

1. INTRODUCTION

Lethabo Power Station consists of 6 generating units, each equipped with condensers for the main and the boiler feed pump turbines. The condensers cool the turbine exhaust steam by means of clarified cooling water circulation flowing through the tubes of the heat exchanger. The high-level scope of work is to perform internal cleaning of all tubes by means of High-Pressure Water Jet (HPWJ) Cleaning. In addition to the HPWJ cleaning, provision has been made for a lower pressure turbulent flushing of the tube internals during shorter durations, and cleaning of the Main Turbine Condenser Taprogge Screens (2 off, per unit)

2. SUPPORTING CLAUSES

2.1 SCOPE

2.1.1 Purpose

The scope will outline the cleaning contract requirements pertaining to the main and BFPT condensers at Lethabo Power Station

2.1.2 Applicability

This document applies to Lethabo Power Station.

2.2 NORMATIVE/INFORMATIVE REFERENCES

2.2.1 Normative

Latest Revision of the following:

- [1] 240-168966153: Generation Technical Tender Evaluation Procedure
- [2] 2025 Tender Technical Evaluation Strategy for Lethabo Mai Turbine and BFPT Condensers High Pressure Water Jet Cleaning
- [3] 240-107677940 Specification Standard for High Pressure Water Jetting of Condenser and Heat Exchanger Tubes
- [4] Drawings of the condenser are available on request pending the submission of LFM582 Intellectual Property Protection.
- [5] ISO 9001 Quality Management Systems

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2.2.2 Informative

None

2.3 DEFINITIONS

None

2.3.1 Classification

- b) Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 ABBREVIATIONS

Abbreviation	Explanation
BFPT	Boiler feed pump turbine
CW	Cooling Water
HP	High Pressure
LP	Low Pressure

2.5 ROLES AND RESPONSIBILITIES

It will be the role of Lethabo Engineering and outage management to ensure the agreed scope for each unit is executed in line with the requirements as set out in this scope and accompanying documents and standards.

Engineering: Compile scope of work/ works information, Inspections

Asset Management: Review scope of work, conduct Inspections if support is required.

Outage Management: Manages outage activities relevant to this contact, and co-ordinate scope execution, conduct inspection.

PTRB: Contract Manager, Manage the running maintenance activities, supervise the contractor during execution, conducts inspection, Employer QC.

2.6 PROCESS FOR MONITORING

N/A

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2.7 RELATED/SUPPORTING DOCUMENTS

- [1] Coating and Rubber Lining for Lethabo Condensers, associated large bore pipework, waterboxes and tubesheets - Tender Technical Evaluation Strategy (internal use only)
- [2] 240-107677940 – Specification Standard for High Pressure Water Jetting of Condenser and Heat Exchanger Tubes
- [3] 240-56030499: Condenser Healthcare Guideline

3. SCOPE OF WORK

The high-level scope of work is to perform high pressure water jet (HPWJ) cleaning on the main and BFPT condensers on an as-and-when required basis, as part of running maintenance and outage activities. In addition to the HPWJ cleaning, the scope includes lower pressure flushing (without lancing) of condenser tubes and waterboxes, as well as the cleaning of the Taprogge screens installed inside the main condenser (on the 2 HP outlet waterboxes).

The following industrial heat exchangers are included in the scope:

- Main Condenser (with accompanying Taprogge screens)
- BFPT Condenser

For the HPWJ cleaning activities, Full compliance to Eskom standard 240-107677940 – Specification Standard for High Pressure Water Jetting of Condenser and Heat Exchanger Tubes is required.

HP cleaning of the tubes in certain areas may require a second or even a third pass of HPWJ thus the end goal of the Contractor is to get the heat exchangers and condensers clean and free of scale and not do a single pass through each tube. This will be confirmed during inspection.

The contractor shall also make provision to pull / remove condenser or BPFT condenser tubes and plug the remaining holes in the tube sheet (strictly upon request). These pulled tubes will be used for testing or verification after cleaning.

3.1 PLANT DESCRIPTION

Lethabo's main condenser is divided into 4 sections of 8045 tubes, with waterboxes providing access to each side of the tubes. The waterboxes, (8 off) which provides access to each side of the tubes, will not be removed for the cleaning process, therefore the contractor will have to access the tube ends from the confined space of the waterbox manholes.

