



**Long term column testing of compost-based passive metal mine
water treatment at low sulphate concentration and reduced
hydraulic residence time**

Project Scope, Guidance & Supporting Information

CA18/1/10/2566



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Overview

Contractual References

This tender will be associated with Coal Authority reference CA18/1/10/2566

A research contractor will be appointed to undertake laboratory trials on long term column testing of compost-based bioreactors at low sulphate and low residence time.

The conditions of contract are the Coal Authority Works & Services contract (2009).

Background

From 2011, the Authority has been working in partnership with Defra and the Environmental Agency to deliver a programme of metal mine remediation in England. Since 2014, the Authority has successfully operated a full-scale compost-based system at Force Crag to treat zinc, cadmium and lead-rich mine waters from the former Force Crag metal mine site in Cumbria. This treatment technology is envisaged to form a key part of how metal mine discharges are remediated within the forward programme.

A key design variable for such compost-based systems, which ultimately determines the size of system, is the discharge flow-rate. Current design practice for such systems is to design for a hydraulic residence time (HRT) on the order of 15 – 18 hours. A long HRT is needed to ensure that there is time available for sulphate reduction to occur sufficiently for enough sulphide to be released from the process to form a solid precipitate with all the metals to be removed. It is understood that in principle greater removal of sulphate will occur with longer HRT within the compost substrate. However, sulphide production only has to be sufficient to remove the metals in the mine water, and it therefore follows that the HRT required to effect acceptable treatment performance may vary depending on the total concentrations of divalent contaminant metals to be removed i.e. the influent concentrations. Reduction of HRT will result in a lower footprint treatment system that may reduce overall scheme costs and improve deployability where land availability is constrained. One such discharge where such a system may be applicable is the Park Level discharge at the Killhope Mining Museum, County Durham. This mine water is circum-neutral with low sulphate (30 mg/L) and iron (600 µg/L) concentrations, and zinc and lead concentrations of 630 µg/L and 35 µg/L respectively.

Previous research and development work commissioned by the Authority (Jarvis 2016 and Jarvis 2017) has demonstrated in principle that lower HRT systems are capable treating low sulphate mine waters, however questions remain regarding the long-term performance of such systems in terms of the stability of overall removal efficiency for key metals and time taken to reach breakthrough.

The services under this contract are the undertaking of research and development activity to demonstrate the long term performance of compost-based reactors under low sulphate, low hydraulic residence time conditions.

Specific Project Objectives

The key project objectives are to:

- To assess the long term removal performance of low HRT compost-based treatment systems through laboratory column testing using real mine water.
- To investigate the overall absorption capacity of such low HRT systems via breakthrough testing.

- To measure the sulphate reduction rates for all tests.
- Characterise the chemistry of the influent and effluent streams in all tests.
- To characterise the metal content in the spent compost material to provide a full mass balance.
- Identify the appropriate HRT for effective treatment of an exemplar low sulphate discharge (such as the Park Level discharge).
- Make general recommendations about the scale-up of a low HRT system to large pilot or demonstration scale.

The *services* to be provided by the *Contractor* will be to undertake laboratory-based research to address the above objectives.

Tasks (Employers Requirements)

The following tasks have been included in this package of works:

- Project management
- Laboratory experiments
- Technical reporting

1. Project management

The Contractor will be required to manage the project to ensure it is delivered safely to an adequate standard, on time and within budget.

The proposal should allow for:

- Kick-off meeting
- Regular progress meetings (frequency subject to, and applicable for, the proposed methodology)
- Fortnightly email updates of progress should be provided by the Consultant to the Coal Authority's Supervising Officer
- Quality management

The kick-off meeting and subsequent progress meetings may be held in person or by teleconference if preferred by the Contractor.

The Contractor will be required to use the Coal Authority's information and collaboration software tools to share project information and reports as deemed appropriate by the Authority's Project Manager. The Coal Authority will provide access and support for such software tools as required.

