**Technical Support – Work Order Specification**

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| **Title: Provision of a Technical Training Course on Reactive Metals Behaviour** |
| 1. Background to the project

This statement of service specifies ONR’s requirements relating to the delivery of a technical training course on reactive metals behaviour by the successful contractor. The specification covers both the development of the training materials in line with ONR requirements (stage 1) and the delivery at ONR offices in Bootle, Merseyside (United Kingdom) (stage 2). A report written by LLW Repository Ltd, Radioactive Waste Management and the Nuclear Decommissioning Authority define reactive metals as ‘problematic waste’ within the nuclear industry. The term ‘problematic’ refers to waste that has difficult physical, chemical and radiological properties and may have no defined waste treatment or disposal route available or that could give rise to significant hazards (for example hydrogen) as part of that disposal route/treatment process. Examples include highly reactive metals that react with water, such as Lithium, Sodium, Potassium; and metals that can react with cementitious grout to form Hydrogen, such as Aluminium and Magnox Fuel Element Debris (FED). However for the purpose of this training requirement, ONR considers that the reactive metals under consideration must include alkali metals, alkali earth metals, transition metals, post transition metals and actinides.There is therefore a requirement for the ONR to be suitably knowledgeable about reactive metals (alkali metals, alkali earth metals, transition metals, post transition metals and actinides), their behaviour under different conditions and how they can be treated to achieve passive conditions for long term storage within the nuclear industry. To this purpose ONR is seeking an underpinning training programme to allow the ONR the capability to consider and understand all reactive metals behaviour requirements.  |
| During Stage 1 of the project, ONR expects the contractor to undertake the following:* The production of training course materials to reflect ONR’s needs. The basis of this training course is as per ONR’s identified needs as outlined in the table below:

| **Module** | **Title** | **Topics** |
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| 1 | Reactive Metals Overview | Alkali Metals |
| Alkaline Earth Metals |
| Transition Metals |
| Post-Transition Metals |
| Actinides |
| 2 | Conditions for Reactions | Temperature and pH |
| Reaction Behaviours  |
| Reaction Rates  |
| Oxidation and Reduction  |
| 3 | Storage of Reactive Metals | Long Term Storage |
| Chronic Hazards and Issues |
| 4 | Treatment  | Treatment Methods |
| Passive Conditions |
| 5 | Safety | Hazards and Risks |

The scope of the training material should include the following:* Topic 1: Reactive Metals Overview
* Alkali Metals
* Alkali Earth Metals
* Transition Metals
* Post-transition Metals
* Actinides

Topic 1 should cover what the metals are and why they’re important in the nuclear industry, how they are used, and the high level hazards associated with them.* Topic 2: Conditions for Reaction
* Temperature and pH
* Reaction Behaviours
* Reaction Rates
* Oxidation and Reduction

Topic 2 should cover reactions of these materials in different states and temperatures with water, acid, mineral acids and powerful oxidising acids as well as interactions with other materials such as concrete including behaviours with cementitious grout. This should include consideration of potentially pyrophoric behaviour of compounds of these metals that may form during operations, storage or treatment processes including potential hydrides.* Topic 3: Storage of Reactive Metals
* Long Term Storage – behaviour in air
* Chronic Hazards and Issues – associated with storage including any examples within the UK and elsewhere

Examples could include long term storage of Plutonium compounds and their potential behaviour or interaction on the storage containment and also the behaviour of Magnox, both wet and dry, in long term storage conditions. This should cover the behaviour of materials in sealed environments and the potential hazards that may be generated.* Topic 4: Treatment
* Treatment Methods
* Passive Conditions

Topic 4 should include what the potential treatment methods are to achieve passive conditions for disposal, and what these passive conditions look like over the total range of metals as it may be different. This can include various different approaches for different materials owing to their differing hazards, for example polymer encapsulation for reactive ILW materials or hot isostatic pressing for plutonium materials.* Topic 5: Safety
* Hazards and Risks – associated with handling, storage and treatment of these materials, including uncertainties in material behaviour and toxic byproducts that can potentially be generated. If possible include examples and plans for storage and treatment. Where possible case studies of events should be presented to support the examples and emphasise potential hazard management strategies.

