



NEC3 Engineering and Construction

Short Contract (ECSC3)

A contract between Eskom Holdings SOC Ltd (Reg No. 2002/015527/30)

and

for the replacement of service water pipelines at
Camden Power Station for a period of six months

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Documentation prepared by:

C1 Agreements & Contract Data

C1.1 Form of Offer and Acceptance

Offer

The Employer, identified in the Acceptance page signature block on the next page, has solicited offers to enter into a contract for the procurement of:

The replacement of service water pipelines at Camden Power Station for a period of six months.

The tenderer, identified in the signature block below, having examined the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance the tenderer offers to perform all of the obligations and liabilities of the Contractor under the Contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the Contract Data.

The offered total of the Prices exclusive of VAT is	R
Value Added Tax @ 15% is	R
The offered total of the Prices inclusive of VAT is	R
(In words)	

This Offer may be accepted by the Employer by signing the form of Acceptance overleaf and returning one copy of this document including the Schedule of Deviations (if any) to the tenderer before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the tenderer becomes the party named as the Contractor in the conditions of contract identified in the Contract Data.

Signature(s)

Name(s)

Capacity

For the tenderer:

(Insert name and address of organisation)

Name & signature of witness

Date

Tenderer's CIDB registration number:

Acceptance

By signing this part of this Form of Offer and Acceptance, the Employer identified below accepts the tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the conditions of contract identified in the Contract Data. Acceptance of the tenderer's Offer shall form an Agreement between the Employer and the tenderer upon the terms and conditions contained in this Agreement and in the Contract that is the subject of this Agreement.

The terms of the Contract, are contained in:

Part 1 Agreements and Contract Data, (which includes this Form of Offer and Acceptance)

Part 2 Pricing Data

Part 3 Scope of Work: Works Information

Part 4 Site Information

and drawings and documents (or parts thereof), which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules as well as any changes to the terms of the Offer agreed by the tenderer and the Employer during this process of Offer and Acceptance, are contained in the Schedule of Deviations attached to and forming part of this Form of Offer and Acceptance. No amendments to or deviations from said documents are valid unless contained in this Schedule, which must be signed by the duly authorised representative(s) for both parties.

The tenderer shall within one week of receiving a completed copy of this Agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the conditions of contract identified in the Contract Data at, or just after, the date this Agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this Agreement.

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the tenderer receives one fully completed and signed copy of this document, including the Schedule of Deviations (if any) together with all the terms of the contract as listed above.

Signature(s)

Name(s)

Capacity

**for the
Employer**

.....
.....
.....
(Insert name and address of organisation)

Name &
signature of
witness

Date

.....
.....

Note: If a tenderer wishes to submit alternative tender offers, further copies of this document may be used for that purpose, duly endorsed, 'Alternative Tender No. _____'

Schedule of Deviations

Note:

1. To be completed by the Employer prior to award of contract. This part of the Offer & Acceptance would not be required if the contract has been developed by negotiation between the Parties and is not the result of a process of competitive tendering.
2. The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender.
3. A tenderer's covering letter must not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid be the subject of agreement reached during the process of Offer and Acceptance, the outcome of such agreement shall be recorded here, and the final draft of the contract documents shall be revised to incorporate the effect of it.

No.	Subject	Details
1		
2		
3		
4		

By the duly authorised representatives signing this Schedule of Deviations below, the Employer and the tenderer agree to and accept this Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules, as well as any confirmation, clarification, or changes to the terms of the Offer agreed by the tenderer and the Employer during this process of Offer and Acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the tenderer of a completed signed copy of this Form shall have any meaning or effect in the contract between the parties arising from this Agreement.

For the tenderer:

For the Employer

Signature Name Capacity On behalf of <i>(Insert name and address of organisation)</i> Name & signature of witness Date <i>(Insert name and address of organisation)</i>
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C1.2 Contract Data

Data provided by the *Employer*

Clause	Statement	Data
General		
10.1	The <i>Employer</i> is (Name):	Eskom Holdings SOC Ltd (reg no: 2002/015527/30), a state-owned company incorporated in terms of the company laws of the Republic of South Africa
	Address	Registered office at Megawatt Park, Maxwell Drive, Sandton, Johannesburg
10.1 & 14.4	The <i>Employer's</i> representative to whom the <i>Employer</i> in terms of clause 14.4 delegates his actions ¹ is (Name):	
	Address	Camden Power Station
	Tel No.	017 827
	Fax No.	
	E-mail address	
11.2(11)	The <i>works</i> are	The replacement of service water pipelines at Camden Power Station over a period of six months
11.2(13)	The Works Information is in	the document called 'Works Information' in Part 3 of this contract.
11.2(12)	The Site Information is in	the document called 'Site Information' in Part 4 of this contract.
11.2(12)	The <i>site</i> is	Camden Power Station
30.1	The <i>starting date</i> is.	
11.2(2)	The <i>completion date</i> is.	
13.2	The <i>period for reply</i> is	2 weeks
40	The <i>defects date</i> is	52 weeks after Completion
41.3	The <i>defect correction period</i> is	1 week
50.1	The <i>assessment day</i> is the	25th of each month.
50.5	The <i>delay damages</i> are	R5 000 per day
50.6	The retention is	10%
51.2	The interest rate on late payment is	0.5% per week of delay

¹ Except those actions which can only be done by the *Employer* as a Party to the contract.

80.1	The <i>Contractor</i> is not liable to the <i>Employer</i> for loss of or damage to the <i>Employer's</i> property in excess of	the amount of the deductibles relevant to the event
	Does the United Kingdom Housing Grants, Construction and Regeneration Act (1996) apply?	No
93.1	The <i>Adjudicator</i> is	the person selected from the ICE-SA Division (or its successor body) of the South African Institution of Civil Engineering Panel of Adjudicators by the Party intending to refer a dispute to him. (See www.ice-sa.org.za). If the Parties do not agree on an Adjudicator the Adjudicator will be appointed by the Arbitration Foundation of Southern Africa (AFSA).
	Address	
	Tel No.	
	Fax No.	
	e-mail	
93.2(2)	The <i>Adjudicator nominating body</i> is:	the Chairman of ICE-SA a joint Division of the South African Institution of Civil Engineering and the London Institution of Civil Engineers. (See www.ice-sa.org.za) or its successor body
93.4	The <i>tribunal</i> is:	arbitration.
	The <i>arbitration procedure</i> is	the latest edition of Rules for the Conduct of Arbitrations published by The Association of Arbitrators (Southern Africa) or its successor body.
	The place where arbitration is to be held is	South Africa
	The person or organisation who will choose an arbitrator	
	- if the Parties cannot agree a choice or	the Chairman for the time being or his nominee
	- if the arbitration procedure does not state who selects an arbitrator, is	of the Association of Arbitrators (Southern Africa) or its successor body.

