**Technical Support – Work Order Specification**

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| **Title: Provision of Technical Seminar on Lead Fast Reactor Technologies** |
| 1. Background to the project

1.1 This statement of service specifies ONR’s requirements relating to delivery of a seminar on Lead cooled fast reactor by the successful contractor. The specification covers both the development of the seminar materials in line with ONR requirements (stage 1) and the delivery at ONR offices in Bootle, Merseyside (United Kingdom) (stage 2). Note the term lead cooled refers to both pure lead and lead–bismuth cooled reactor concepts and as such any reference to lead coolant should be considered to cover lead and lead bismuth coolants.1.2 On 12 October 2017, as part of the Clean Growth Strategy, the UK Government announced an immediate investment to further develop the capability and capacity of the nuclear regulators to support and assess the development of advanced technologies. Within the funding framework created by the UK Department of Business, Energy and Industrial Strategy (BEIS), ONR developed a programme of work to grow ONR’s capability in advanced technologies, which focused on Advanced Modular Reactors (AMR) and Small Modular Reactors (SMRs). This resulted in a strategy and plan to ensure ONR has up-to-date knowledge of Generation IV reactor technologies including Sodium Fast Reactors (SFRs), Lead Fast Reactors (LFRs), High Temperature Gas Reactors (HTRs) and Molten Salt Reactors (MSRs), including AMRs/SMRs. 1.3 Lead Fast Reactor Technology is currently the subject of research and commercialisation efforts worldwide. In line with this change of emphasis ONR is seeking to improve its understanding of LFR designs and technology. It is known that LFR’s have been designed and operated in the Former Soviet Union and that design programmes for LFR’s exist in Russia and this may be a route to gain understanding of the reactor operation. It is also noted that consideration on non-light water reactor designs is being undertaken by US NRC and thus there may be the opportunity to gain understanding from them.1.4 Therefore there is a requirement for ONR to be similarly aware of LFR designs and the underpinning physics, chemistry and engineering associated with these reactor concepts. This seminar would act as one of the means to build the capability required for regulation of innovative designs in the future. |
| 1. SCOPE OF THE SERVICES REQUIRED

2.1 During Stage 1 of the project, ONR expects the contractor to undertake the following:* The production of training seminar materials to reflect ONR’s needs. The basis of this training seminar is as per ONR’s identified needs outlined below:
	+ The background to the technology, including early LFR designs and current status of development;
	+ An overview of LFR technologies, including key design concepts, systems and their level of technical maturity and deployment;
	+ Fuel & Coolant characteristics, including Chemistry and Thermal Hydraulic behaviours;
	+ LFR neutronics (by comparison with other metal cooled fast reactors and traditional Light Water Reactors, LWRs);
	+ Materials: structural integrity challenges including chemical/mechanical degradation mechanisms/ challenges (corrosion, erosion, fatigue, creep, dissolution, adhesion and lubrication issues etc.). Design options, current status of development, and views on supply chain capability for key safety aspects of the design;
	+ Systems and components including:
		- Fuel clean up and treatment systems that may be required, including online facilities;
		- Heat transport and conversion, support systems, balance of plant, overview of LFR instrumentation (including overview of key parameters monitored and significance);
		- Ancillary systems, off gas and waste treatment approaches / technology that may be proposed / used in the design and deployment of LFR;
		- Design, qualification, installation and maintenance of control and protection equipment.
	+ Fuel Cycle and Safeguards Considerations;
	+ Operating Experience;
	+ Safety Analysis: key faults and hazards, accident sequences, status of hazard analysis. Available modelling tools / computer codes;
	+ Regulatory issues / challenges identified by past/ ongoing regulatory reviews/ other type of reviews;
	+ Status of deployment; knowledge gaps, research and development activities.
* This should include not just the reactor itself but also the following areas and aspects:
	+ Fuel clean up and treatment systems that may be required, including online facilities, in the deployment of LFRs.
	+ An understanding of the any reprocessing or support to the fuel cycle required, dependent upon the type of LFR and its fuel.

2.2 As part of the review and delivery of the course, the contractor should explicitly provide references to any materials used, and any names of any external academics and organisations which have been consulted or referred to in the development of the course. If a contractor cannot fulfil some of the above requirements, or needs to partner with other organisations to achieve the full scope of work, this should be explicitly put forward in the tender response.2.3 As part of this work, the contractor should plan to take part in meetings with ONR via teleconference (to discuss progress made, provide early sight of the seminar materials as they are adapted and prepare for course delivery). An assumption of such 3 teleconferences (project kick-off, pre-delivery and post-delivery review) should be made for the purposes of developing the precise scope and content of the work to be undertaken.2.4 At the end of Stage 1, the contractor will provide a single, fully referenced set of the seminar materials including overheads / slides and any practical exercises proposed both in MS PowerPoint formats or similar (to be agreed with ONR). Any assumptions and extrapolations made, caveats and uncertainties should be explicitly documented. 2.5 Following Stage 1 the contractor should plan for delivery of the seminar in the UK. This scope anticipates that the seminar will be delivered by staff members at a mutually agreed dates (anticipated to be no later than end of March 2020) subject to ONR’s acceptance of the seminar materials (to be provided to ONR no later than 3 weeks prior to the delivery date).2.6 The contractor is requested to identify the suitably qualified and experienced persons (SQEPs) that will deliver the seminar in the UK. Remote delivery e.g. via videoconference will not be accepted. The contractor is also requested to outline the duration of face-to-face seminar in the UK (anticipated up to 2 days plus travel time), provide an upper bound estimate of costs associated with travel and subsistence by the contractor’s staff and the level of post-delivery support that could be offered to supplement the seminar delivery. The latter should be in the form of a schedule of rates (for any future support if required).* and reporting requirements;
* Any meeting requirements and where they will take place.