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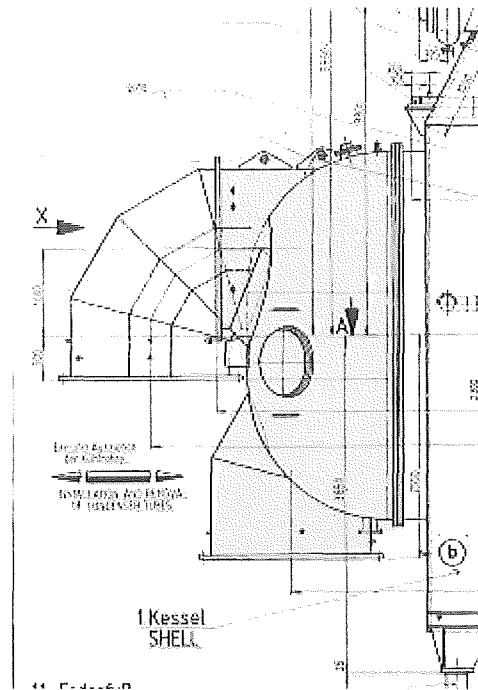


Figure 1: Typical waterbox configuration and access

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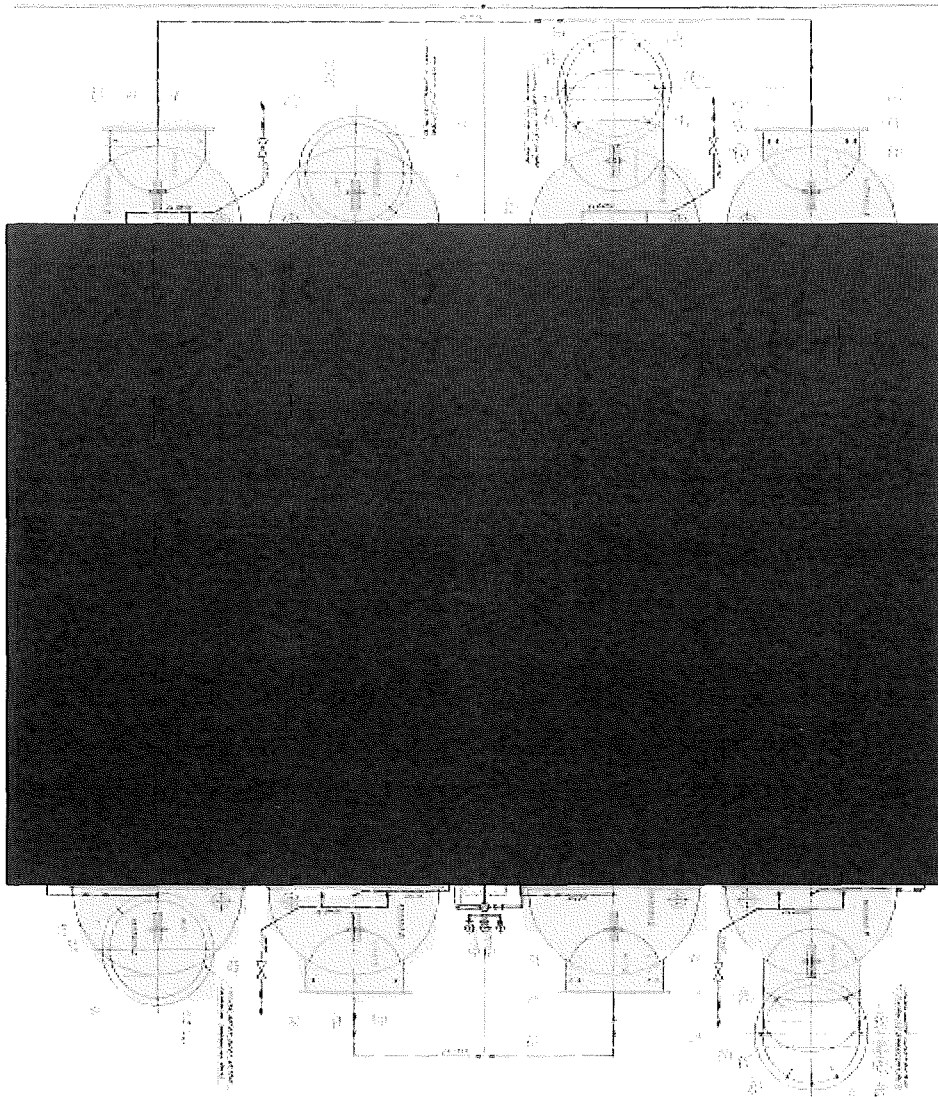


Figure 2: Each main condenser has 8 waterboxes

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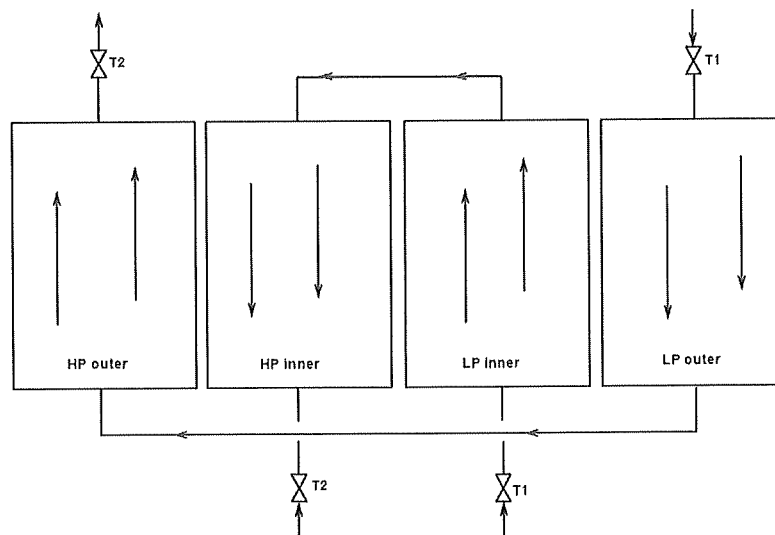