The conditions of contract are the NEC3 Engineering and Construction Short Contract (April 2013)²³ and the following additional conditions Z1 to Z11 which always apply:

Z1 Cession delegation and assignment

Z1.1 The *Contractor* does not cede, delegate, or assign any of its rights or obligations to any person without the written consent of the *Employer*.

Z1.2 Notwithstanding the above, the *Employer* may on written notice to the *Contractor* cede and delegate its rights and obligations under this contract to any of its subsidiaries or any of its

² If June 2005 Edition applies, delete April 2013, and insert June 2005

³ State whether attached as a 'PDF' file in terms of Eskom's licence, or to be obtained from Engineering Contract Strategies Tel 011 803 3008, Fax 086 539 1902 or www.ecs.co.za.

present divisions or operations which may be converted into separate legal entities as a result of the restructuring of the Electricity Supply Industry.

Z2 Change of Broad Based Black Economic Empowerment (B-BBEE) status

- Z2.1 Where a change in the *Contractor's* legal status, ownership or any other change to his business composition or business dealings results in a change to the *Contractor's* B-BBEE status, the *Contractor* notifies the *Employer* within seven days of the change.
- Z2.2 The *Contractor* is required to submit an updated verification certificate and necessary supporting documentation confirming the change in his B-BBEE status to the *Employer* within thirty days of the notification or as otherwise instructed by the *Employer*.
- Z2.3 Where, as a result, the *Contractor's* B-BBEE status has decreased since the *starting date* the *Employer* may either re-negotiate this contract or alternatively, terminate the *Contractor's* obligation to Provide the Works.
- Z2.4 Failure by the *Contractor* to notify the *Employer* of a change in its B-BBEE status may constitute a reason for termination. If the *Employer* terminates in terms of this clause, the procedures on termination are those stated in Clause 91.1 and the amount due on termination includes amounts listed in Clause 92.1 less a deduction of the forecast additional cost to the *Employer* of completing the works.

Z3 Confidentiality

- Z3.1 The *Contractor* does not disclose or make any information arising from or in connection with this contract available to others except where required by this contract. This undertaking does not, however, apply to information which at the time of disclosure or thereafter, without default on the part of the *Contractor*, enters the public domain or to information which was already in the possession of the *Contractor* at the time of disclosure (evidenced by written records in existence at that time). Should the *Contractor* disclose information to others where required by this contract the *Contractor* ensures that the provisions of this clause are complied with by the recipient.
- Z3.2 If the *Contractor* is uncertain about whether any such information is confidential, it is to be regarded as such until notified otherwise by the *Employer*.
- Z3.3 In the event that the *Contractor* is, at any time, required by law to disclose any such information which is required to be kept confidential, the *Contractor*, to the extent permitted by law prior to disclosure, notifies the *Employer* so that an appropriate protection order and/or any other action can be taken, if possible, prior to any disclosure. In the event that such protective order is not, or cannot, be obtained, then the *Contractor* may disclose that portion of the information which it is required to be disclosed by law and uses reasonable efforts to obtain assurances that confidential treatment will be afforded to the information so disclosed.
- Z3.4 The taking of images (whether photographs, video footage or otherwise) of the works or any portion thereof, in the course of Providing the Works and after Completion, requires the prior written consent of the *Employer*. All rights in and to all such images vests exclusively in the *Employer*.
- Z3.5 The *Contractor* ensures that all his subcontractors abide by the undertakings in this clause.

Z4 Waiver and estoppel: Add to clause 12.2:

- Z4.1 Any extension, concession, waiver, or relaxation of any action stated in this contract by the Parties or their delegates or the *Adjudicator* does not constitute a waiver of rights and does not give rise to an estoppel unless the Parties agree otherwise and confirm such agreement in writing.

Z5 Health, safety, and the environment

- Z5.1 The *Contractor* undertakes to take all reasonable precautions to maintain the health and safety of persons in and about the execution of the *works*. Without limitation the *Contractor*:
- accepts that the *Employer* may appoint him as the "Principal Contractor" (as defined and provided for under the Construction Regulations 2014 (promulgated under the Occupational Health & Safety Act 85 of 1993) ("the Construction Regulations") for the Site.
 - warrants that the total of the Prices as at the Contract Date includes a sufficient amount for proper compliance with the Construction Regulations, all applicable health & safety laws and regulations and the health and safety rules, guidelines and procedures provided for in this contract and generally for the proper maintenance of health & safety in and about the execution of *works*; and
 - undertakes, in and about the execution of the *works*, to comply with the Construction Regulations and with all applicable health & safety laws and regulations and rules, guidelines and procedures otherwise provided for under this contract and ensures that his Subcontractors, employees and others under the *Contractor's* direction and control, likewise observe and comply with the foregoing.
- Z5.2 The *Contractor*, in and about the execution of the *works*, complies with all applicable environmental laws and regulations and rules, guidelines and procedures otherwise provided for under this contract and ensures that his subcontractors, employees and others under the *Contractor's* direction and control, likewise observe and comply with the foregoing.

Z6 Provision of a Tax Invoice and interest. Add to clause 50

- Z6.1 The *Contractor* provides the *Employer* with a tax invoice in accordance with the *Employer's* procedures stated in the Works Information, showing the correctly assessed amount due for payment.
- Z6.2 If the *Contractor* does not provide a tax invoice in the form and by the time required by this contract, the time by when the *Employer* is to make a payment is extended by a period equal in time to the delayed submission of the correct tax invoice. Interest due by the *Employer* in terms of clause 51.2 is then calculated from the delayed date by when payment is to be made.
- Z6.3 The *Contractor* is required to comply with the requirements of the Value Added Tax Act, no 89 of 1991 (as amended) and to include the *Employer's* VAT number 4740101508 on each invoice he submits for payment.

Z7 Notifying compensation events

- Z7.1 Delete from the last sentence in clause 61.1, "unless the event arises from an instruction of the *Employer*."

Z8 *Employer's* limitation of liability; Add to clause 80.1

- Z8.1 The *Employer* liability to the *Contractor* for the *Contractor's* indirect or consequential loss is limited to R0.00 (zero Rand).

Z9 Termination: Add to clause 90.2, after the words "or its equivalent":

- Z9.1 or had a business rescue order granted against it.

Z10 Addition to Clause 50.5

Z10.1 If the amount due for the *Contractor's* payment of *delay damages* reaches the limits stated in this Contract Data (if any), the *Employer* may terminate the *Contractor's* obligation to Provide the Works.

If the *Employer* terminates in terms of this clause, the procedures on termination are those stated in Clause 91.1 and the amount due on termination includes amounts listed in Clause 92.1 less a deduction of the forecast additional cost to the *Employer* of completing the *works*.

