes, through resignations or other extenuating circumstances, are not always in our control.</p>	The University considers retirement or resignation of key team members extenuating circumstances.
21	Questions & Clarifications	IV.F	What is the expected turn-around time for responses to questions submitted.	Answers will be shared as soon as possible. Depending on when questions are received, we may issue answers prior to May 30 <sup>th</sup> , or we may wait and group them together.
22	Submittal Format	IV.D	Is there any flexibility on the printed proposal submission process? Could electronic copies only be considered? Requiring hard copies is unusual for RFPs.	Hard copies only plus the one USB containing an electronic copy are required for this RFQ.

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23	Project Description	II.B	<p>During the April 17 Q&amp;A, in response to a question, the University of Missouri representatives stated that they would not disqualify teams that could meet the research and isotope production mission for this reactor with other designs than those delineated in the RFQ. Regarding the listed design objectives on RFQ page 4, Item II.B of (a) tank-in-pool type reactor, (b) non-pressurized, low-temperature operation, (c) LEU fuel, arrangements utilizing an existing qualified fuel design, please confirm these design objectives are NOT requirements to qualify for the RFP and subsequent award as long as research and isotope production goals are met.</p>	<p>The design, performance and operating objectives are not scoring criteria for the RFQ, but they are guiding principles for the RFP.</p>
24	Project Description	II.C	<p>Please confirm that using OTHER than underwater target handling systems that meet the same goal of communicating with receiving hot cells and compatibility with licensed transport packages would not disqualify other designs from consideration.</p>	<p>The design, performance and operating objectives are not scoring criteria for the RFQ, but they are guiding principles for the RFP.</p>
25	Selection & Schedule	V.B	<p>Please confirm that, "...the project objectives and design criteria as outlined in the University Project Description..." on RFQ page 9, item B.3 is referring to RFQ page 4 items II B, C and D.</p> <ul style="list-style-type: none"> <li>• RFQ Page 9 item B3: Performance Features (300 points) <ul style="list-style-type: none"> <li>○ 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.</li> </ul> </li> </ul>	<p>RFQ Page 9, item B3: Performance Features refers to section II, Project Description on page 4 and item IV.C.4. on page 7.</p>

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			<ul style="list-style-type: none"> <li>○ Quality and feasibility of the team's conceptual approach to project management.</li> <li>● RFQ Page 4 Items II B (Design Objectives), C (Performance Objectives), and D (Operating Objectives)</li> </ul>	
26	Selection & Schedule	V.B	How are the RFQ project team responsibilities (identified in section III on pages 4 and 5 and categorized as either mandatory qualifications or desired qualifications/criteria) related to the RFQ point selection criteria presented in RFQ page 9, Item V.B (RFQ selection criteria)?	The RFQ project team responsibilities will be evaluated under Item V.B.1 & 2, Project Team Qualifications & Project Team Relevant Experience.
27			For the NRC-issued construction permit for the site located in Discovery Ridge, does the University have the results of the land survey, geotechnical report, environmental assessment, and security assessment associated with that permit? If so, will the University make that information available for review to support the RFP process?"	A specific lot at Discovery Ridge has not been identified for the building of MURR NextGen.
28	Project Overview & Selection & Schedule	I.B & V.C	After the submittal of the design and licensing documents to the University by March 2026 to obtain approval by the NRC. Please clarify (1) has the University planned for a specific duration for the NRC to complete the Preliminary Safety Analysis Report (PSAR) review and approval and issue a Construction Permit and (2) anticipated support from the project team after March 2026 to support this review period.	We do not have a Regulatory Engagement Plan at this time, but one will be developed after the RFP is awarded.
29			It is understood that currently MURR produces a number of isotopes. Are there any additional	This is not relevant to the RFQ response.

