Order Form

1. Contract Reference	This Order Form is subject to the Terms and Conditions in the EPRI Project Funding and License Agreement (EPRI Contract No.: 20018744) for the EPRI Advanced Nuclear Technology Program (the "Project") which are included as an Appendix to this order form. These terms and conditions take precedence over the terms and conditions referenced in this Order Form. GBN project reference is prj_3354.	
0. Buyer	Great British Nuclear - Registration number 05027024 Registered office: 3-8 Whitehall Place, London, SW1A 2EG	
1. Supplier	Electric Power Research Institute, Inc.	
2. The Contract	The Contract between the Buyer and the Supplier is for the Buyer to participate in funding the Project and receive certain rights to the results of the Project research. The Supplier shall collaborate with the Buyer in connection with the Project and grant Buyer a license to the Deliverables described below on the terms set out in this Order Form and the attached Project Funding and License Agreement ("**Conditions**") and Annexes (see Appendix 1) Unless the context otherwise requires, capitalised expressions used in this Order Form have the same meanings as in the Conditions.	
3. Deliverables	**Goods**	N/A
	Services	N/A
4. Specification	See Appendix 1	
5. Start Date	1st May 2024	
6. Expiry Date	30th April 2027	
2. Extension Period	N/A	
7. Buyer Cause	Any Material Breach of the obligations of the Buyer or any other default, act, omission, negligence or statement of the Buyer, of its employees, servants, agents in connection with or in relation to the subject-matter of the Contract and in respect of which the Buyer is liable to the Supplier.	
3. Optional Intellectual Property	Not applicable.	

Rights ("IPR") Clauses	
12. Charges	[redacted]
13. Payment	Payment of undisputed invoices will be made within 30 days of receipt of invoice, which must be submitted promptly by the Supplier. All invoices must be sent, quoting a valid Purchase Order Number (PO Number) and any other relevant details, to [redacted] Within 10 Working Days of receipt of your countersigned copy of this Order Form, we will send you a unique PO Number. You must be in receipt of a valid PO Number before submitting an invoice. To avoid delay in payment it is important that the invoice is compliant and that it includes a valid PO Number, item number (if applicable) and the details (name, email, and telephone number) of your Buyer contact (i.e. Buyer Authorised Representative). Non-compliant invoices may be sent back to you, which may lead to a delay in payment. Payments will be made to **Please remit ACH/Wires listing invoice No. as the first line of detail in the notes section** [redacted] **Please remit check including the invoice number to:** [redacted] If you have a query regarding an outstanding payment please contact our Accounts Payable team either by email to: [redacted]
14. Data Protection Liability Cap	N/A – No transfer of Data to the Supplier.

15. Progress Meetings and Progress Reports	N/A
16. Buyer Authorised Representative(s)	For general liaison your contact will continue to be [redacted]
17. Supplier Authorised Representative(s)	For general liaison your contact will continue to be [redacted]
18. Address for notices	Great British Nuclear 1 Victoria Street, London, SW1H 0ET Attention: Email: Electric Power Research Institute, Inc. ("EPRI") 3420 Hillview Avenue Palo Alto, CA 94304
8. Key Staff	N/A
19. Procedures and Policies	N/A
20. Special Terms	Termination for convenience is set out within Appendix 1, clause 8.03. For clarity as to how this relates to fees: - If the Buyer, referred to as the Funder within clause 8.03, terminates for convenience, the Funder will not be refunded (pro-rata or not), any fees that Funder has already paid that year. The Funder will be exempted from paying any fees due after termination. - If the Supplier cancels the project, the Buyer would be entitled to a pro-rata refund of fees (or if they wish so, they can have those fees reallocated to a different project) for all deliverables/scope after the date of termination. For example, If the Supplier cancels the project in June, the Buyer could be refunded 50% (or whatever the pro-rata share is for remaining deliverables) of the fees already paid in Q1.