Z11 Ethics

For the purposes of this Z-clause, the following definitions apply:

Affected Party means, as the context requires, any party, irrespective of whether it is the *Contractor* or a third party, such party's employees, agents, or Subconsultants or Subcontractor's employees, or any one or more of all of these parties' relatives or friends,

Coercive Action means to harm or threaten to harm, directly or indirectly, an Affected Party or the property of an Affected Party, or to otherwise influence or attempt to influence an Affected Party to act unlawfully or illegally,

Collusive Action means where two or more parties co-operate to achieve an unlawful or illegal purpose, including to influence an Affected Party to act unlawfully or illegally,

Committing Party means, as the context requires, the *Contractor*, or any member thereof in the case of a joint venture, or its employees, agents, or Subcontractors or the Subcontractor's employees,

Corrupt Action means the offering, giving, taking, or soliciting, directly or indirectly, of a good or service to unlawfully or illegally influence the actions of an Affected Party,

Fraudulent Action means any unlawfully or illegally intentional act or omission that misleads, or attempts to mislead, an Affected Party, in order to obtain a financial or other benefit or to avoid an obligation or incurring an obligation,

Obstructive Action means a Committing Party unlawfully or illegally destroying, falsifying, altering, or concealing information or making false statements to materially impede an investigation into allegations of Prohibited Action, and

Prohibited Action means any one or more of a Coercive Action, Collusive Action Corrupt Action, Fraudulent Action, or Obstructive Action.

Z11.1 A Committing Party may not take any Prohibited Action during the course of the procurement of this contract or in execution thereof.

Z11.2 The *Employer* may terminate the *Contractor's* obligation to Provide the Services if a Committing Party has taken such Prohibited Action and the *Contractor* did not take timely and appropriate action to prevent or remedy the situation, without limiting any other rights or remedies the *Employer* has. It is not required that the Committing Party had to have been found guilty, in court or in any other similar process, of such Prohibited Action before the *Employer* can terminate the *Contractor's* obligation to Provide the Services for this reason.

Z11.3 If the *Employer* terminates the *Contractor's* obligation to Provide the Services for this reason, the amounts due on termination are those intended in core clauses 92.1 and 92.2.

Z11.4 A Committing Party co-operates fully with any investigation pursuant to alleged Prohibited Action. Where the *Employer* does not have a contractual bond with the Committing Party, the *Contractor* ensures that the Committing Party co-operates fully with an investigation.

Z12 Insurance

Z_12.1 Replace core clause 82 with the following:

Insurance cover 82

- 82.1 When requested by a Party, the other Party provides certificates from his insurer or broker stating that the insurances required by this contract are in force.
- 82.2 The *Contractor* provides the insurances stated in the Insurance Table A, from the *starting date* until the earlier of Completion and the date of the termination certificate.

INSURANCE TABLE A

Insurance against	Minimum amount of cover or minimum limit of indemnity	Cover provided until
Loss of or damage to the works	<p>The replacement cost where not covered by the <i>Employer's</i> insurance</p> <p>The <i>Employer's</i> policy deductible as at contract date, where covered by the <i>Employer's</i> insurance</p>	The <i>Employer's</i> certificate of Completion has been issued
Loss of or damage to Equipment, Plant and Materials	<p>The replacement cost where not covered by the <i>Employer's</i> insurance</p> <p>The <i>Employer's</i> policy deductible as at contract date, where covered by the <i>Employer's</i> insurance</p>	The Defects Certificate has been issued
The <i>Contractor's</i> liability for loss of or damage to property (except the works, Plant and Materials and Equipment) and for bodily injury to or death of a person (not an employee of the <i>Contractor</i>) arising from or in connection with the <i>Contractor's</i> Providing the Works	<p><u>Loss of or damage to property</u> <u>Employer's property</u> The replacement cost where not covered by the <i>Employer's</i> insurance</p> <p>The <i>Employer's</i> policy deductible as at contract date were covered by the <i>Employer's</i> insurance</p> <p><u>Other property</u> The replacement cost</p>	

	<u>Bodily injury to or death of a person</u> The amount required by the applicable law	
Liability for death of or bodily injury to employees of the <i>Contractor</i> arising out of and in the course of their employment in connection with this contract	The amount required by the applicable law	

82.3 The *Employer* provides the insurances as stated in the Insurance Table B

INSURANCE TABLE B

Insurance against or name of policy	Minimum amount of cover or mini of indemnity
Assets All Risk	Per the insurance policy document
Contract Works insurance	Per the insurance policy document
Environmental Liability	Per the insurance policy document
General and Public Liability	Per the insurance policy document
Transportation (Marine)	Per the insurance policy document
Motor Fleet and Mobile Plant	Per the insurance policy document
Terrorism	Per the insurance policy document
Cyber Liability	Per the insurance policy document
Nuclear Material Damage and Business Interruption	Per the insurance policy document
Nuclear Material Damage Terrorism	Per the insurance policy document

Z13 Nuclear Liability

- Z13.1 The *Employer* is the operator of the Koeberg Nuclear Power Station (KNPS), a nuclear installation, as designated by the National Nuclear Regulator of the Republic of South Africa and is the holder of a nuclear licence in respect of the KNPS.
- Z13.2 The *Employer* is solely responsible for and indemnifies the *Contractor* or any other person against any and all liabilities which the *Contractor* or any person may incur arising out of or resulting from nuclear damage, as defined in Act 47 of 1999, save to the extent that any liabilities are incurred due to the unlawful intent of the *Contractor* or any other person or the presence of the *Contractor* or that person or any property of the *Contractor* or such person at or in the KNPS or on the KNPS site, without the permission of the *Employer* or of a person acting on behalf of the *Employer*.
- Z13.3 Subject to clause Z13.4 below, the *Employer* waives all rights of recourse, arising from the aforesaid, save to the extent that any claims arise or liability is incurred due or attributable to the unlawful intent of the *Contractor* or any other person, or the presence of the *Contractor* or that person or any property of the *Contractor* or such person at or in the KNPS or on the KNPS site, without the permission of the *Employer* or of a person acting on behalf of the *Employer*.

Z13.4 The *Employer* does not waive its rights provided for in section 30 (7) of Act 47 of 1999, or any replacement section dealing with the same subject matter.

Z13.5 The protection afforded by the provisions hereof shall be in effect until the KNPS is decommissioned.