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			isotopes that the University is planning for with NEXTGEN MURR?	
30	Project Overview	I.A	This section states that "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". Please define the "novel" design attributes that the University would like to include in NEXTGEN MURR.	The word "novel" is not meant to disqualify existing reactor designs.
31	Project Overview	I.B	Please clarify potential contracting structures being considered by MURR.	This will be clarified in the RFP process.
32	Project Description	II.D	Should we assume 6.5 days per week (same with MURR)?	145 operating hours per week, 52 weeks per year includes all necessary downtime for refueling and weekly maintenance. It does not include outages for periodic major inspections or special component replacement. MURR presently achieves this operating scenario. It is desired, but not mandatory that NextGen MURR operate the same schedule.
33	Project Description	II.D	"Reactor designs should require infrequent and/or short planned outages to facilitate modular component changeouts". Please clarify if there is an acceptance criteria for this objective.	This will be clarified in the RFP process.
34	Project Description	II.D	"Operating plans should minimize the number of fuel changes required per annum". Please clarify if there is an acceptance criteria for this objective.	This will be clarified in the RFP process.

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35	Project Overview	I.B	The Preconstruction Services (PCS) section only identifies procurement strategy as part of the work scope (completion before March 2026). Please clarify when the University anticipate the development of procurement specifications to be developed.	The procurement strategy will be developed during the two-year strategy phase.
36			Please confirm that foreign companies are not prevented to be contracted by the University of Missouri (also considering conditions that may flow down from federal funding sources) to undertake the NextGen MURR Project	Domestic firms, preferably Missouri firms, is a desirable but not mandatory qualification.
37			We would appreciate receiving information on the contracting strategy and contracting method that the University would propose to apply for this job.	The procurement strategy will be developed during the two-year strategy phase.
38			Given its impact on allocation of key responsibilities, risks, liabilities, warranties, insurance and several other details that affect the preparation of a proposal, we ask please to consider providing together with the RFQ a draft of the Contract including its Terms & Conditions that the University would propose to be signed.	A draft contract will not be provided at this time.
39			We have interest in visiting the MURR, we would appreciate indicating how we should proceed with this request.	Visits will not be facilitated for the RFQ phase.
40			The time to prepare and submit the RFP seems a little too short as per industry standards taking account the characteristics, complexity and arrangements to be put in place for preparing conceptual designs given the goals specified by the University for NextGen MURR. We recommend to reconsider the said time lapse.	We will take this under advisement.

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41			Which are the financing sources for this project (University, DOE, private investors, others)? Is the financing already approved?	The funding for the entire project remains to be determined and will likely be from a combination of sources.
42			We would recommend the University providing more information on the users requirements on neutron beams in terms of fluxes, supermirror guides, shutters, cold neutron source, among others.	This will be clarified in the RFP process.
43			We would recommend the University providing more requirements on user related features, like required service areas, required services, special requirements (slab loads, cranes, others), recommended hot cells (quantities, key elements, activities to be managed), typical targets characteristics. Pneumatic transport systems required, and others.	This will be clarified in the RFP process.
44			Assuming one of the main design drivers is radioisotope production, we would recommend the University providing a preliminary list of radioisotopes to be produced, and production requirements linked to them (activity, specific activity, irradiation volume, production per week, number of dedicated positions -if any-), and special requirements such as need of a controlled environment for specific irradiations (any limits on temperature, dose, fluence, etc.).	This will be clarified in the RFP process.
45			Please indicate the Lot Number allocated to the project in Discovery Ridge.	A specific lot at Discovery Ridge has not been identified for the building of MURR NextGen.
46			Please confirm that is mandatory that the fuel to be used at the NextGen MURR is LEU.	It is expected that HALEU fuel will be required to achieve the reactor performance objectives

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				(i.e. Enrichment between 5% - 20%). The primary requirement is to stay below 20% enrichment.
47			Based on our experience from similar projects and the number of matters that need to be analyzed and prepared for responding to a RFQ, the time allocated to responding to the RFP is extremely short, we recommend to revisit the 2 months allowed (suggested minimum 4 months).	We will take this under advisement.
48	Project Overview	I.B	The Preconstruction Services (PCS) section requires the development of detailed project cost. Please confirm the intent is to (1) develop a detailed project estimates related to the engineering, procurement and construction of the NextGen facility and (2) the desired estimate classification (Class 1 – 5) at the completion of the Design and Licensing phase.	The procurement strategy will be developed during the two-year strategy phase. The class of estimate will be decided in consultation with the awarded firm.

**The due date for responses remains as June 9, 2023, at 2:00 p.m. CDT.**

**Kristen Meade  
Director of UM Procurement/CPO  
University of Missouri Procurement**