



The Coal
Authority

Resolving the **impacts** of mining

Carnon Valley Treatment Study and Development Campaign

PROJECT SCOPE AND PROCUREMENT PROCEDURES DOCUMENT

Date: July 2019

Reference: CA18/2/1/29

Overview

Introduction

Operation of the Wheal Jane Mine Water Treatment Plant is currently managed by the Coal Authority on behalf of the Department for the Environment, Food and Rural Affairs. The Plant treats 6.0 million cubic metres of mine water per year, contaminated with 310 tonnes of heavy metals, using a High Density Sludge (HDS) process with lime dosing, constructed in 2001. This results in the annual production of 3,800 equivalent dry tonnes of ochre sludge. The ochre is predominantly iron oxy-hydroxides with other heavy metal precipitates. Treated water is discharged to the Clemow's Stream, a tributary of the Carnon River.

The current sludge disposal method is to send it to Clemow's Valley Tailings Dam which presents a significant annual cost. Due to the ongoing cost, investigations were conducted to identify alternative methods of producing and disposing of this material, including the production of separate products to reduce the volume of sludge produced that may be potentially designated as hazardous waste.

The Great County Adit produces 10.8 million cubic metres of mine water per year, discharging 150 tonnes of heavy metals directly into the Carnon River, untreated.

Investigations are underway to determine future treatment options for Wheal Jane mine water and the feasibility of treating County Adit mine water, either independently or as a combined source. This development campaign will support and inform the investigations as they progress.

Technical Data

Desktop studies have been conducted to ascertain the requirements of future treatment solutions for both Wheal Jane and County Adit mine waters, including a technology appraisal and high level cost assessments of applicable technologies using vendor data and the performance data from the existing Wheal Jane plant for cost baselines.

The previous level of study used the mine water chemistry and flows detailed in Table 1 and Table 2 as the Process Design Criteria.

Table 1: Mine water chemistry (total metals) and flows.

		Flow	Normal Flows		Peak Flows		Minewater Chemistry Data (Total Metals)							
		Normal	Summer	Winter	Summer	Winter	Cd	Cu	Zn	Fe	Ni	Mn	As	Al
Wheal Jane Shaft #2	Average	191	108	426	160	528	0.0200	0.321	27.51	81.4	0.176	3.74	1.06	9.85
	95th %-ile	426					0.0332	0.729	34.64	104	0.225	4.27	2.61	11.1
	Maximum	528					0.0520	1.382	38.07	114	0.476	4.45	10.3	12.1
County Adit Discharge	Average	342	151	706	180	1,370	0.0028	0.503	1.63	9.21	0.071	0.56	0.64	1.23
	95th %-ile	706					0.0038	0.820	2.30	14.8	0.099	0.74	1.25	1.65
	Maximum	1,370					0.0043	0.820	2.46	20.4	0.099	0.74	2.41	1.65
Combined Flow	Average	533	259	1,132	340	1,898	0.0090	0.437	10.92	35.1	0.109	1.70	0.79	4.33
	by 95th %-iles	1,132					0.0149	0.786	14.47	48.4	0.147	2.07	1.76	5.20
	by Maximums	1,898					0.0175	0.976	12.37	46.4	0.204	1.77	4.61	4.56

*N.B. - Larger Datasets Used

Table 2: Mine water chemistry (dissolved metals)

		Minewater Chemistry Data (Dissolved Metals)											
		pH*	Cond.	Cl	SO ₄	Cd	Cu	Zn	Fe	Ni	Mn	As	Al
Wheal Jane Shaft #2	Average	3.36	1,654	254	375	0.0203	0.324	27.69	83.87	0.177	3.72	0.54	9.81
	95th %-ile	3.00	1,890	324	412	0.0350	0.737	33.95	102.70	0.220	4.23	1.41	11.00
	Maximum	2.90	2,100	332	537	0.0536	1.339	39.19	115.00	0.485	4.49	2.00	12.78
County Adit Discharge	Average	5.13	339	39	81	0.0022	0.253	1.50	7.24	0.069	0.59	0.10	1.00
	95th %-ile	4.65	370	46	94	0.0032	0.482	2.11	12.10	0.097	0.70	0.44	1.32
	Maximum	4.65	398	47	94	0.0036	0.588	2.15	18.30	0.097	0.74	1.06	1.35
Combined Flow	Average	3.79	811	116	186	0.0087	0.279	10.90	34.74	0.108	1.71	0.26	4.16
	by 95th %-iles	3.41	942	150	214	0.0152	0.578	14.10	46.21	0.143	2.03	0.81	4.96
	by Maximums	3.44	872	126	218	0.0175	0.797	12.46	45.21	0.205	1.78	1.32	4.53