Z14 Asbestos

For the purposes of this Z-clause, the following definitions apply:

AAIA	means approved asbestos inspection authority.
ACM	means asbestos containing materials.
AL	means action level, i.e., a level of 50% of the OEL, i.e., 0.1 regulated asbestos fibres per ml of air measured over a 4-hour period. The value at which proactive actions is required in order to control asbestos exposure to prevent exceeding the OEL.
Ambient Air	means breathable air in area of work with specific reference to breathing zone, which is defined to be a virtual area within a radius of approximately 30cm from the nose inlet.
Compliance Monitoring	means compliance sampling used to assess whether or not the personal exposure of workers to regulated asbestos fibres is in compliance with the Standard's requirements for safe processing, handling, storing, disposal and phase-out of asbestos and asbestos containing material, equipment, and articles.
OEL	means occupational exposure limit.
Parallel Measurements	means measurements performed in parallel, yet separately, to existing measurements to verify validity of results.
Safe Levels	means airborne asbestos exposure levels conforming to the Standard's requirements for safe processing, handling, storing, disposal and phase-out of asbestos and asbestos containing material, equipment, and articles.
Standard	means the <i>Employer's</i> Asbestos Standard 32-303: Requirements for Safe Processing, Handling, Storing, Disposal and Phase-out of Asbestos and Asbestos Containing Material, Equipment and Articles.
SANAS	means the South African National Accreditation System.
TWA	means the average exposure, within a given workplace, to airborne asbestos fibres, normalised to the baseline of a 4-hour continuous period, also applicable to short term exposures, i.e., 10-minute TWA.

Z14.1 The *Employer* ensures that the Ambient Air in the area where the *Contractor* will Provide the Services conforms to the acceptable prescribed South African standard for asbestos, as per the regulations published in GNR 155 of 10 February 2002, under the Occupational Health and Safety Act, 1993 (Act 85 of 1993) ("Asbestos Regulations"). The OEL for asbestos is 0.2 regulated asbestos fibres per millilitre of air as a 4-hour TWA, averaged over any continuous period of four hours, and the short-term exposure limit of 0.6 regulated asbestos fibres per millilitre of air as a 10-minute TWA, averaged over any 10 minutes, measured in accordance with HSG248 and monitored according to HSG173 and OESSM.

Z14.2 Upon written request by the *Contractor*, the *Employer* certifies that these conditions prevail. All measurements and reporting are affected by an independent, competent, and certified occupational hygiene inspection body, i.e., a SANAS accredited, and Department of Employment and Labour approved AAIA. The *Contractor* may perform Parallel Measurements

and related control measures at the *Contractor's* expense. For the purposes of compliance, the results generated from Parallel Measurements are evaluated only against South African statutory limits as detailed in clause Z14.1. Control measures conform to the requirements stipulated in the AAIA-approved asbestos work plan.

- Z14.3 The *Employer* manages asbestos and ACM according to the Standard.
- Z14.4 In the event that any asbestos is identified while Providing the Services, a risk assessment is conducted and if so required, with reference to possible exposure to an airborne concentration of above the AL for asbestos, immediate control measures are implemented, and relevant air monitoring conducted in order to declare the area safe.
- Z14.5 The *Contractor's* personnel are entitled to stop working and leave the contaminated area forthwith until such time that the area of concern is declared safe by either Compliance Monitoring or an AAIA approved control measure intervention, for example, per the emergency asbestos work plan, if applicable.
- Z14.6 The *Contractor* continues to Provide the Services, without additional control measures presented, on presentation of Safe Levels. The contractually agreed dates to Provide the Services, including the Completion Date, are adjusted accordingly. The contractually agreed dates are extended by the notification periods required by regulations 3 and 21 of the Asbestos Regulations, 2001.
- Z14.7 Any removal and disposal of asbestos, asbestos containing materials and waste, is done by a registered asbestos contractor, instructed by the *Employer* at the *Employer's* expense, and conducted in line with South African legislation.

Data provided by the *Contractor* (the *Contractor's Offer*)

The tendering contractor is advised to read both the NEC3 Engineering and Construction Short Contract (April 2013) and the relevant parts of its Guidance Notes (ECSC3-GN)⁴ in order to understand the implications of this Data which the tenderer is required to complete. An example of the completed Data is provided on page 31 of the ECSC3 April 2013 Guidance Notes.

Completion of the data in full is essential to create a complete contract.

10.1	The <i>Contractor</i> is (Name): Address Tel No. Fax No. E-mail address	
63.2	The percentage for overheads and profit added to the Defined Cost for people is	%
63.2	The percentage for overheads and profit added to other Defined Cost is	%
11.2(9)	The Price List is in	the document called 'Price List' in Part 2 of this contract.
11.2(10)	The offered total of the Prices is [Enter the total of the Prices from the Price List]:	R excluding VAT [in words] excluding VAT

⁴ Available from Engineering Contract Strategies Tel 011 803 3008, Fax 086 539 1902 or www.ecs.co.za.

C2 Pricing Data

C2.1 Pricing assumptions

Entries in the first four columns in the Price List are made either by the *Employer* or the tendering contractor

If the *Contractor* is to be paid an amount for the item which is not adjusted if the quantity of work in the item changes, the tenderer enters the amount in the Price column only; the Unit, Quantity and Rate columns being left blank.

If the *Contractor* is to be paid an amount for the item of work which is the rate for the work multiplied by the quantity completed, the tenderer enters the rate which is then multiplied by the expected quantity to produce the Price, which is also entered.

All Prices are to be shown excluding VAT unless instructed otherwise by the *Employer* in Tender Data or in an instruction the *Employer* has given before the tenderer enters his Prices.

If there is insufficient space in the Price List which follows, state in which document the Price List is contained.

C2.2 Price List

REPLACEMENT OF SERVICE WATER PIPELINE: BILL OF QUANTITIES

PLEASE SEE THE ATTACHED BOQ FOR THE PRICELIST AND TO BE COMPLETED.

C3: Scope of Work

C3.1 Works Information

Description of the works

Introduction

Service Water is tapped off from the main Raw Water supply line to the Water Treatment Plant and is conveyed via the Service Water pumps through two pipelines to the plant i.e., the East and West Service Water supply lines.

The Service Water pumps (three electrical and three diesel) share a common suction manifold that splits into three legs each supplying one set of pumps (i.e., one electrical and one diesel). Each pump discharge connects to the common discharge manifold and splits into the East and West Service Water supply lines. The East and West Service Water supply lines feed into two parallel lines that supply Service Water to units one to eight i.e., the header supplying the Air Heaters and Ash Plant and the header supplying the Boiler and Turbine tundishes.

The Service Water System supplies cooling water to the following systems/plants:

- Ash water sealing system
- Auxiliary cooling system
- Back up to fire system

The Service water pipework is severely corroded and needs to be replaced.

Supporting Clauses

Scope

Purpose

The Service water pipework is severely corroded and needs to be replaced.