2. Laboratory experiments

The Contractor will be required to plan and undertake appropriate laboratory experiments to achieve the aims and address the key research questions of the project.

The proposal must clearly state if any of the work is proposed to be subcontracted. The proposal should include details of the task(s) being subcontracted and the proposed subcontractor.

It is envisaged that the laboratory experiments comprise a series of continuous flow columns or similar. The Contractor may recommend an alternative methodology within their proposal with supporting justification.

Key parameters to be varied during the experiments include:

- Mine water flow rate
- Compost bed depth

The experiments should be planned to ensure high quality, reliable data is achieved (i.e. ensuring sufficient replicants).

Analysis of the water chemistry will be undertaken on samples of the mine water influent before and during the tests. Analysis of effluent water should be undertaken periodically throughout the tests to ensure that sufficient data is available for reliable analysis. Analysis of the spent compost material should be undertaken at the end of each test with a sample of virgin material analysed to provide a baseline.

The proposal must include the Contractor's proposed experiment design, including justification of the approach adopted:

- Methodology including details of the scenarios that will be tested.
- Details of analytical parameters and methods to be used during the study.
- Details of the QA/QC procedures that will be adopted during the study.

Any assumptions must be clearly stated.

The Coal Authority and the Contractor will agree a method of facilitating mine water sample collection for the project. The Contractor should include the resources to collect their own samples as an option within the proposal. .

3. Technical reporting

The Contractor will be required to prepare a technical report on the research findings in the format described below.

Deliverables

The key deliverable will comprise a technical report including the following elements:

- Executive summary (1 page)
- Introduction
- Experimental Methodology

- Results (summarised in body of report with full factual data set to be provided in appendices)
- Interpretation
- Conclusions
- Lessons Learned
- Recommendations

The technical report must be of a suitable standard for sharing publicly with stakeholders including water companies and environmental regulators.

The Contractor will also be required to present the findings of the research to the Coal Authority in Mansfield.

Indicative Timetable

Below is detailed the indicative timetable of events to facilitate the proposal preparation. The final project timetable will be agreed at start-up.

Post award we would expect the *services* to be programmed as detailed in the table below, assuming the data and design information is supplied by Bentleys, STS or the Coal Authority.

Task	Time Scale
Invitation to Tender and upload to Contracts Finder	8 September 2017
Tender Period Closes	20 October 2017
Assessment & Award	3 weeks to moderate and award
Project Start-up Meeting	Subject to availability – ideally 1 week after award
Completion of testing	Subject to proposed methodology
Submission of draft technical report	First draft to be submitted at 90% project completion.
Presentation of research findings to Coal Authority	Following submission of draft report.
Provision of Coal Authority comments on draft report	2 weeks after report submission
Submission of final technical report	2 weeks after comments received.

Milestones

The key milestones within the project are:

- Provide draft technical report in accordance with timescales agreed at start-up meeting
- Delivery of final report following review with any comments raised by project panel fully addressed

Tender Programme

The *Contractor* must demonstrate that they can meet the timetable detailed above (this may be subject to change). The *Contractor* will be expected to begin work immediately following contract award.

Pricing

A financial ceiling will be set, based upon the appointed Contractor's financial submission. The financial ceiling will not be exceeded by the appointed Contractor without prior justification and the written authorisation of the Coal Authority's Project Manager.

Tender Return, Assessment & Criteria

The ITT Bid evaluation will be based on the technical and financial proposals within the bids and the information set out in each compliant bid

Bidders must accept the Coal Authority's terms & conditions.

The Coal Authority will reject any Bid which is not a Compliant Bid.

A Bid shall only be a compliant bid if the following documents have been completed and submitted:

- Qualification Envelope completed in the Bravo e-portal
- Technical Questionnaire and Responses - Completed in the Bravo e-portal

The tendering *Contractors* are to ensure that the registered contact details on the eTendering portal are correct for this process.

In order to register, please log on to www.coal.bravosolution.co.uk, following the links and should you have any difficulties with this procedure, please contact Bravosolution, the Authority's provider, on 0800 368 4850 (free phone number), who will assist you throughout the whole procedure at any time.