* N.B. low pH is considered "high", in terms of alkali demand.

The Process Design Criteria is currently under review, to accommodate additional data from 2016 – 2018. The updated PDC will be provided to successful Vendors on contract award.

To supplement the conventional single-stage treatment options, a study was conducted at the Wheal Jane Mine Water Treatment Plant to investigate the feasibility of a two stage process, with the intention of reducing operational expenditure and risk and to develop a sustainable process with one or more saleable products, or reduced disposal costs.

This testing campaign confirmed that a two stage process using differential chemical precipitation can yield two different residue products.

Under the test conditions, the first stage removed 99% of the Iron from the mine water along with 99.8% of the arsenic. The second stage removed significant amount of zinc, copper, aluminium, manganese and cadmium. The metals removal provided a discharge that met the requirements stipulated in the current discharge consent.

These tests were extrapolated to reflect the theoretical design of an optimised scheme under standard conditions and on a per annum basis. The result was a (dry) production of 1,620 tonnes, which accounted for 1,100 of iron, arsenic and aluminium oxy-hydroxides, and 520 tonnes of mixed heavy metal sludge. In relation to the current yearly production of 3,800 tonnes of dry tonnes of ochre sludge, the two stage process generated significantly less solids.

The testing was performed with mine water of better quality (i.e. less polluted) than is typically experienced at Wheal Jane, so further investigation is required to confirm the efficacy of the two stage process at different seasonal water qualities. In addition previous testing will also have to be repeated.

The findings of the previous two stage test work will be made available to the successful vendor.

Scope of Works

The core objective of the Works is to provide the data necessary to identify the most cost effective method treating Wheal Jane and / or County Adit mine waters. For the various options to be compared objectively, processes must be considered at optimised or near-optimised conditions. "Optimal" can be a subjective measure, therefore for clarity, the Authority considers "optimised" to mean that the sum of the following costs is minimised for a given set of feed conditions and process type:

- Power consumption variable costs
- Chemical reagent costs (incl. transport, etc..)
- Consumable costs (i.e. replacement electrodes, wear parts, etc..)
- Labour costs

Other costs and factors will be considered as Sensitivities during the Authority's cost effectiveness appraisals and are not to be included in determining Optimal conditions. Specifically to be excluded include:

- Waste disposal costs
- Prospective sale of waste streams
- Renewable power use
- Sustainability criteria

During a review of the completed works, the Coal Authority has concluded that the best approach to the campaign is to split the proposed works into two distinct phases.

Phase 1 will be a study at Optioneering level, meaning that costs for each option under consideration are produced with a +/-50% confidence in the accuracy of the cost estimate values. It is anticipated that laboratory screening tests may be necessary to refine operating conditions and quantify costs to the extent necessary for +/-50% confidence.

Phase 2 will be a study at Detailed Scoping level, meaning that costs for each option under consideration are produced with a +/-35% confidence in the accuracy of the cost estimate values. It is expected that laboratory scale trials will be conducted to demonstrate costs under the proposed operating conditions, to the extent necessary for +/-35% confidence.