Service Water Design Information:

- Medium: Raw Water
- Raw Water Quality:
 - pH - 7 - 11.5
 - K25 - 500
 - Na - 50ppm
 - SiO₂ - 20ppm
 - Mg - 20 - 100ppm
 - Cl - 20 - 100ppm
 - SO₄ - 100 - 400ppm
- Design Temperature: 30°C (Operating Temperature + 50%)
- Design Pressure: 1200kPa (Operating Pressure + 50%)
- Material: Carbon Steel A106B
- Pipe Schedule: Schedule 40
- NDE Requirements: As per construction code BS EN 13480 and 240-83539994 Standard for Non-Destructive Testing (NDT) on Eskom Plant
- Piping Design and Welding requirements: As per construction code BS EN 13480

Normative References

- 0.36/17010 - Service Water Pump System
- 0.36/13926 - Raw Water Treatment System
- 0.36/13938 - Service Water East System

- 0.36/13939 - Service Water West System
- 240-106365693 - Standard for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings
- 240-101712128: Standard for the Internal Corrosion Protection of Water Systems, Chemical Tanks and Vessels and Associated Piping with linings
- 240-106628253 - Standard for Welding Requirements on Eskom Plant
- 240- 56364545 - Structural Design and Engineering Standard
- ISO 12944 - Paints and Varnishes - Corrosion Protection of Steel
- ISO 146 - Hot Dip Galvanized Coatings on Fabricated Iron and Steel Articles
- EN 13480 - Metallic Industrial Piping
- EN 1092 - Flanges and their joints - Circular flanges for pipes, valves, fitting, and Accessories, PN designed
- BS 10 - Specification for flanges and bolting for pipes, valves, and fittings
- 240- 105020315 - Eskom Standard for Low Pressure Valves
- 240- 83539994 - Standard for Non-Destructive Testing (NDT) on Eskom Plant
- SANS 664-1 - Wedge gate and resilient seal valves for waterworks
- EN10204 - Metallic products - types of inspection certificates
- OHSA - Occupational Health and Safety Act South Africa No 85 and amendments

ABBREVIATIONS

Abbreviations ASTM	American Society for Testing and Materials
BS	British Standard
CW	Cooling Water
NDT	Non-Destructive Test
QC	Quality Control
QCP	Quality Control Plan
SOW	Scope of Work
Pipework	Refers to valves, pipes, flanges, strainers, gaskets, bolts, nuts, etc.

Scope of Work

The following scope of work is for the supply of material, fabrication, delivery, installation, and commissioning of the service water pipework. This replacement shall include all equipment required for the complete replacement of the pipework (e.g., valves, pipes, flanges, strainers, gaskets, bolts, nuts, etc).

The Service Water Pipework replacement scope will include the following:

- The Service Water Pumps Suction Header (00 PCB 10 BR 010) starting from the tap off from the Raw Water Pump suction line (00 GAC 50 BR 010)
- The suction pipework to each set of electrical and diesel pumps (00 PCB 21-23 BR 010 and 00 PCB 31-33 BR 010)

- East and West Service Water Supply pipework (00 PCB 11 BR 010 and 00 PCB 12 BR 010) starting from valves 00 PCB 11/12 AA 505

NB. The replacement must include both Service Water strainers (00 PCB 11/12 AT001), isolation valves 00 PCB 22 AA 506 and 00 SGA 40 AA 501/502

- Header supplying the Air Heaters and Ash Plant (01/02 PCB 20 BR 010)
- Header supplying the Boiler and Turbine tundishes (01/02 PCB 10 BR 010)
- Tap offs from the Header supplying the Air Heaters and Ash Plant and the Header supplying the Boiler and Turbine tundishes to each unit up to and including the first isolation valve per unit tap off
- Tap off to the East and West Ash Water Sealing System (01/02 PCB 23 BR 010)
- It should be noted that the proposed execution dates (subject to approval from National Control) for the scope of work is as follows:
 - Part 1: 15th to the 20th of December 2023
 - Part 2: 03rd to the 08th of January 2024

NB. The Contractor will be responsible for supplying all necessary lifting and rigging equipment necessary to execute the scope.

Pre-Preparation:

- All specifications to be confirmed by the Contractor prior to execution
- All documentation as per RTD/MAT/21/038: Protective Coating Specification – Camden Power Station: Service Water Piping (100NB – 800NB) must be given to Eskom for acceptance. This document can be found in Annexure D
- The contractor must comply with the information in Annexure A, which is the requirement criteria for corrosion protection paint and rubber lining applicators
- As part of the tender returnables, Annexure B must be completed by the contractors
- All material required for the replacement should be procured and delivered to site prior to commencement of the task
- All bends, end caps, T-pieces and reducers should be purchased and not fabricated
- Material Data Sheet and EN10204 3.1 cert to be supplied to the Client prior to execution
- Contractor to walk the plant and supply an as-built drawing of the existing plant for approval by the Client and the Welding Administrator
- The as-built drawing should include clear labels indicating all welds
- A bill of material must accompany the as-built drawing
- Scaffolding to be built for the entire length of pipe that will be replaced (where required)
- Once a detailed SOW is concluded, the Contractor must supply necessary QCP and Welding Procedures for approval prior to commencement

Service Water Pipe Specifications:

- All pipework shall conform to ASTM A234 WPB
- Material: Carbon Steel, Grade B Seamless Pipe
- Schedule 40
- Size: 4-inch, 10-inch, 12 inch and 18 inch
- Total Pipe Length (to be purchased in 6m lengths):
 - 4 inch = ± 100m
 - 10 inch = ± 1500m
 - 12 inch = ± 1000m
 - 18 inch = ± 20m

Flange Specifications:

- All flanges shall conform to BS 10: Table E or latest equivalent
- All flange sizes: 4-inch, 10-inch, 12 inch and 18 inch
- Flange Type: Forged Weld Neck Raised Face
- Material: Carbon Steel with EN10204 3.1 certification
- Bolts and Nuts: As per BS 10: Table E or latest equivalent, High Tensile Strength 8.8

Bends Specifications:

- All pipe material shall conform to ASTM A234 WPB
- Schedule 40
- Nominal Bore: 4-inch, 10-inch, 12 inch and 18 inches (Quantity to be verified)
- Material Data sheet and EN10204 3.1 cert to be supplied

T Piece

- Material ASTM A234 WPB
- Schedule 40
- Common Suction and Discharge Manifold:
 - > Equal T Piece = 10 inch
 - > Unequal T Piece: Main diameter =18-inch, Branch diameter = 12 inch
- Common Service Water Lines
 - > 12-inch inlet and outlet
 - > Centre to End should be 6 inches, this must be verified on plant
- Material Data sheet and EN 10204 3.1 cert to be supplied

Reducers:

- Material ASTM A234 WPB
- Schedule 40
- 6-inch inlet and 4-inch outlet, this must be verified
- Material Data sheet and EN10204 3.1 cert to be supplied

End Cap:

- Material ASTM A234 WPB
- Schedule 40
- 4-inch, 10-inch, 12 inch and 18 inches
- Material Data sheet and EN 10204 3.1 cert to be supplied