Figure 3: View of configuration for the main condensers with T1(inlet) and T2 (outlet)

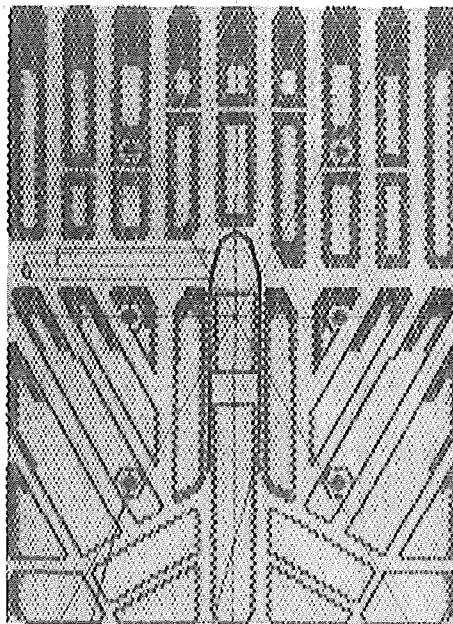


Figure 4: Diagram of Main condenser tubesheet (1 waterbox shown)

The Lethabo BFPT condenser is of single pressure design, with an inlet valve on the one side and outlet on the other. The basic layout can be seen below in figure 4.

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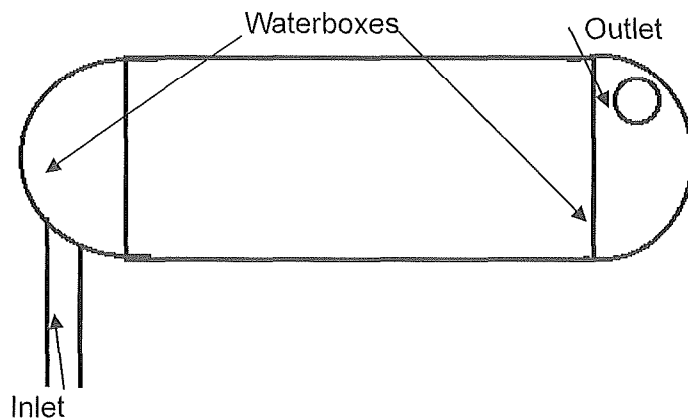


Figure 5: Basic Layout of the BFPT Condenser

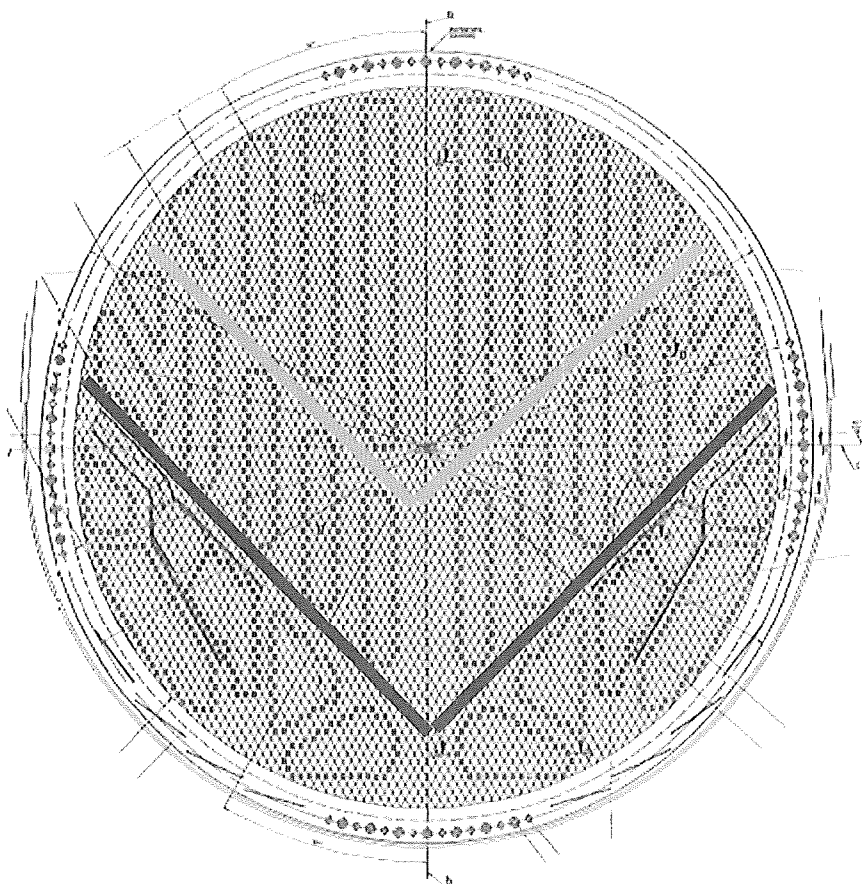


Figure 6: Tubesheet configuration of BFPT Condenser (red line shows inlet side baffle plat, green line shows outlet side baffle plate located in waterboxes)

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General considerations:

It is the responsibility of the contractor to ensure that the safety measures are adhered to in terms of the OSH act. The main condenser is classified as confined space as per OHS Act referenced below. The portable electrical tools need to comply with section 10 of the electrical installation regulations and the portable lights to section 11(2).