N.B. Where the required services need to be delivered in a specific manner or to a specific standard, include details as appropriate. However, try to avoid being overly prescriptive as the contractor(s) may be able to offer alternative delivery solutions. |
| 1. OBJECTIVES

3.1 The main phases for this project are as follows:* Stage 1: Review and delivery of ONR LFR technology seminar to address ONR additional needs. This should also include:
	+ Identification of relevant literature sources used, as available in the public domain;
	+ Issue of seminar materials to ONR at least three weeks prior to delivery, including incorporation of comments following ONR’s review.
* **Stage 2**: Seminar delivery in the UK (ONR offices in Bootle, no later than end of March 2020) and post-seminar support (the latter subject to further specification of ONR needs) to ONR/ Environment Agency (EA) staff. For planning purposes, ONR estimates that seminar delivery should take no more than two working days (from 9.00 to 4.00 pm each day). For budgeting purposes, it could also be assumed that the post-delivery support would be around 20 hours. Bidders should explain divergence from the above assumptions as part of their bid.
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| 1. CONSTRAINTS

4.1 The following constraints will apply: ONR would expect the course development / tailoring work to start as soon as practicable upon contract award and contractor should consider 4th November 2019 for planning purposes. ONR also expects the successful proposal to build sufficient flexibility in the submission to incorporate feedback from ONR on the draft seminar materials (provided for review by ONR at least 3 weeks prior to delivery). ONR will provide any comments/ amendments required no later than 2 weeks prior to the seminar date.4.2 Conflicts of Interest (CoI) As part of the submission, the contractor is required to declare any past, present or suspected conflict of interests originating from past or current provision of seminars in this field to LFR vendors, designers, their parent organisations, predecessors or associated contractors.  Conflicts of interest are to be advised by completion and submission of the Potential Conflicts of Interest Declaration Form, attached at Schedule C.4.3 Security clearanceIt is expected that personnel developing and delivering the seminar will have suitable internal clearance from contractor to undertake these tasks.  |
| 1. CONTRACT MANAGEMENT

5.1 ONR will require to be kept updated about progress with delivery of the required work via telephone conferences. It is anticipated that a project kick-off teleconference will take place soon after contract awards followed by 2 other teleconferences (interim / pre-delivery review and post-delivery review). This will be scheduled at mutually suitable times. A maximum of 4 hours should be allowed for each teleconference. |
| **TECHNICAL RESPONSE** |
| 1. Response

6.1 To submit a compliant proposal in response to this specification, the contractor is requested to provide:* Clearly address all aspects of the specification (including scope and constraints);
* Provide a description of how the proposed contractor staff has the appropriate experience to undertake this work;
* Provide details of the project team members, including grades and rates and curriculum vitae (CV) summarising relevant experience;
* Explain how the aims and scope of the work are to be addressed, and the proposed approach.

This should include:* + Identification of the required tasks with the number of days required for each task and timescales, including details of who will undertake each of the tasks; and
	+ Experience of the project team relevant to each of the tasks. This should include a brief description of examples of the work undertaken by the individual that provides evidence of adequate experience to undertake the assigned task.
* Identify the anticipated engagement with ONR, including any progress meetings;
* Include a project plan and timetable covering each of the proposed tasks;
* The arrangements for managing delivery of the work including contact details of the contract / project manager proposed for this task. This should also include the cost control arrangements that will apply during stages 1 and 2 of the project.
* Provide a detailed breakdown of all proposed costs associated with Stage 1 of the work and project team members’ rates that support the costings, any assumptions, exclusions and caveats made in developing the price. Costs associated with printing of seminar materials / workbooks for ONR staff use (for course delivery) should be excluded. ONR printing facilities will be used.
* Include the project management and subcontracting costs that may arise as a result of any engagement of external experts, academics or organisations.
* It is not currently anticipated that face-to-face meetings at ONR Bootle offices will be required as part of Stage 1 of the project. However, travel may be incurred during seminar delivery (Stage 2). An upper bound estimate of travel and subsistence costs is requested as part of the proposal.

The timeframes for Stage 2 (seminar delivery) are to be confirmed based on the duration of pre-contract discussions and stage 1 (course development / tailoring tasks). It is currently anticipated that the seminar should take place no later than 31st March 2020, which allows 3-4 months for contract agreement and course development. The contractor should clearly outline any difficulties in meeting the above timescales at the time the proposal is developed. ONR may also record the seminar for knowledge management purposes. Bidders are invited to identify any issues associated with this as part of their submissions.* The proposed team member rates that would apply to Stage 2 (seminar delivery and post-delivery support) are also required.
* Provide a schedule of invoices and forecast of invoice values.
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