Gasket Specifications:

- 3mm Klingersil type C4430

Valve specs

- All valves must conform to 240 - 105020315 Eskom Standard for Low Pressure Valves
- 4-inch, 10-inch, 12 inch and 18-inch Gate Valve Rising spindle
- Raised face
- Resilient seat, ceramic coated
- PN16
- Flange drilled as per BS 10: Table E or latest equivalent

Service Water Strainer Specs:

- 2 x 10" duplex strainers – manufactured according to BS 10
- Material = Cast iron
- Flange height from ground = 345mm
- Flange to flange measurement = 1143mm
- Flange diameter = 406.4mm
- Flange thickness = 15.9mm
- Pipe outer diameter = 273mm

- No of holes on flange = 8
- Hole diameter = 22.2mm
- PCD = 355.6mm
- Strainer mesh size = 5mm
- Strainer material = Stainless steel

Installation:

- Remove existing Service Water pipework
- Install new pipework including all valves and fittings
- Weld flanges on new pipes
- All welding will be in line with the requirements of EN13480 and the Eskom welding requirements document 240-106628253 Standard for Welding Requirements on Eskom Plant

NB. NDT's to be conducted by an Eskom approved NDT company

- **All fit-up inspections must be conducted by Welding Inspector**
- **All final welds must be NDT as per 240-83539994 Standard for Non-Destructive Testing (NDT) on Eskom Plant**
- **Apply a corrosive resistant internal and external coating as per Eskom specification (see Annexure D)**

NB. Internal and external corrosion protection to comply with 240-106365693 - Standard for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings and 240-101712128: Standard for the Internal Corrosion Protection of Water Systems, Chemical Tanks and Vessels and Associated Piping with linings Install gaskets and flange pipe sections together by fastening nuts and bolts

- **Install valve were applicable**
- **QC to inspect each section of pipe once coupled together to ensure all bolts and nuts are fastened**
- **The new lines to be connected into the existing Service Water System**
- **Leak test line without removing scaffolding to identify leaks**

Proposed Execution Plan

Suction Header for Service Water Pump 3 and Interconnecting Isolating Valves Replacement:

Duration: 24 hours

- **Proposed start date:**
- Scope to be executed:
 - > The Service Water Pumps Suction Header (00 PCB 10 BR 010) starting from the tap off from the Raw Water Pump suction line (00 GAC 50 BR 010) up to and including valve 00 PCB 10 AA 502
 - > The suction pipework to Service Water electrical and diesel pump 3 (00 PCB 23 BR 010 and 00 PCB 33 BR 010)
 - > Isolating valves 00 PCB 11/12 AA 505, 00 PCB 22 AA 506, 00 SGA 40 AA 501/502, 01/02 PCB 20 AA 505 and 01/02 PCB 10 AA 501

Suction Header for Service Water Pump 1 and 2:

Duration: 48 hours

- **Proposed start date:**
- **Proposed end date:**
- Scope to be executed:
 - > The Service Water Pumps Suction Header (00 PCB 10 BR 010) starting after valve 00 PCB 10 AA 502 till the blank at the end of the pipeline
 - > The suction pipework to Service Water electrical and diesel pumps 1 and 2 (00 PCB 21/22 BR 010 and 00 PCB 31/32 BR 010)

West Service Water Supply Pipework Replacement:

Duration: 6 days

- **Proposed start date:**
- **Proposed end date:**
- Scope to be executed:
 - West Service Water Supply Line (00 PCB 12 BR 010) starting from Service Water strainer (00 PCB 12 AT001) up to and including the tie-ins to the Header supplying the Air Heaters and Ash Plant (02 PCB 20 BR 010) and the Header supplying the Boiler and Turbine tundishes (02 PCB 10 BR 010)
 - Header supplying the Air Heaters and Ash Plant (02 PCB 20 BR 010)
 - Header supplying the Boiler and Turbine tundishes (02 PCB 10 BR 010)
 - Tap offs from the Header supplying the Air Heaters and Ash Plant and the Header supplying the Boiler and Turbine tundishes to each unit (units 5-8) up to and including the first isolation valve per unit (units 5-8) tap off
 - Tap off to the West Ash Water Sealing System (02 PCB 23 BR 010) up to and including valve 02PCB 23 AA 501

East Side Station Shut Down:

Duration: 6 days

- **Proposed start date:**
- **Proposed end date:**
- Scope to be executed:
 - East Service Water Supply Line (00 PCB 11 BR 010) starting from Service Water strainer (00 PCB 11 AT001) up to and including the tie-ins to the Header supplying the Air Heaters and Ash Plant (01 PCB 20 BR 010) and the Header supplying the Boiler and Turbine tundishes (01 PCB 10 BR 010)
 - Header supplying the Air Heaters and Ash Plant (01 PCB 20 BR 010)
 - Header supplying the Boiler and Turbine tundishes (01 PCB 10 BR 010)
 - Tap offs from the Header supplying the Air Heaters and Ash Plant and the Header supplying the Boiler and Turbine tundishes to each unit (i.e., units 1-4) up to and including the first isolation valve per unit (i.e., units 1-4) tap off
 - Tap off to the East Ash Water Sealing System (01 PCB 23 BR 010) up to and including valve 01 PCB 23 AA 501

ANNEXURE A – REQUIREMENT CRITERIA FOR CORROSION PROTECTION PAINT AND RUBBER LINING APPLICATORS

REQUIREMENT CRITERIA FOR CORROSION PROTECTION PAINT AND RUBBER LINING APPLICATORS	
<p>Compiled By: Main Contractor Name:</p>	<p>Date: Company Representative Name: Title: Signature:</p>
<p>1. Quality Assurance Fully operational Quality Management System that meets the intent of ISO900. Required documentation to include:</p> <ul style="list-style-type: none"> ○ Quality Control check sheets to record paint batch numbers, psychrometric conditions, surface preparation, paint application and special tests as required. ○ Works Procedures ○ Daily Activity Reports ○ Quality Control Plans ○ Inspection and Test Plans ○ Contract/Works Programmes ○ Non-Conformance Reports ○ Release Certificates ○ Certificates of Conformance ○ Data Books <p>2. Personnel and Skills</p> <ul style="list-style-type: none"> ○ Appointed Site Manager / representative with project management skills. ○ Competent site supervisors qualified to SAQCC (Corrosion Protection) Module PS1 'General Painting Supervisors'. ○ Coating applicators/painters qualified to SAQCC (Corrosion Protection) Module PA1 'General Heavy Duty Coatings Applicator'. ○ Coating inspectors qualified to SAQCC (Corrosion Protection) 'Coating Inspectors' Level 1 (shop inspections) or Level 2 (site inspections) or NACE Coating Inspection Programme (CIP) ○ Sufficient personnel must be available to carry out the work within the required time frame. <p>3. Safety</p> <ul style="list-style-type: none"> ○ Appointed safety officer. ○ Fully comprehensive Safety File satisfying both the OHS Act as well as Construction Regulations. 	