The tender will be awarded on the basis of the most economically advantageous tender and will be assessed based upon a **75% Quality and 25% Financial split**, with the quality assessment being completed prior to the financial assessment.

The documentation to be submitted is summarised.

One Quality Submission is required on the eTendering portal.

The Financial submission for the project is to be submitted on the eTendering portal.

The Evaluation of the ITT responses will be carried out in two stages.

These stages are:

- Stage One: Core Assessment;
- Stage Two: Technical Assessment.

Stage 1 – Core Assessment

The assessment at Stage 1 will comprise of a number of questions on the following topics:

- General & Organisation
- Economic & Financial & Legal Standing and Insurance
- Safety, Health & Environmental Issues

These elements will be assessed on a minimum “meets requirements” basis.

The Authority reserves the right to exclude any bid that does not meet the minimum requirements for these elements

The “meets requirements” score required in the health and safety and environmental sections of the questionnaire is 40%.

The Authority will exclude a bid from this process if it establishes that the economic operator has been convicted of any of the offences defined in Regulation 57 of the Public Contract Regulations 2015

Bids meeting requirements will then be evaluated on the basis of the most economically advantageous tender.

Your tender should be submitted on a fixed price basis and should remain open for acceptance for a period of 120 days from the closing date for the receipt of tenders.

Tenders received after the tender closing date will not be considered. Failure to comply with the provisions of these Instructions or to complete the tender document in full and without alteration may also result in the disqualification of your tender.

Your submitted tender rates and prices must be exclusive of Value Added Tax.

Quality Scoring Assessment

Assessment	Meaning	Score
Adds Value	The evaluator believes that as well as meeting the requirements in all respects the proposal describes additional features that will benefit the Authority	5
Fully Acceptable	The evaluator is fully satisfied that the proposal meets the requirement in all aspects	4
Minor Reservations	The evaluator is confident that the supplier has the ability to meet the requirement but has some minor reservations	3
Significant Reservations	The evaluator believes the supplier has the ability to partially meet the requirement, but has some major reservations about the approach or solution proposed. The supplier has not met the minimum requirements as specified.	2
Unacceptable	The evaluator believe that the evidence fails to show that the supplier is capable in the requirement area	0

The Coal Authority reserves the right to deem any submission scoring a 0 or 2 for any scored question as non – compliant and as such may be excluded from consideration

Quality Assessment – Details

See below details, requirements and weightings for the quality elements of this opportunity.

No.	Subject	Requirement and / or Evidence Required	Quality Weighting
1.	Programme / GANTT Chart	<p>Programme / Gantt Chart for the Decision Making Process identifying key stages, detailing key activities, latest date[s] for receipt of information from The Coal Authority / 3rd parties; submission dates for each deliverable.</p> <p>Show start/finish dates and all predecessor / successor relationships</p> <p>Maximum single side of A3</p>	10%
2.	Project Personnel / Organisational Experience	<p>CV's for the named individuals that are committed to the project delivery for the key roles, demonstrating how their experience will benefit this project</p> <p>Maximum of two sides of A4 per CV</p>	25%
3.	Understanding of project brief, aims and objectives Approach, Methodology Statement	<p>Scope of works clearly defined with purpose of each proposed activity also clearly defined. Any assumptions should be clearly stated.</p> <p>Maximum six sides of A4, including all figures and tables</p>	30%
4.	Project Management, Communication & Organisational Chart	<p>Project Organisational Chart with names of individuals for each key role that are committed to the project delivery.</p> <p>Maximum of one side of A3</p> <p>Details of the intended use of specialist consultants or sub-contractors.</p> <p>Maximum of two sides of A4</p>	10%
5.	Skills & Experience	<p>At least three example projects where similar research activities have been undertaken within the last 5 years demonstrating expertise in laboratory experiments of relevance to mine water treatment</p> <p>Maximum of four sides of A4</p>	25%

Guidelines

The questionnaire should be completed by a partner/director/senior manager.