22. Incorporated Terms	This Order Form is subject to the Terms and Conditions in the EPRI Project Funding and License Agreement for the EPRI Advanced Nuclear Technology Program (EPRI Contract No.: 20018744). These terms and conditions take precedence over the terms and conditions referenced in this Order Form. The following documents are incorporated into the Contract. If there is any conflict, the following order of precedence applies: (a) Conditions (Appendix 1) (b) Annexes to the Conditions (Contained within Appendix 1) (c) Order Form

Signed for and on behalf of the Supplier	Signed for and on behalf of the Buyer
Name: [redacted]	Name: [redacted]
	Great British Nuclear [redacted]
Date: 29/4/2024	Date: 29/4/2024
Signature:	Signature:

Appendix 1 - EPRI Project Funding and License Agreement (EPRI Contract No.: 20018744)

DocuSign Envelope ID: A2A084CC-627A-4E32-8B9A-86E6C0B9AD4F

[redacted]

Article 4. Funder Rights and Restrictions.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Article 7. License; Restrictions on Use.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]r.

[redacted] [redacted]

[redacted]

[redacted]

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized representatives.

Approval / **British Nuclear Fuels Ltd DBA Great British Nuclear** (“Funder”) 1100 Daresbury Park Daresbury, United Kingdom WA4 4GB Signature: [redacted] Name: [redacted] Title: [redacted] Date: 29/4/2024	Approval / **Electric Power Research Institute, Inc**. (“EPRI”) 3420 Hillview Avenue Palo Alto, CA 94304 Signature: [redacted] Name: [redacted] Title: [redacted] Date: 29/4/2024

Please return this Agreement to:

EPRI

Attn: [redacted]

201 E John Carpenter Freeway, Ste 800
Irving, TX 75062
[redacted]
[redacted]

Exhibit A

Additional Agreement Terms

1. **Project Title, Agreement, Funder and Transaction Numbers:** This Project Funding and License Agreement with British Nuclear Fuels Ltd DBA Great British Nuclear, EPRI Funder No. 10008515, applies to the EPRI Project ID entitled: "*Advanced Nuclear Technology Program*". The Parties will reference EPRI Contract ID 20018744 in all correspondence. Any other terms and conditions contained in other documents or elsewhere, such as a purchase order issued by Funder pursuant to this Agreement is solely for Funder's internal requirements. All such terms and conditions are superseded by the terms and conditions set forth in this Agreement.

2. **Contact Information:**

Contact	Name	Tel/Fax	Email
Funder Contracts:	[redacted]		[redacted]
Funder Project Manager:	[redacted]		[redacted]
EPRI Project Manager:	[redacted]	[redacted]	[redacted]
EPRI Contracts Negotiator:	[redacted]	[redacted]	[redacted]
EPRI Technical Advisor:	[redacted]	[redacted]	[redacted]

3. **Project Funding:**

FUNDING TYPE / YEAR	2024	2025	2026	TOTAL FUNDS
Cofunding	[redacted]	[redacted]	[redacted]	$300,000
Total Funding	[redacted]	[redacted]	[redacted]	$300,000

4. **Statement of Work, Tasks and Deliverables:** See Exhibit B, which is incorporated herein by reference.

5. **Territory:** Funder is authorized to use the EPRI materials in United Kingdom.

6. **Invoicing:** ☐ Current year payment enclosed (This form is the invoice for the current year). Address invoices to: British Nuclear Fuels Ltd DBA Great British Nuclear

Attn: [redacted]

[redacted]

☐ Funder requires Purchase Order No. _____ to appear on invoice(s).

Exhibit B

Funding Statement of Work

EPRI Funder Name: British Nuclear Fuels Ltd DBA Great British Nuclear

EPRI Contract ID: 20018744

Project Title: "*Advanced Nuclear Technology Program*"

EPRI Project ID: 1-065093

Program Description

Reducing the risk and uncertainty of building and operating new nuclear power plants by improving every stage of the life cycle – siting, licensing, constructing, starting, and initial operations – is key to successfully deploying new nuclear plants. Research is required to overcome technical challenges and to inform related regulatory and supply chain issues. The Advanced Nuclear Technology (ANT) program targets efficiency improvement opportunities through the development of technical products and tools that minimize deployment and operational risks and uncertainties. R&D activities evaluate and address the challenges of deploying nuclear power plants of all generational designs, including large light-water reactors and advanced reactor technologies, which encompass light-water small modular reactors, microreactors, and non-water-cooled reactor designs. The ANT program also encompasses EPRI research conducted under the Nuclear Beyond Electricity (NBE) initiative, which is developing resources to enable existing and future nuclear plants to participate in energy markets beyond electricity generation for the grid.