REQUIREMENT CRITERIA FOR CORROSION PROTECTION PAINT AND RUBBER LINING APPLICATORS (Continued)		
Compiled By: Main Contractor Name:		Date: Company Representative Name: Title: Signature:
4. Facilities and Equipment		
Rating	Activity Type	Equipment
1	On-site patch repairs and top coats. Maintenance painting where abrasive blast cleaning and spraying not required or possible.	Mechanical Cleaning: needle guns, power wire brushes etc. Hand cleaning: wire brushes, scrapers, sand paper etc. Paint Applications: brushes and rollers.
2	Rating 1 activities + Abrasive blast cleaning and priming at fabricator's works or on site. Spraying of any or all coats.	Rating 1 equipment + Surface preparation: compressors, blast pots. Paint Applications: conventional and/or airless spray equipment.
3	Rating 1 & 2 activities + Working in confined areas such as tank linings, Cooling Water duct linings, penstock linings etc.	Rating 1 & 2 equipment + Blast media removal equipment, vacuum cleaners, high pressure water washers, dehumidifiers. Lighting and ventilation equipment. Additional qualified staff required when time constraints require night shifts.
5. Quality Control Testing Equipment		
<ul style="list-style-type: none"> ○ Hygrometer ○ Wet film thickness (WFT) gauge. ○ Depth profile gauge. ○ Surface temperature gauge. ○ Electronic dry film thickness (DFT) gauge. ○ Pin-hole detection equipment (low voltage wet sponge or high spark) as required. 		
6. Case Histories		
<ul style="list-style-type: none"> ○ Records of completed successful contracts. ○ List of major clients. 		

ANNEXURE B: CAPABILITY CHECKLIST FOR CORROSION PROTECTION PAINT AND RUBBER LINING APPLICATORS

CAPABILITY CHECKLIST FOR CORROSION PROTECTION PAINT AND RUBBER LINING APPLICATORS (Continued)		
Main Contractor:		
Company Representative Name and Title :		Date:
		Signature:
Applicator:		Report No:
Date of Evaluation:		Vendor Number:
Scope: Quality Management System compliance, facilities, equipment, skills & general rating.		
Requirements	Y/N	General Comments
1. Quality Assurance		
Is a Quality Management System in place		
QC check sheets		
Works Procedures		
Daily Activity Reports		
Quality Control Plans		
Inspection & Test Plans		
Contract/Works Programmes		
Non-Conformance Reports		
Release Certificates		
Certificates of Conformance		
Data Books		
Requirements	No:	
2. Personnel Skills		
Number of Site Managers on staff		
Number of Site Supervisors on staff		
Number of Site Supervisors qualified to SAQCC		
Number of Coating Applicators on staff		
Number of Coating Applicators qualified to SAQCC		
Number of Coating Inspectors on staff		
Number of Coating Inspectors qualified to SAQCC		
Sufficient personnel to carry out the contract		

CAPABILITY CHECKLIST FOR CORROSION PROTECTION PAINT AND RUBBER LINING APPLICATORS (Continued)		
Main Contractor:		
Company Representative Name and Title :		Date:
		Signature:
Applicator:		Report No:
Date of Evaluation:		Vendor Number:
Requirements	Y/N	General Comments
3. Safety		
Is there an appointed Safety Officer		
Is there a comprehensive Safety File		
Requirements		General Comments
4. Facilities & Equipment		
Surface Preparation Equipment:		
Hand Cleaning:		
Wire brushes		
Scrapers		
Sand paper		
Chipping hammers		
Power Cleaning: (electrical or pneumatic)		
Needle guns		
Power wire brushes		
Power sanders		
Abrasive Blast Cleaning:		
Compressors		
Blast pots		
Hoses and nozzles		
Water Cleaning:		
High Pressure cleaning equipment 68 - 680 bar (1 000 – 10 000 psi)		
Ultra High Pressure cleaning equipment 2 000 – 2 500 bar range (30 000 – 36 000 psi)		

CAPABILITY CHECKLIST FOR CORROSION PROTECTION PAINT AND RUBBER LINING APPLICATORS (Continued)		
Main Contractor:		
Company Representative Name and Title :		Date:
		Signature:
Applicator:		Report No:
Date of Evaluation:		Vendor Number:
Requirements	Y/N	General Comments
Lining Application		
Brushes		
Rollers		
Conventional spray equipment		
Airless spray equipment		
Specialised Equipment		
Media removal equipment (conveyors etc)		
Vacuum cleaners		
Dehumidifying equipment		
Lighting equipment		
Ventilation equipment		
Requirements	Y/N	General Comments
5. Quality Control Testing Equipment		
Hygrometer		
Wet film thickness (WFT) gauges		
Depth profile gauge (or Testex tape)		
Surface temperature gauge		
Electronic dry film thickness (DFT) gauge		
Pin-hole detection equipment (wet sponge/high spark)		
Requirements	No:	General Comments
6. Relevant i.e. comparable Case Histories		
Requirements		
Rating		
Does the applicator qualify for rating 1, 2 or 3. Specifically with respect to item "4. Facilities and Equipment" in Annexure A "REQUIREMENT CRITERIA FOR CORROSION PROTECTION PAINT AND RUBBER LINING APPLICATORS" sheet.		

ANNEXURE C: QUESTIONNAIRE FOR THE SELECTION OF SUITABLE ORGANIC LINING SYSTEM/RUBBER LINING FOR THE INTERNAL CORROSION PROTECTION OF WATER SYSTEMS, CHEMICAL TANKS AND VESSELS AND ASSOCIATED PIPING

The selection of the required organic lining system or rubber lining compound for immersed service is directly dependent upon the properties of the liquid being contained. Each specific liquid will require a specific organic lining or lining compound and it must never be assumed that similar liquids are in fact the same. In the case of rubber lining SANS 1198 'The manufacture of rubber sheeting for rubber lining' covers the requirements for the manufacture of rubber sheeting of soft and hard (ebonite) rubber for lining of pipes and pipe fittings of diameter at least 25 mm, and other metal or concrete equipment. It includes a classification of the linings that enables the requirements to be specified by a line call-out.

The following information is required by the paint applicator/rubber lining applicator to select the suitable lining or compile the required line call-out for the rubber compound to be used.