Table 1: General summarised information

GENERAL INFORMATION:			
Power Station:	Lethabo Power Station		
Unit:	Various		
<u>Component: Main Turbine Condenser</u>			
Scope:	<p>The internal surfaces of all 32 180 tubes are to be cleaned by means of High-Pressure Water Jetting (HPWJ) with a minimum operating pressure of 1000 bar at the nozzle with a minimum flow rate of 50 l/min/nozzle. The acceptance criteria are that all scale shall be removed from the internal surface of the tubes, i.e. the entire internal tube surface of all the tubes shall be completely cleaned to a uniform metallic colour with no traces of corrosion product or other scales and deposits.</p> <p>Furthermore, cleaning of the Taprogge screens should also take place to remove scale and debris stuck in the screens.</p>		
HEAT EXCHANGER SPECIFIC INFORMATION: Main Condenser			
Tube details:	Main Bundle "Condensing Zone"	Secondary Bundle "Air Extraction"	Impact Tubes "Peripheral tubes"
Tube material:	Titanium Grade 2	Titanium Grade 2	Titanium Grade 2
Number of Tubes:	21860	2260	8060
Tube Length:	12.08m	12.08m	12.08m
Tube OD:	23.2mm	23.2mm	23.2mm
Tube Wall Thickness:	0.5mm	0.5mm	0.7mm
Tube Profile:	Straight	Straight	Straight
Anticipated Scale Thickness:	1mm	1mm	1mm
Tube Stick-Out from Tubesheet (Inlet/Outlet)	3mm	3mm	3mm

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Tubesheet Coating	Epoxy Coating		
Waterbox Access:	Waterboxes will not be removed from the condenser – access to the tube ends is from within the confined space of the waterbox. Simultaneous access is available in 8 waterboxes.		
<u>Component: BFPT Condenser</u>			
Scope:	The internal surfaces of all 3230 tubes are to be cleaned by means of High-Pressure Water Jetting (HPWJ) with a minimum operating pressure of 1000 bar at the nozzle with a minimum flow rate of 50 l/min/nozzle. The acceptance criteria is that all scale shall be removed from the internal surface of the tubes, i.e. the entire internal tube surface of all the tubes shall be completely cleaned to a uniform metallic colour with no traces of corrosion product or other scales and deposits.		
HEAT EXCHANGER SPECIFIC INFORMATION: BFPT Condenser			
Tube details:	Main Bundle "Condensing Zone"	Secondary Bundle "Air Extraction"	
Tube material:	Admiralty Brass	Titanium Grade 2	
Number of Tubes:	3004	226	
Tube Length:	6.04m	6.04m	
Tube OD:	23mm	23.2 mm	
Tube Wall Thickness:	1mm	0.5mm	
Tube Profile:	Straight	Straight	
Anticipated Scale Thickness:	1mm	1mm	
Tube Stick-Out from Tubesheet (Inlet/Outlet)	+3mm	+3mm	
Tubesheet:	Muntz Metal with Epoxy Coating		
Waterbox Access:	Waterboxes will not be removed from the condenser – access to the tube ends is from within the confined space of the waterbox. Simultaneous access is available in both (2) waterboxes.		

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EMPLOYER INFORMATION:	
Water supply:	Potable quality water at a pressure of about 6 bar to be used for HP cleaning. Termination point is 5 m away from waterboxes.
Electricity supply:	Electricity for lights, termination point 2m away from waterbox.
Scaffolding:	Scaffolding will be constructed in such a manner as to avoid or as far as possible ensure unrestricted access to all tubes.
Isolation and Permitting:	To be ensured by Employer
Provision of tube samples for performing tests and optimization (prior to full scale cleaning).	Tube samples will be provided prior to awarding of contract.
Definition of "Roles and Responsibilities" for the removal of manhole covers on waterboxes:	Opening of manhole covers on all waterboxes prior to commencement of work. Provision of barricading to ensure no unauthorised access.
Definition of "Roles and Responsibilities" for the supply and installation of fans on the waterboxes for ventilation purposes:	Ventilation falls under the Contractor's responsibilities.