Approach

The ANT program's mission is to reduce the risk and uncertainty of constructing and operating new nuclear power plants. The program reviews existing technologies from inside and outside the nuclear industry in order to evaluate and adapt those technologies best suited for use in nuclear power plants. This is done by finding, defining, and extending useful and valuable existing technologies; performing necessary R&D to determine the efficacy of those technologies in nuclear applications; and working with codes and standards organizations to potentially enable effective use of the new technologies. The program also performs R&D to help address new plant design challenges in the areas of construction, operations, and maintenance that can lead to optimized performance, during, and after construction. ANT also collaborates with various industry organizations to further the reach and impact of the program's research.

ANT's technical focus areas emphasize support for near-term and long-term deployment of plants, and encompass early licensing and siting activities through commercial operation:

***Engineering and Construction Innovation*:** Research into new engineering technologies informs those responsible for the engineering, procurement, and construction of new nuclear power plants. In every case, the goal is to lower costs, increase quality, and shorten build times. Priority areas include:

Common engineering tools

- Working to establish the technical basis and engineering guidance for advanced construction tools, supporting industry consensus on their use and confidence in their application. Also, developing guidance to inform analyses and seismic qualifications for components such as pressure vessels, component anchorages, and piping.

Pursuing cost reduction in construction practices

- Evaluating and supporting development of practical solutions for construction cost reductions. This includes the exploration of advanced technologies such as digital twins and modular construction techniques to evaluate their applicability for nuclear plant application.

Enabling advancement in construction materials

- Assessing the readiness of innovative construction technologies such as self-consolidating concrete, high strength rebars, and concrete under elevated temperatures for deployment in nuclear plant projects.

***Advanced Manufacturing and Materials*:** The commercial deployment of new reactors will demand high component quality, reduced lead times, and improved cost competitiveness. This ANT focus area is helping to deliver all three. Current priorities include:

Advanced fabrication methods

- Maturing, evaluating, and demonstrating the value of advanced manufacturing techniques to accelerate and reduce risk for long-lead time component production.

Developing and qualifying new materials

- Pursuing improved ways to evaluate and qualify new materials for high-temperature advanced reactor components and systems.

Protecting against component degradation

- Developing techniques and guidance to combat challenges associated with corrosion and em brittlement.

Initial Operations and Maintenance: The future success of advanced reactor plants will not depend only on sound design and engineering; in an increasingly efficient electricity generating market, optimized operation and maintenance are fundamental to reducing costs. In this focus area, ANT's priorities are:

Driving toward automation

- Supporting the development and demonstration of remote, automated technologies such as drones and robotics to improve safety and optimize staff for the future fleet.

Developing essential diagnostic technologies

- Working to ensure that sensors required for operation in high-temperature and high-radiation environments are ready at the time they're needed.

Extending the scope of EPRI guidance to the future fleet.

- Ensuring that the valuable EPRI guidance that has supported the operating fleet reflects the latest experience and is ready to meet the needs of the future fleet of advanced reactors, such as through the application of risk-informed inspections.

***Project Development and Execution*:** Schedule, cost, and risk present clear challenges for the future fleet of advanced reactors. EPRI is defining what an optimized project lifecycle looks like and developing the tools to support end users in executing on their new nuclear projects. ANT's priorities include:

Strategic planning and analysis

- Supporting resource planners with market analyses, techno-economic assessments, and incorporating EPRI guidance at different phases in the lifecycle of a nuclear power project.

Detailed project development

- After the commitment to explore a new nuclear project, ANT provides guides on owner-operator requirements, technology selection, siting, plant conceptual design, and more will support decisions to successfully move the project into full execution.

Committed project execution

- Tools including project execution guides spanning project management, engineering, procurement, construction, and commissioning, and guidance on digital and model-based systems engineering, will provide the basis for end-users to understand and follow through on any new nuclear project.

***Nuclear Design and Fuel Cycle*:** As advanced reactors deploy; additional research may be needed to support management of new fuel forms and associated waste after use in the reactor. EPRI is developing the technical basis to support the efficient and economical management of irradiated fuel in innovative reactor technologies. ANT's priorities include:

Accelerating fuel cycle readiness

- The many fuel cycle options enabled by advanced reactors create flexibility, but the impacts these options have on licensing, operations, recycling, and disposal are not completely understood. EPRI is working to increase understanding to inform decision making by developers and operators.