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. This should include both completed and ongoing research programmes. If a contractor cannot fulfil any part 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 training materials as they are adapted and prepare for course delivery). An assumption of such 3 teleconferences (project kick-off, pre-delivery review of the training materials and post-delivery review of the training materials) 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 training in the UK. This is the Stage 2 section. There is a requirement to deliver the training and, owing to the current Covid‑19 circumstances, two options are requested to be presented; both options should be individually priced as part of the response to allow ONR to select the best solution in the current circumstances. It should be noted that option one would be the preferred method of delivery:* Option one: This is a seminar to be delivered by TSC staff members at a mutually agreed date (anticipated to be no later than 31 01 2021) subject to ONR’s acceptance of the seminar materials (to be provided to ONR no later than 5 weeks prior to the delivery date). ONR states that it will seek to record this seminar for future training purposes.
* Option two: This is to produce the seminar as a series of recorded voice over lectures in a suitable MP4 format to allow them to be disseminated to the ONR team. This option is also to include a follow-up Q&A session (nominally half a day) with the ONR inspectors four weeks after the delivery of the recorded materials to ONR (format to be determined, but expected to be in some form of video conference).

2.6 ONR reserves the right to move from the preferred option one to option two, in terms of training material delivery, if government guidance on social distancing and social interaction changes in response to changes in the current Covid-19 infection rates.2.7 ONR will own any training material produced by the TSC for the purposes of the course and reserves the right to re-use them for future training purposes.2.8 The contractor is requested to identify the suitably qualified and experienced persons (SQEPs) who will deliver the training in the UK. This will include confirmation that the identified persons will satisfactorily meet Visa requirements for UK entry for the purposes of delivering the seminars. In terms of SQEP requirements, the ability to deliver technically detailed information in clear and understandable English is a minimum requirement. The contractor is also requested to outline the duration of face-to-face seminars in the UK (anticipated up to 3 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). |
| 1. OBJECTIVES

The main phases for this project are as follows:**Stage 1**: Research and develop training materials for the provision of a technical training course on the behaviour of Reactive Metals. This should also include:* + Identification of relevant literature sources used, as available in the public domain;
	+ Issue of training materials to ONR at least five weeks prior to delivery, including incorporation of comments following ONR’s review.

**Stage 2**: Seminar delivery in the UK and post-seminar support (the latter subject to further specification of ONR needs). If option one is selected, the intent is for the delivery to be local to ONR’s offices in Bootle to a maximum of 30 ONR/ Environment Agency (EA) staff.  |
| 1. CONSTRAINTS

The following constraints will apply:ONR would expect the course development / tailoring work to start as soon as practicable upon contract award and the contractor should consider 01 10 2020 as the starting date for Stage 1 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 7 weeks prior to delivery). ONR will provide any comments/ amendments required no later than 4 weeks prior to the seminar date.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 training in this field to licensees, dutyholders, 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.Security ClearanceIt is expected that personnel developing and delivering the seminar will have suitable internal clearance from contractor to undertake these tasks. Security Markings of Documents It is not anticipated that the delivery of the seminar and the references to be provided by the contractor will require references to nuclear-sensitive information and/or commercially sensitive materials. Both the contractor and ONR staff will ensure that no such information is provided as part of the seminar materials or discussed during delivery. |
| 1. CONTRACT MANAGEMENT

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 of training materials and post-delivery review of training materials). This will be scheduled at mutually suitable times. A maximum of 4 hours should be allowed for each teleconference. |
| **TECHNICAL RESPONSE** |
| 1. Response

The Technical Response should demonstrate a clear understanding of the work required.To submit a compliant proposal in response to this specification, the contractor is requested to:* + 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 including any internal governance arrangements (peer review/acceptance process) for the training information.

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 including flights, UK internal travel to ONR offices in Bootle and associated subsistence) will 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 Jan 2021, 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.
	+ 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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