



COCHRAN LTD

TENDER PROPOSAL

FOR

**4 OFF – FIRE TUBE STEAM
PACKAGED BOILERS**

PROJECT: VENATOR BOILER PLANT FEED

PROJECT NUMBER: 17202101

RFQ NUMBER: 3-17202101-1

REFERENCE: 18-0122C

Date 8 November 2018

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Sections 2 to 7 removed by Brian Bennett before submission to the Environment Agency.

SECTION 1

COVER LETTER



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GL/CQ

8 November 2018

Wood PLC

For the Attention of Julie Curnow / Stewart Brennan

Dear Madam,

OUR REFERENCE:	18-0122C
PROJECT:	Venator Boiler Plant FEED
WOOD PROJECT NO:	17202101
QUOTATION REQUEST:	3-17202101-1
SITE:	Venator, Greatham Works, Hartlepool

We thank you for your recent enquiry for the above project and herewith have pleasure in forwarding our tender submission for consideration.

Following the Early Design Order and subsequent Hazop meetings at both Cochran and Wood facilities we herewith update our tender document to highlight the commercial changes to the proposed scope of supply that was highlighted during those Hazop meetings. These are captured within our price schedule within this tender.

We have reviewed the project specifications issued and made certain comments within this tender submission however generally we have used our company standards to the specification for certain components and suppliers standard equipment which we have found generally acceptable throughout the process and commercial industry.

We are confident that the package offer meets the technical expectations of your specification and demonstrates our commitment to your project sufficiently to enable us to engage further in discussions on specific areas mentioned to ensure that all parties fully understand expectations and an agreeable solution is provided.

For boiler sizing purposes we understand that the total steam requirement is for 110,000kg/hr F&A 100C and as requested we have offered four off steam boiler units each generating maximum of 30,305kg/hr F&A100°C and 24 barg exiting the superheater. The Actual steam flow will be 27,000 kg/gr from a feed water temperature of 100C. If the feed temperature is greater than 100C then our performance values, (superheater temperatures, efficiencies) will change.

We understand that you require superheated steam at a minimum temperature of 255°C with a minimum turndown of the boiler unit at 10,000kg/hr F&A100°C (3.3:1), to generate the minimum steam temperature of 255°C the superheated temperature at 100% MCR (30000kg/hr F&A 100°C) would be circa 273°C. Should greater turndown be required we would need to discuss operational implications in more detail.

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Each steam boiler would be designed to generate 25 barg saturated steam at the boiler shell outlet to provide the 24 barg superheated steam at the exit of the superheater when operating at 100% MCR. Please note at turndown conditions the superheated steam pressure would increase due to reduced pressure loss through the superheater at turndown conditions.

It should be noted that if the boilers were under standby condition or start up loads, the superheated steam temperature may not be within the steam temperature tolerances of 255°C and 280°C therefore we have included for the supply only of a motorised steam isolating valve and automatic steam vent valve for the steam superheater.

For the boiler final scope of supply we would wish to discuss the overall steam distribution and collection system proposed by others and the total operating philosophy for the plant, as at this stage the steam boilers would be maintained at hot standby pressure conditions via intermittent firing of the individual boiler combustion equipment to maintain the standby pressure to be determined

As demonstrated above the steam pressure and temperatures would vary depending on the operating philosophy of the boilers and various load conditions therefore we would welcome the opportunity to discuss this further with you to ensure that the correct parameters and requirements are understood and provided. We have not included for any steam pressure reducing stations or steam de-superheater units.

Using the existing feed water pumps on site we have allowed for a maximum supply inlet pressure of 35 barg to inlet of our feed slam shut off valve (terminal point). Should the pump delivery pressure be higher than 35 bar during lower flow conditions then we may need to re assess the design pressures of the economiser, and feed valves or through discussions could the pump delivery pressure be reduced before the boiler skids for a maximum of 35 bar.

For emission levels we have designed the twin furnace boiler with flue gas re-circulation to minimum the NOx emission levels from each unit and would guarantee NOx emission levels of 60mg/Nm³ @ 3% O₂ in dry flue gases for Natural Gas firing. Should FGR be removed from the boiler we would anticipate a NOx emission level achievable of circa 80mg/Nm³ @ 3% O₂.

The boilers would be supplied with controls as recommended in BG01 arrangement 3, including self-monitoring modulating water level controls, automatic TDS control system, automatic intermittent blowdown valve, sample cooler, and self-checking photocell. We have excluded a loose BG01 panel for the Phoenix Room

We note the reference to the boilers being located outdoors in an area designation non-hazardous and safe area. We have therefore offered equipment suitable for locating within a safe non-hazardous area. It is our understanding that the individual boiler control panels would be located off the boiler units within suitable housing enclosure supplied by others, therefore each boiler control panel would be supplied loose for other to fit and wire on site.