Please answer each question fully. The Authority stresses the value and importance of substantiating answers with supporting documentation when requested.

The questionnaire should be completed accurately, if successful this document will form part of the contract.

The response and supporting documents must relate specifically to the organisations policy and arrangements.

Organisations currently providing services to the Authority must provide full details as requested and not just refer to the Authority.

Appendices in the form of attachments are either requested for the response to a specific question or can be included in the General Attachment area of this questionnaire but where included must be clearly labelled and cross referenced to ensure the information supplied can be assessed in full.

Assessment & Feedback

The tender submissions will be assessed in accordance with selection criteria.

Feedback will be provided at that time to organisations which are not successful through the issue of a letter providing debrief information on the assessment of the tender, scoring and confirmation of the successful tenderer.

Acceptance Procedure

The Authority does not bind itself to accept your tender and will not be responsible for, nor pay for, any expenses or losses which may be incurred by you in the preparation of your tender.

No tender shall be deemed to have been accepted unless such acceptance has been notified in writing to the tenderer.

Whether or not your tender is accepted, you must treat the details of all tender documents as private and confidential. If you decide not to submit a tender, you must reply that you wish to reject the tender and provide a comment why.

If you require clarification then a query through the online messaging facility should be submitted.

Declaration

We declare that this is a bona fide tender, intended to be competitive, and that we have not fixed or adjusted the amount of the tender by or under or in accordance with any agreement or arrangement with any other person.

We also declare that we have not done and we undertake that we will not do at any time before the returnable date for this tender any of the following acts:-

(a) Communicate to a person other than the person calling for these tenders the amount or approximate amount of the proposed tender;

(a) Enter into any agreement or arrangement with any other person that he shall refrain from tendering or as to the amount of any tender to be submitted;

(b) Offer, pay or give or agree to pay or give any sum of money or valuable consideration directly or indirectly to any person for doing or having done or causing or having caused to be done in relation to any other tender or proposed tender for the said work any act or thing of the sort described above.

In this declaration the word 'person' includes any persons and any body or association, corporate or unincorporated; and 'any agreement or arrangement' includes any such transaction, formal or informal, and whether legally binding or not.

1. LEGAL BACKGROUND

Appendix A – Values & Behaviours

External values

Expert

We deliver peace of mind underpinned by our expertise and in-depth knowledge of our subject.

All Angles

We bring all our experience from public safety, environmental and information viewpoints to deliver more sustainable solutions.

Inventive

We always look for creative and intelligent ways to meet our customers' needs.

Agile

We are agile, responsive and committed to delivering the best value solutions for customers.

Appendix B – Transparency Guidance

Transparency

Government has set out the need for greater transparency across its operations to enable the public to hold public bodies and politicians to account. This includes commitments relating to public expenditure, intended to help achieve better value for money.

As part of the transparency agenda, Government has made the following commitments with regard to procurement and contracting:

- All new central government ICT contracts over the value of £10,000 to be published in full online from July 2010.
- All new central government tender documents for contracts over £10,000 to be published on a single website from September 2010, with this information to be made available to the public free of charge.
- All new central government contracts over the value of £10,000 to be published in full from January 2011.
- New items of central government spending over £25,000 to published online from November 2010.

Suppliers and those organisations looking to bid for public sector contracts should be aware that if they are awarded a new Government contract, the resulting contract between the supplier and Government will be published. In some circumstances, limited redactions will be made to some contracts before they are published in order to comply with existing law and for the protection of national security.

The publication of information incorporates but is not limited to the following documentation/information. This will cover potential contract extensions and orders placed against a framework or term contract.

Contracts: contract, specification, terms and conditions, schedules and pricing – issued by both the tenderer and the Authority.

Tenders: invitation to tender, specification, terms and conditions, prequalification questionnaires, OJEU notices – issued by the Authority.

Spending: summary of invoice information in relation to payments made and includes invoice values – submitted by suppliers.