3.5 ROLES AND RESPONSIBILITIES DURING EXECUTION

Scope requirement	Responsible Party
Isolation and permit to work on components	Employer
Scaffolding (based on contractor's request/requirements)	Employer
Opening of waterbox manhole doors	Employer
Initial/dirty inspection of condenser	Contractor & Employer
Removal of foreign matter/debris and cleaning of waterboxes	Contractor
Rodding of blocked tubs, clearing of blockages	Contractor
High pressure cleaning of all tubes at specified pressure (second or even third passes in the problem area as required)	Contractor

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Post-wash high level flood test and plugging of leaking tubes (if any)	Employer
Endoscopic inspection to check for cleanliness	Contractor (Employer to witness)
Recording of plugged tubes (new and pre-existing) on tube map	Employer
Recording of blocked tubes on tube map	Contractor
Inspect waterbox and tubesheet for damage	Contractor and Employer
Cleaning of Taprogge Screens	Contractor
Flushing of tubes (if duration for HPWJ is too short)	Contractor
Final inspection, damage checks and handover	Contractor and Employer

3.6 ACCEPTANCE CRITERIA

For HPWJ: The internal surfaces of all tubes as described above shall be cleaned by means of High Pressure Water Jetting (HPWJ). The acceptance criteria is that all scale shall be removed from the internal surfaces of the tubes, i.e. the entire internal tube surface of all the tubes shall be completely cleaned to a uniform metallic colour with no traces of corrosion product or other scales and deposits. This shall be validated by means of high-resolution endoscope inspection (with minimum endoscope specifications as outlined below) and / or destructive analysis of "cleaned tube" where applicable. Failure to achieve the acceptance criteria shall be considered as non-performance with respect to the contract.

In addition to the requirements set out in 240-107677940 Section 4.1, the following shall also be regarded as acceptance criteria

For Flushing: The internal surfaces of all tubes as described above shall be cleaned by means of a turbulent flush to remove mud, sedimentation, blockages and debris. This method of cleaning is not expected to remove hard scale; however, it is expected of the contractor to report areas containing hard scale formation

For Taprogge screen cleaning: The screens shall be free from scale, debris and mud based on a visual inspection

3.7 SAFETY REQUIREMENTS

The safety of the Contractor personnel is of extreme importance. The following are the minimum safety requirements shall apply:

1. Operators shall wear CE (European Economic Area Conformity Marking) certified water jetting suits, and face shields rated for the working pressure.

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2. All foot and leg protection equipment to be appropriately rated for the working pressure.
3. The Contractor shall work in accordance with a safety procedure/instruction aligned to industry recognised HPWJ practices and standards to protect personnel using HPWJ equipment.
4. HPWJ operators shall be trained and certified by an independent industry recognised HPWJ authority. No operator will be allowed to use HPWJ lances on site without the required certification.
5. All HPWJ hoses, pressure accessories, pressure equipment and pressure vessels in the HPWJ system to be designed for a minimum design pressure of 1 035 bar (103.5 MPa). All previously mentioned equipment shall be pressure tested to 1.25 times the design pressure of the equipment. Test certificate to be provided.
6. All hose end connections to be fitted with the appropriate “hose checks” to prevent injury by restraining the hose in the event of an end fitting failure.
7. The HPWJ pump discharge shall be fitted with a calibrated pressure gauge and safety relief valve or rupture diaphragm. Test certificate to be provided.
8. Any manholes which are open for ventilation purposes shall be properly barricaded by the Contractor to eliminate unauthorised human entry while cleaning is in progress.
9. Barriers and Warning notices must be in place before any work commences
10. Specific requirements related to Eskom’s “Life Saving Rules” that would be applicable to this activity.
11. The Contractor’s operator shall use a handheld pneumatic powered feeder, which incorporates a sleeve into which the nozzle retracts as it exits the tube. The feeding speed and dwell time shall be set during commissioning as defined in section 3.8. This equipment/device shall be used at all times to ensure operators are not exposed to water jets when moving the lance from one tube to another

3.7 MINIMUM EQUIPMENT REQUIREMENTS

1. For tubes with an internal diameter of above 20.5 mm, the minimum nozzle flow rate shall be 50 litre/min at 1 000 bar working pressure.