For the Boiler control panel we include for one Boiler/Burner Control panel per boiler which would be 3-door wardrobe type panel consisting of Door 1 – Burner 1 control, Door 2 – Boiler control including mounting the touchscreen interface and boiler controls, Door 3 – Burner 2 controls. The burners would be set up for unison firing for each boiler during normal operation.

The individual boiler panels have been designed based on control voltage supplies for each part of the boiler / burner control being provided to each panel section.

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We have not included for the electrical cabling and site wiring between the boiler unit and remote control panels as others are undertaking all site wiring and final location of equipment have not been finalised. We would provide a local Burner mounted Panel containing the Ratiotronic 6000 controls and wire from the burner mounted equipment to this panel in Adaptaflex SP Type M IP65. Boiler mounted equipment, such as, water level controls and TDS Blowdown equipment would be wired to a Boiler junction box IP65 in stainless steel. The maximum allowable cable run from the Boiler water level electrodes to the Boiler panel mounted controllers within the control room must not exceed 100m.

We have included for the supply only for four off Gas pressure reducing valve sets, one per boiler to reduce the gas pressure from 2 barg to burner requirements. We assume others would install within gas pipework main to each boiler. Our termination point would be the inlet of the gas train mounted on the boiler units.

For communication interface between our equipment and site BMS system we have included to provide Modbus RS 485 interface protocol, the termination point for the Modbus interface would be at our equipment, i.e. each boiler control panel. We would provide full interface details post order for all equipment within our scope.

Within this tender submission we have provided a price schedule based on your general requirements, however as certain elements of the projects are down to interpretation we have provided some additional costs and / or alternative costs for further discussion and agreement with the client.

You have requested for attendance during the design stage post order placement and before commencement of procurement and manufacture, therefore we have included for undertaking boiler designs, general arrangement drawings, P&ID's, plant layout, preparation of material lists for Cochran once final scope and specifications has been agreed, attendance of Hazop and design meetings chaired by others, including necessary co-ordination for site layout on the steam boilers and ancillary equipment.

All risk assessments and general documentation shall be provided in our standard format which we assume is acceptable and would be pleased to bring a copy of our standard turnkey installation documentation from a previous project for review and acceptance during the post tender meetings.

We wish to confirm that the boilers would be manufactured at our manufacturing facility in Annan, Dumfries & Galloway and extend the invitation to attend this facility, this visit can be arranged prior to any order selection and anytime during manufacture. Any pre-delivery (FAT) tests would be to Cochran and our Burner supplier standard procedures. We have provided for one burner to undergo a FAT and fired in Dunphy works. All four Boilers will be trial assembled in our works and dismantled prior to despatch.

We would wish to clarify that we assume we would be acting as Sub-Contractor to the main contractor on this project and have offered a day rate for site supervision.

We have not provided any special protection of the equipment once they are delivered and positioned on site, we assume that the project programme will be continuous with the mechanical and electrical installation following on with commissioning and testing immediately after completion of installation. We have therefore excluded any packing, special site protection for the equipment and installation services, or storage in our works.

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We would refer to the section within our tender titled 'Clarification and Qualifications' for more specific comments and qualifications on each boiler type and ancillary equipment being offered, these comments are general as we have provided our standard propriety equipment on the boilers and ancillary equipment.

We have not included costs for providing any fuel, water, electricity or services to the boiler units during commissioning and testing and assume these would be provided 'free of charge' by the client.

The boiler plant offered will be CE marked, built to latest construction codes, independently inspected throughout manufacture and subject to quality procedures developed by us over the past 130 years of boiler manufacture in the UK.

We seek to work in partnership with customers to achieve the most efficient and reliable boiler installation possible, embracing latest technical advances and demands to protect our environment.

Total satisfaction for our customers, we believe, is achieved through our ability to design, supply, install and commission all necessary boiler house services as a complete package, in addition to supplying the UK's best built boilers. This commitment can be extended to include whole "life cycle" support services including plant operation and maintenance.

We trust that our tender, technical specifications and literature provide sufficient information to enable you to adequately assess our offer. Should you wish to discuss any aspects of the boiler offered, site installation, or integration within existing site services please contact our UK Sales Manager:

Mr Graham Lamming Telephone Number 01461 202111
 Fax Number 01461 306197
 Mobile Number 07736 799832

We look forward to developing this project further with you.

Yours faithfully
For COCHRAN LTD

Chris Quince
Sales Engineer