Each phase would assess treatment options producing both a single residue stream and multiple residue streams, if deemed applicable by the Vendor. The following Scenarios are to be appraised:

- Existing Location – Wheal Jane mine water only
 - Expansion of / addition to the existing HDS plant (including pressure filtration).
 - Conversion of the existing HDS plant to operate “spare” stream as a second stage during non-peak demand (including pressure filtration).
 - Retrofit the existing HDS plant for alternative technologies.
- New build (assume flat ground, at the Wheal Jane Earth Science Park).
 - Wheal Jane mine water only.
 - County Adit mine water only.
 - Both Wheal Jane and County Adit mine waters (proportionately mixed).

In order to appraise the appropriate technologies for each Scenario, the Works are to be tendered under four Lots.

Lot 1

Lot 1 is open to High Density Sludge solutions only. A single Vendor will be selected for this Lot. The following Scenarios are to be assessed in the Lot, presuming treatment of Wheal Jane mine water only at the existing treatment location.

- Expansion of / addition to the existing HDS plant (including pressure filtration).
- Conversion of the existing HDS plant to operate “spare” stream as a second stage during non-peak demand (including pressure filtration).

Lot 2

Lot 2 is open to all treatment technologies, excluding High Density Sludge and hydroxide precipitation based solutions. Multiple Vendors may be selected for this Lot. The following Scenarios are to be assessed in the Lot, presuming treatment of Wheal Jane mine water only at the existing treatment location.

- Expansion of / addition to the existing HDS plant (including pressure filtration).
- Retrofit the existing HDS plant for alternative technologies.

Lot 3

Lot 3 is open to High Density Sludge solutions only. A single Vendor will be selected for this Lot. The following Scenarios are to be assessed in the Lot, presuming a new build is required, on generic flat ground at the Wheal Jane Earth Science Park.

- Wheal Jane mine water only.
- County Adit mine water only.
- Both Wheal Jane and County Adit mine waters (proportionately mixed).

Lot 4

Lot 4 is open to all treatment technologies, excluding High Density Sludge and hydroxide precipitation based solutions. Multiple Vendors may be selected for this Lot. The following Scenarios are to be assessed in the Lot, presuming a new build is required, on generic flat ground at the Wheal Jane Earth Science Park.

- Wheal Jane mine water only.
- County Adit mine water only.
- Both Wheal Jane and County Adit mine waters (proportionately mixed).

The technical deliverables required by the Coal Authority for each phase and Scenario are listed below. Note these are the same for the expansion, retrofit and new build options.

- Major equipment list, including “size” (i.e. capacity) of equipment.
- Process Flow Diagram.
- Mass and Energy Balance.
- Annual mass and projected assays of the solid product streams.
- Predicted Process Water quality in between precipitation stages (where applicable).
- Contractually dependent consumables – total lime (tonnes), total hydrogen peroxide (cubic metres), total flocculant (kilograms), total and additional power (kilowatt hours) and total operator / maintainer requirement (man-hours). Study level appropriate estimates to be given for all operational consumables (+/- 35% or 50% OpEx)

- Study level appropriate capital cost estimate (+/- 35% or 50% CapEx), with breakdown by equipment list item.
- Solids speciation, determined by laboratory chemical / mineralogical analysis. The solids must be kept and returned to The Coal Authority at the conclusion of the works.

It is anticipated that it will necessary to undertake confirmatory testing of different seasonal water qualities, independent of any historical test work.

During the laboratory testing and design stages of the development campaign it is envisaged that progress meetings, updates and conference calls would be by default on a bi-weekly basis or as required pending changes in workload and project resources.

The treatment study and development campaign will also evolve during the course of testing as the outcomes and results become available which will enable refinement and conceptual strategy for flowsheet options. As a consequence of this, stage gate meetings will be required so that both parties agree on the best way to proceed with respect to the intended outcomes. These meetings will be held at the Coal Authority office in Mansfield.

A major stage gate meeting will be undertaken at the conclusion of phase 1 to discuss whether to proceed, pause or discontinue each technology, Scenario and Lot prior to commencing phase 2. Parties will come to an agreement on how to proceed with the remainder of the development campaign. Criteria to be considered at this checkpoint will include:

- Costs (capital, operating and fixed-term NPV)
- Sustainability criteria
- Technology maturity / buildability criteria
- Technical risk
- SHE risks
- Waste (costs, classification, potential for and value of re-use)

The Coal Authority is committed to conducting the review and selection process in a transparent and fair manner, however we reserve the right to consider factors in addition to those listed above in determining progression to the second phase of study.