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2. Rotating tube cleaning nozzles with multiple radical water jets shall be used. The cleaning nozzles shall be obtained from a recognised HPWJ equipment supplier including technical datasheets, providing technical information for a range of nozzle sizes, shall be available for all types of nozzles used on site. The maximum pressure rating of the nozzle shall be 1 035 bar or 15 000 psi. Nozzles with a higher pressure rating are not acceptable. The minimum number of nozzles available on site for the main and BFPT condensers are 6 and 2 respectively.
3. A technical data sheet shall be provided for the HPWJ pumps. The HPWJ pump shall maintain a minimum continuous working pressure of 1 000 bar at a flow rate of 50 litre/minute. This requirement assumes one pump will supply one cleaning nozzle. If a single pump is to supply more than one nozzle simultaneously, the pump shall maintain a minimum continuous working pressure of 1 000 bar and a minimum volume flow of 50 (litre/min) per each of the cleaning nozzles attached simultaneously to the pump.
4. The nozzles shall travel the full length of all the tubes
5. The HPWJ flexible hose from the foot valve to the tube cleaning nozzle shall have a minimum internal diameter of 6 mm. The maximum hose length is the condenser tube length plus an additional 7 m. The foot valve shall be positioned in the water box. The minimum number of hoses available on site for the main and BFPT condensers are 4 and 2 respectively.
6. The flexible hose from the pump outlet to the foot valve shall have a minimum internal diameter of 10 mm.
7. Provision of a reasonable set/number of spare equipment and tooling particularly nozzles, hoses, couplings, all wear and tear parts such as seals etc. These spares shall be available on site. In the event of HPWJ Pump breakdown then repair or suitable replacement shall be affected within 2 hours. The latter shall only apply to eventualities involving unexpected major breakdown of HPWJ Pumps.
8. Under no circumstances will the tube sheet coating or tube ends be damaged by the HPWJ cleaning. The Contractor shall establish a system or method to ensure impinging water jets from the nozzle are not directly focused towards the tube sheet or onto the outside diameter of the exposed tube ends. Prior to any HPWJ cleaning activities and inspection shall be performed by the Contractor supervisor and the Engineer to record the existing condition of the tube sheet and tube ends. This activity shall be included in the QCP as a hold point. Any damage to coating will be for contractor's expense to repair; Eskom's coating standard shall be applied for any coating repairs.
9. The Contractor shall make provision of adequate number of handheld pneumatic powered feeders to ensure the required dwell time is achieved for every tube.
10. The Contractor's selection of all lances, nozzles, sleeves and hosing shall be suitable for the tubing diameters as defined above in Table 1 of this document.
11. Endoscope/Fiberscope to be supplied by the Contractor to be used for pre and post cleaning inspection. The fibre scope shall have a reach length of at least 6 m with a digital display. This endoscope shall meet the minimum requirements stated on the table below:

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Table 2: Endoscopic Camera Requirements

Endoscopic Camera Minimum Requirements	
Camera Lens	Dual (front and Side)
Video Resolution	1080p HD (1920 x 1080 pixel) resolution
Megapixels (MP)	2.1
Image Format	RAW or TIFF
Video Format	MP4
Focal Length	30 mm
Magnification	2x
Waterproof	IP67
Bore hole minimum size	10 m

3.8 REQUIREMENTS AND COMMISSIONING BEFORE WORK CAN START

Before any work is performed the Contractor shall demonstrate the following to the Employer:

1. The Contractor shall compile a method statement, safety work procedure and Quality Control Plan (QCP) and submit to the Employer for approval before the condenser cleaning may commence. The Employer shall have the opportunity to add witness or hold points on the QCP.
2. Provide all required certificates (equipment pressure tests, pressure gauge calibration, personnel training) as stipulated above.
3. The Employer shall verify that the equipment on site complies in all respects to the technical data sheets provided with the tender as well as that the number of pumps, hoses, foot valves, cleaning nozzles, etc. on site corresponds with the quantities provided in the tender returnables.
4. The Contractor shall demonstrate to the Employer that the HPWJ pump, hose and nozzle combination can supply a volume flow rate of 50 litre/min with the pump being operated at rated speed (container/stopwatch method). This test assumes one pump will supply one cleaning nozzle by means of a HPWJ hose of representative length, i.e. a hose that will be used at Lethabo for the main condenser. If a single pump is to supply more than one nozzle simultaneously the pump shall maintain a minimum volume flow of 50 litre/min per each of the cleaning nozzles attached simultaneously to the pump.
5. The Contractor shall demonstrate that the lance safety device (with a handheld pneumatic powered feeder) prevents the lance from withdrawing from the tube during HPWJ and hence is safe for operators
6. Before starting with the production cleaning activity, the contractor in consultation with the employer shall establish an acceptable nozzle resident/dwell time (cleaning a minimum of 10 tubes) demonstrating the capability of meeting the acceptance criteria stipulated in section. The contractor QC representative shall ensure this is achieved at all times and record the actual dwell time on a check sheet every hour.

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7. The Contractor shall supply and install suitable protection or cover on the cooling water inlet duct to eliminate any of the debris removed from the condenser tube falling down the CW inlet duct.
8. The Contractor shall supply suitable Endoscope/Fiberscope equipment to facilitate inspection pre- and post-cleaning.

3.9 DETAILED HPWJ EXECUTION

1. All tubes which are blocked or obstructed, and which cannot be unblocked by HPWJ shall be marked on the tube sheet drawing and submitted to the Employer.
2. The Contractor shall keep a daily logbook with the number of tubes cleaned; working pressures and achieved dwell times.
3. Due to limited outage time the Contractor shall work in at least two water boxes simultaneously with the capacity to increase this to four if required.
4. Automated lance feeding equipment with variable speed control shall be used to ensure dwell times are achieved. This is also to enhance efficiency & consistency.
5. Lances and nozzles shall be fitted with an indexing front guide tube and stopper.
6. The cleaning duration will be calculated by the contractor based on the agreed dwell time per tube.
7. As stated above the minimum acceptance criteria is that all scale shall be removed from the internal surface of the tubes, i.e. the entire internal tube surface of all the tubes shall be completely clean with no traces of corrosion product or other scales and deposits on the tube internal surfaces.
8. The Contractor shall clean the water boxes and drainpipes after cleaning the tubes. All foreign materials and debris shall be removed from the water boxes and CW duct inlet and outlet. Note that this includes the area surrounding the water box inlet manhole where some scale has been flushed out.