Enabling the use of advanced fuel designs

- Considerable research has gone into the development of fuel for light-water reactors. With new fuel forms come new challenges. EPRI is working to identify and address these gaps so that advanced fuel forms can be used when needed.

Supporting innovative reactor development

- The evolution and growth of non-electric markets could create energy needs well-matched to the capabilities of nuclear energy solutions. ANT supports the development of innovative reactor technologies that look beyond the current options.

***Nuclear Beyond Electricity*:** There is increasing interest in utilizing nuclear energy to decarbonize other markets. The work in this area enables existing and future nuclear plants to participate in energy markets beyond the practice of generating electricity only to supply the electric grid. ANT's priorities include:

Low Carbon Fuels

- Investigating methods to produce hydrogen, ammonia, synfuels and biofuels using existing and new nuclear plants.

Process Manufacturing

- Determining the methods and benefits of integrating co-located nuclear plants with industrial processes to support decarbonization and resiliency.

Data Centers

- Re-thinking how to produce and deliver energy to data centers in behind the meter applications.

District Energy

- Researching ways to use nuclear energy to produce heating, cooling, and electricity for campus applications.

  Water and Wastewater

- Looking at ways to use nuclear energy to produce clean water for municipal and industrial uses.

Flexible Grid Operations

- Researching mechanisms to support nuclear integration with a grid containing significant amounts of renewables.

ANT has launched five Technology User's Groups (TUGs) to provide a forum for discussion and research need elicitation on technology specific topics. The groups include:

- Light Water Reactor TUG
- Fast Reactor TUG
- Molten Salt Reactor TUG
- High-Temperature Gas-Cooled Reactor TUG
- Microreactor TUG

Research Value

ANT participants gain access to the following:

- Foundational documents such as the EPRI *Utility Requirements Document* (URD), a comprehensive set of plant functional requirements developed over the last 20 years to inform the design and construction of a nuclear plant. The URD is used by utilities to support contract development and as a tool to evaluate new plant design. Emphasis is placed on areas that are most important to achieving excellent development and operation with respect to safety, performance, constructability, and economics.
- The body of results from ANT's investigations to reduce the cost of fabricating components through advanced manufacturing techniques such as powder metallurgy-hot isostatic pressing (PM-HIP), electron beam welding, diode laser cladding, and additive manufacturing. These technologies enable the manufacture of components in significantly less time, at lower cost, and with improved inspection capabilities.
- Research results in adapting modern digital technologies for new nuclear plants, including data-centric configuration management, data interoperability standards, equipment schema,

and data handover processes that plant owners can implement to achieve effective configuration management; and research results evaluating the performance and implementation of augmented reality, indoor positioning systems, and automated chemistry.
- Equipment reliability tools that can be incorporated into new plant designs to increase plant availability and capacity factors.
- Refined methodologies for applying risk-informed pre-service and in-service inspection techniques to advanced nuclear plant designs.
- Research and international collaboration on the efficient design and placement of concrete and reinforcing steel.
- Research informing design and demonstration of small modular reactors, including component fabrication techniques, emergency planning zone sizing, accident source term, and technology for staff optimization and reduced operating costs.
- Economic assessments of the future generation of advanced reactors.

Key Activities

Research and development in 2024 will continue to focus on key areas that support advanced reactor deployment. Some examples include:

- External Hazards Design Assessment for Advanced Reactors (Technical Report 2024)
- Considerations for Construction of Deeply Embedded Structures (Technical Report 2024)
- Assessment of Steel-Plate Concrete Composite (SC) Wall Defects (Technical Report 2024)
- Model-Based Systems Engineering Guide (Technical Report 2024)
- Project Execution Guide for Separated Nuclear Facility (Technical Report 2024)
- Commissioning Guide for Advanced Reactors (Technical Report 2024)
- Autonomous Plant Studies for Advanced Reactors (Technical Report 2024)
- Mechanical Connections for Advanced Reactor Applications (Technical Report 2024)
- Results from Phase 2 of the Small Modular Reactor Advanced Manufacturing Project (Technical Report 2024)
- Results from Phase 2 Modular Electron Beam Welding Project (Technical Report 2024)
- Assessment of Advanced Cladding Technologies (Technical Report 2024)
- ODS Stainless Steel Fabrication via Laser Directed Energy Deposition Additive Manufacturing (Technical Report 2024)
- Material Degradation Matrix for Advanced Non-Light Water Reactors (Technical Report 2024)
- Graphite Procurement Sourcebook for Advanced Reactors (Technical Report 2024)
- Advanced Reactor Fuel Cycle Gap Analysis (Technical Report 2024)
- Techno-Economic Evaluation of Flexible Nuclear Power Plant Operation (Technical Report 2024)
- Evaluation of Load Following Methods for Nuclear (Technical Report 2024)
- Evaluation of Automatic Grid Control for Nuclear Power (Technical Report 2024)
- Ammonia Market Characterization (Technical Report 2024)
- Synfuel Market Characterization (Technical Report 2024)
- Biofuel Market Characterization (Technical Report 2024)
- Data Center Market Characterization (Technical Report 2024)
- Pulp and Paper Process Design using Nuclear Energy (Technical Report 2024)
- Cost Optimization of Methods for Increasing Steam Temperature (Technical Report 2024)
- Technical Requirements for Hydrocarbon Processing (Technical Report 2024)
- District Energy Techno-Economic Analyses (Technical Report 2024)
- Desalination Market Analysis (Technical Report 2024)
- Evaluation of Methods for Desalination with Nuclear Energy (Technical Report 2024)

Accomplishments

Significant recent accomplishments for the ANT program include the following:

- Worked with industry partners to issue Phase 1 of the joint EPRI and NEI Advanced Reactor Roadmap.
- Incorporated the Nuclear Beyond Electricity initiative into the ANT program.
- Formed the NuIDEA (Nuclear in District Energy Applications) initiative and collaboratively defined the actions needed in 11 different areas to enable nuclear energy as an option in the district energy market by 2026.
- Completed Phase 1 of the Small Modular Reactor (SMR) Advanced Manufacturing Project and launched Phase 2. The project is demonstrating manufacture of an SMR reactor vessel utilizing advanced manufacturing technologies. The technologies being demonstrated in the project have the potential to significantly reduce manufacturing costs and schedules for major nuclear components.
- Issued report providing technical bases for proposed alternative American Society of Mechanical Engineers (ASME)Section III construction rules.
- Published lessons learned from recent commissioning experiences that will be instrumental in developing improved approached for commissioning advanced reactors.
- Finished and delivered first phase of the National Reactor Innovation Center (NRIC) demonstration which included creating a digital twin for innovative structural elements to be used in containment construction.
- Published report on digital twins use cases, best practices, and process of building a successful digital twin for nuclear applications.
- Published a report evaluating the applicability of current used fuel storage and transportation technologies to advanced reactor fuel forms.
- Began engagement with industry through Extended Storage Collaboration Program (ESCP), introducing and pursuing further research into advanced fuel back-end management.
- Published report focused on considerations for adding hydrogen to operating plants. The report provides insights related to technical, business, and regulatory considerations as owners and operators of nuclear plants consider the implementation of hydrogen at their sites.
- Published advanced reactor material qualification roadmap. This roadmap identifies technical gaps for various material types and could help support advanced reactor deployment through accelerated materials qualification.
- Published a report on rethinking deployment scenarios for advanced reactors. This report explores how advanced nuclear heat sources can be configured, fabricated, and delivered to participate in and decarbonize global fuel and other commodity markets.
- Received regulator endorsement of a topical report on Tri-structural Isotropic (TRISO) particle fuel that will enable a streamlined licensing process.
- Published multiple technology briefs on: powder metallurgy - hot isostatic pressing; diode laser cladding; cold spray deposition; laser powder bed fusion; additive manufacturing to support replacement part supply chains; digital twin activities update; harnessing nuclear fusion energy; and molten salt reactors.
- Supported development of the first code case for additive manufacturing in pressure retaining components in nuclear applications.
- Created an additive manufacturing roadmap for the nuclear power industry to provide an achievable path to the use of this technology in the nuclear industry
- Performed material property assessment and data gap analysis for materials for high-temperature gas reactors, gas-cooled fast reactors, and sodium-cooled fast reactors. These documents form the basis for the EPRI advanced reactor material development roadmap.
- Evaluated the feasibility of borehole co-location with advanced reactors for onsite management of spent nuclear fuel. This approach lays the groundwork for an emerging solution to ultimate disposal that could reduce costs by an order of magnitude.