Conditions of Contract & Procurement Procedure

The Authority as a Non Departmental Public Body is required to undertake this process in compliance with the Public Contracts Regulations 2015.

The conditions of contract are the core clauses of the NEC3 Professional Services Contract June 2013 together with main Option A, dispute resolution Option: W1, secondary Options : X2, X9, X10, X11, X18

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

Change will be managed on this project by The Coal Authority and the appointed Consultant through the NEC 3 Early Warning and Compensation Event process. The Coal Authority's Conject system will be used to manage & track the change process.

Any questions in respect of the tender documentation are to be sent via the procurement portal using the messaging facility within the system. This ensures that a complete audit trail of the process is achieved. Questions raised which result in additional information being provided will be shared with all organisations together with the Authority's response, but will not breach any areas of commercially sensitive information.

The Authority accepts no liability for any costs incurred by organisations in respect of preparing and submitting documentation or any element of the procurement process.

Programme for Delivery

Phase	Process	Date
Tender	Contract Notice Published	19/07/19
	Tender Documentation available	19/07/19
	Deadline for Queries	23/08/19
	Tender Closing Date	30/08/19
	Evaluation of Tenders starts including any clarifications*	02/09/19
Award	Award Notification*	30/09/19
	Indicative start of contract*	14/10/19

*Any Changes will be notified as appropriate throughout the procurement process.

Vendors may submit more than one feasible programme of works, where a compromise between test work costs and quality of output may be necessary. If more than one potential programme is submitted, the Vendor should indicate their preferred programme and provide justification as to how the preferred programme delivers an optimum cost vs. detail balance, taking into account the Quality and Price weighting in the Selection Criteria.

Submission of Tender

Your tender 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.

Tender Phase

Selection Criteria/Scoring

The Invitation To Tender (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 procurement e-portal
- Technical Questionnaire and Responses - Completed in the procurement e-portal
- Commercial Offer - Completed and attached where indicated

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 “meets minimum 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 reserves the right to exclude any submission not achieving this minimum requirement for those sections.

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. The weighting to be applied to scoring questions within the tender will be as follows:

Technical / Quality – 70%

Price – 30%

Stage 2 – Technical Assessment

The following information will be assessed and the selection will be based on the demonstration of the ability to deliver the requirements detailed within the works information.

- Experience of delivering this type of works
- Methodology proposed to deliver the project
- Knowledge of local stakeholders
- Experience of proposed staff

The expectations from a vendor wishing to bid for the treatment study and development campaign are the following:

- Technical presentation on the vendor's treatment technology, including the applicability of it to multi-stage metals removal if relevant.
- Detailed Proposal, indicating testing plan, total works and scope.
- Quotation, itemised by project phase.
- Schedule of works.

Case studies and examples of the use of the vendor's treatment technology on mine water, or an equivalent environment.

Scoring

Scoring questions are identified within the tender and the table below provides a summary of the scoring to be applied.

Score Categories	Meaning	Scores
Adds Value	The evaluators believe that as well as meeting requirements in all respects, the response has additional features that benefit and adds value for the Authority	5
Fully Acceptable	The evaluators are fully satisfied that the proposal meets the requirement in all aspects	4
Minor Reservations	The evaluators are confident that the supplier has the ability to meet the requirement but have some minor reservations	3
Significant Reservations	The evaluators believe 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.	1
Requirement Not Met	The evaluators believe that the evidence fails to show that the contractor is capable in the requirements area	0

The Coal Authority reserves the right to deem any submission scoring 0 or 1 as being non-compliant and therefore excluded from consideration.

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.

It is intended that the procurement process will take place in accordance with the provisions of this ITT but The Coal Authority reserves the right to terminate, suspend, amend or vary this procurement process by notice to all potential bidders in writing.

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;
- (b) 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;
- (c) 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.

Appendix A – 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.