3.10 MANPOWER CONSIDERATIONS

Table 3: Manpower Considerations

HPWJ Cleaning of Main Condenser	<p>HPWJ cleaning shall be done on a 24-hour basis (day shift and night shift, or 3x8 hour shifts)</p> <ul style="list-style-type: none">- HPWJ cleaning (including inspection) shall be completed in a maximum of 7-10 calendar days- Up to 8 HWPJ cleaning operators required per shift- 1x supervisor per shift- 1x technician per shift- 2x assistants per shift
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HPWJ Cleaning of BFPT Condenser	<p>HPWJ cleaning shall be done on a 24-hour basis (day shift and night shift, or 3x8 hour shifts)</p> <ul style="list-style-type: none">- HPWJ cleaning (including inspection) shall be completed in a maximum of 2 calendar days- Up to 8 HWPJ cleaning operators required per shift- 1x supervisor per shift- 1x technician per shift- 1x assistants per shift
Flushing of Main Condenser	<p>Shall be completed within 2 calendar days, done on a 24 hour basis (day shift and night shift, or 3x8 hour shifts)</p> <ul style="list-style-type: none">- Up to 8 HWPJ cleaning operators required per shift- 1x supervisor per shift- 1x technician per shift

4. TENDER EVALUATION PROCESS AND RETURNABLES

From a technical perspective, the tenders will be evaluated in multiple phases.

Phase 1A: A desktop evaluation of the mandatory gatekeepers as set out in section 4.1. To be considered for further evaluation, this section has to be complied with and will be regarded as a gatekeeper.

Phase 1B: Qualitative desktop evaluation of the tenders that passed the mandatory requirements in Phase 1A. A minimum score of 70% will be required for phase 1B in order to be considered for phase 2 of the evaluation. The returnables that will be assessed in this phase of the evaluation, are set out in section 4.2 of this document

Phase 2: Workshop evaluation of the tenderer's that met the requirements of Phase 1, will take place at the tenderer's workshop. The aspects that will be evaluated in this phase, are set out in section 4.3 of this document.

4.1 MANDATORY TECHNICAL EVALUATION CRITERIA

Gatekeepers identified in the tender document will be "must meet" criteria identified in tabular questionnaire form. The tenderer's submission will be assessed based upon questionnaire seeking **YES** or **NO** response from the tenderers with no point scores or weighted averaged assigned to the response.

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Response of **NO** against any criteria will be elimination of the tenderer's submission for further consideration or short listing for detailed technical evaluation. Gatekeepers will be minimum criterion elements with most significant and critical parameters applicable to the successful execution of the RFQ.

The *contractor* shall provide a verifiable reference list of previous projects performed since 2021 using a minimum of 800 bar working pressure, involving HPWJ cleaning of industrial heat exchanger tube internals. Verifiable references of at least 3 projects completed successfully within the last 5 years, are required. The reference list shall be provided in the format as shown in table 4.

IMPORTANT NOTES:

1. The *employer* reserves the right to contact the references provided to verify the work that was done and the quality and validity thereof. Projects that were unsatisfactorily completed or could not be verified as authentic, will not count towards the mandatory threshold of 3 projects for each system.
2. The following shall **NOT** be accepted as valid references:
 - External cleaning of heat exchanger tubes
 - Cleaning of heat exchanger tubes with an internal diameter above 30mm
 - Reference could not be verified with the details that were supplied or references that were verified and received negative feedback.
 - Work was performed earlier than 2021.
 - Copies of previous purchase orders without the completion of table 4 will not be acceptable.
 - Vague references for cleaning without specific information related to the component type, size and type of work done
 - Working pressure of less than 800 bar
 - Less than 3 references that meet the requirements

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BFPT Condensers at Lethabo Power Station**

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Table 4: Verifiable Reference Table (completion is MANDATORY)

COMPLETION OF THIS TABLE BY THE <u>CONTRACTOR</u> IS MANDATORY. FAILURE TO COMPLETE THE TABLE (3 REFERENCES)/PROVIDE THE INFORMATION REQUIRED IN THE TABLE WILL RESULT IN DISQUALIFICATION	
Reference 1	
Component on which HPWJ cleaning was done	
Pressure at which cleaning was performed (bar)	
Surface of tubes that were cleaned (internal and/or external)	
Size (internal diameter) of the tubes that were cleaned (mm)	
Date when the project was completed	
Client Company Name	
Project reference number (order no, contract no, etc.)	
Client representative contact details	
Name and surname:	
Telephone number:	
Client business email address:	
Reference 2	
Component on which HPWJ cleaning was done	
Pressure at which cleaning was performed (bar)	
Surface of tubes that were cleaned (internal and/or external)	
Size (internal diameter) of the tubes that were cleaned (mm)	
Date when the project was completed	
Client Company Name	
Project reference number (order no, contract no, etc.)	
Client representative contact details	
Name and surname:	
Telephone number:	
Client business email address:	
Reference 3	
Component on which HPWJ cleaning was done	
Pressure at which cleaning was performed (bar)	
Surface of tubes that were cleaned (internal and/or external)	
Size (internal diameter) of the tubes that were cleaned (mm)	
Date when the project was completed	
Client Company Name	
Project reference number (order no, contract no, etc.)	
Client representative contact details	
Name and surname:	
Telephone number:	
Client business email address:	

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4.2 QUALITATIVE TECHNICAL EVALUATION CRITERIA PHASE 1B: DESKTOP EVALUATION

Tenderers who passed the mandatory gatekeepers will be subjected to a qualitative technical evaluation. For the qualitative technical evaluation, a minimum score of 70% has to be obtained to gain further consideration (including Phase 2 site visit) for this transaction. The contractor shall submit their own application method statements for the work, in line with the provided specification.

The following returnables will be evaluated in this section:

1. Exclusions or deviations from the above specification. If no exclusions or deviations, a specific statement to this effect is to be included in the tender.
2. Proof that the contractor owns automatic lance feeding equipment with variable speed control. Proof shall include data sheet as well as photos of equipment.
3. The Contractor shall complete Tables 5 to 8 below with the details of the equipment that will be available on site for the full duration of the contract to complete the cleaning of the condenser/heat exchanger within the allowed time period. These components shall also be used during the Phase 2 Site Evaluation and shall be used on site after contract award. Furthermore, these components shall be compliant to the requirements set out in this document
4. Technical datasheets or proof of performance characteristics for the rotating tube cleaning nozzles, HPWJ pumps and flexible hoses for cleaning the tubes as described in Table 1. These datasheets shall correspond to the information provided in (3) above.
5. Provides a preliminary method statement for cleaning the condenser tubes as per the scope provided. The method statement includes amongst other items like safety requirements, commissioning, monitoring during the cleaning process, equipment, etc.
6. Provides a preliminary method statement the flushing of condenser tubes and the cleaning of Taprogge screens as per the scope provided. The method statement includes amongst other items like safety requirements, commissioning, monitoring during the cleaning process, equipment, etc.

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Scope of Work: HPWJ cleaning of Main and BFPT Condensers at Lethabo Power Station

Unique Identifier: N/A
 Alternative Identifier: N/A
 Document Type
 Revision: 0
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Table 5: HPWJ Nozzle Inventory

HPWJ Nozzle #	Part number	Supplier Name	Pressure rating or range (in bar)	Flow range, l/min
1				
2				
3				
4				
5				
6				

Table 6: HPWJ Pumping Capacity/Resources

HPWJ pump #	HPWJ Pump identification	HPWJ Pump flow rate (l/min) at 1000 bar working pressure	Number of cleaning sets, i.e. cleaning nozzles, hoses, foot valves, etc., which will be connected simultaneously to the pump
1			
2			
3			
4			

Table 7: HPWJ Hose Inventory

HPWJ Hose #	HPWJ hose series or part number	Hose internal diameter, mm	Hose external diameter, mm	Maximum working pressure, bar
1				
2				
3				
4				

Table 8: HPWJ Automatic Lance Feeding Equipment

HPWJ Lance #	Automatic lance feeder series or part number	Supplier Name	Feeding Speed Range
1			
2			
3			
4			

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4.3 QUALITATIVE TECHNICAL EVALUATION PHASE 2: SITE VISIT

Tenderers who passed the gatekeepers and obtained a score of 70% or higher for the evaluation performed based on the returnables listed in section 4.2 of this document, will be subject to a visit at their works, from the technical evaluation team. During this site visit, the following will be evaluated and scored and a minimum score of 70% needs to be obtained to be given further consideration for this tender:

1. Overall Inspection of workshop and facilities.
2. Housekeeping, safety considerations and neatness of workshop and facilities.
3. Visual inspection of the following equipment:
 - a. Cleaning Nozzles
 - b. Automatic lance feeding equipment
 - c. High Pressure hoses
 - d. HPWJ Pumps

If any of this equipment doesn't correspond with the tender returnables in section 4.2 point (3), it will be regarded as non-compliance and lead to disqualification.

4. The contractor shall demonstrate the required flow rate as detailed in section 3.8 point 4. This test can be done by using a bucket & stopwatch method
5. The Contractor shall demonstrate the cleaning of a heat exchanger tube. During this demo the all the equipment that will be used on site, e.g. pump, hose, nozzle, feeder, safety features, etc. will be demonstrated and scored.
6. Interview with proposed site manager and qualification review.
7. Interview with proposed QC officer and qualification review.
8. Interview with 2 or more HPWJ cleaning operators and qualification review

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