1.0 LOCATION OF COMPONENT	
1.1 Name of power station	Camden P/S
1.2 Component Identification i.e. Plant Code	Service Water Pipework
2.0 COMPONENT DETAILS	
2.1 Capacity of Component	
2.2 Dimensions	
2.3 No of access man-holes	
2.4 Size of access man-holes	
2.5 Location of access man-holes	
2.6 Diameter and length of pipework	(10", Length 50m) (12", Length 35m) (18", Length 20m)
2.7 Material of construction (mild steel etc.)	Carbon steel
2.8 Please provide A4 drawing of component with this questionnaire	
3.0 ACCESS COMPONENT	
3.1 Is access available to locate compressors and equipment next to the component?	Yes
3.2 If adjacent access is not available how long will air and spray hoses need to be?	
4.0 TYPE OF WORK	
4.1 New works – clean original steel	Replacement of service water pipework with new material
4.2 Maintenance work – previously lined	
4.3 Concrete i.e. Water retaining structures	
4.3.1 Are surfaces new, dry, cured, post	

service? 4.3.2 Is there spalling, cracking, exposed rebar? 4.3.2 What is allowable duration for lining activity?	7 days
4.4 Type and age of previous lining	Assumed galvanised steel
4.5 Condition of the previous lining	Pipelines are showing signs of corrosion both internally and externally
4.6 Total surface area to be lined (m ²)	
5.0 SURFACE PREPARATION	
5.1 Can abrasive blast cleaning be carried out inside the component/vessel/tank with consideration of access/confined space, ventilation etc.	
6.0 PROPERTIES OF LIQUID CONTAINED IN OR IN CONTACT WITH THE COMPONENT	
6.1 Acids/alkalis	
6.1.1 Type of acid/alkali	N/A
6.1.2 pH of acid/alkali	
6.1.3 Concentration of acid/alkali	
6.2 Organic liquids – organic acids, fats oils or solvents	
6.2.1 Type of organic liquid	N/A
6.2.2 pH of organic liquid	
6.3.3 Concentration of organic liquid	
6.3 Petroleum products – petrol, diesel etc	
6.3.1 Type of petroleum product	N/A
6.4 Water – type of water	
6.4.1 Potable water	In all cases a water analysis is required and shall contain the following parameters as a minimum; pH, Turbidity (FTUs), Conductivity ($\mu\text{S.cm}^{-1}$), Total aerobic bacteria (CFUs/ml), Total anaerobic bacteria (CFUs/ml), Chlorides (mg.kg^{-1}), Sulphate (mg.kg^{-1}). A range of analysis (min, max, average) is required for each of the parameters.
6.4.2 Cooling Water	
6.4.3 Raw water (with micro-organisms?) X	
6.4.4 Water treatment process waters (provide specific composition/concentration) i.e. % hydrochloric acid, sulphuric acid, caustic soda, ammonia, etc.)	
6.4.5 Distilled/demineralised/de-ionised	
6.4.6 Condensate	
6.5 Temperature & Pressure of liquid	

6.5.1 Normal operating temperature	Ambient = approx. 14 deg C
6.5.2 Maximum or peak temperatures	40 deg C
6.5.3 Minimum temperatures	-4 deg C
6.5.4 Pressure of Liquid	600 - 800kPa
6.5.5 Maximum pressure of liquid	800 kPa
6.5.6 Flow rate of liquid	
6.5.7 Will vacuum conditions occur?	No
6.7 If applicable, abrasion characteristics of the liquid	
6.7.1 Provide information of content, particle size, and physical characteristics of abrasive suspended matter likely to be present	<ul style="list-style-type: none"> • Raw Water Quality: o pH - 7 - 11.5 o K2S - 500 o Na - 50ppm o SiO2 - 20ppm o Mg - 20 - 100ppm o Cl - 20 - 100ppm o SO4 - 100 - 400ppm
7.0 OPERATION OF COMPONENT	
7.1 Is the component operated on a continuous or batch process basis	Continuous
7.2 Ion exchange vessels	Specifics to be provided as per points 6.4 and 6.5 above for both the process condition as well as the regen condition in the same vessel.
7.3 Will the applied lining be subjected to any thermal shock, if so describe the operation.	No
8.0 GENERAL	
8.1 Provide any further information considered relevant to ensure the selection of the most appropriate organic lining/rubber lining material i.e. photographs of previous components/coating condition	
8.2 In the case of refurbishment work what is the shut-down period during which this lining work must be carried out (number of days)	
8.3 Provide information and details of whether corrosion protection by lining will interface with areas such as flanges, crevices and transition areas to other protective lining systems which would necessitate specific consideration. Schematics, photographs or appropriate drawings will be required to provide specific recommendations.	

Note: In the case of refurbished components all mechanical and welding repairs must be carried out before any lining applications are started.

ANNEXURE D: RTD/MAT/21/038: PROTECTIVE COATING SPECIFICATION – CAMDEN POWER STATION: SERVICE WATER PIPING (100NB – 800NB)

To be considered as Annexure D of 240-101712128 and 240-106365693: Specifications for the Internal & External Corrosion Protection of Water Systems, Chemical Tanks and Vessels and Associated Piping with Coatings	
Component/s	Piping, Associated Pumps, Valves and Flanged surfaces. All piping and associated piping fittings (i.e. as spool pieces, T-pieces, bends, end caps and etc.) in the range from 100NB – 800NB. Multiple straight lengths up to 6 metres. Typically new piping will be corrosion protected off site..
<u>Internal Immersed</u> (Material/Substrate)	New carbon steel (mill scale). For new steel there is a high probability of oil contamination due to the manufacturing process. (Refer to relevant sections below)
<u>Internal Immersed</u> (Environment)	<ul style="list-style-type: none"> • Operating Temperature: -4°C – 40°C • Pressure: 600 – 800 kPa • Flow rates of up to 0.1m³/s. • pH: 7 to 11.5 • Medium: Cooling Water (CW) • Conductivity (K) < 500 µS • Chloride 20 - 100 mg.kg⁻¹ as Cl • Magnesium 20 – 100 mg.kg⁻¹ as Mg • Sodium < 500 mg.kg⁻¹ as Na • Sulphate 100 - 400 mg.kg⁻¹ • SiO₂ 20 mg.kg⁻¹ •
<u>Internal Immersed</u> (Surface Preparation and coating)	Abrasive blast clean to Grade Sa 3 (ISO 8501-1). The surface profile as specified by the coating manufacturer.

<u>Generic System</u>	Solvent Free Epoxy
First Coat	Apply by airless spray/pipe coater; one coat Two Component Solvent Free Amine Cured Epoxy coating from 350 - 450 micron. Thinning in excess of 5% shall not be permitted.
Stripe Coat	After allowing sufficient time (as recommended by coating manufacturer) for the first coat to cure, all accessible edges, weld seams, bolt holes and other crucial areas shall be given an additional stripe coat by brush.
Final Coat	After allowing sufficient time for the first coat and stripe coating to cure, the manufacturer's recommendations shall be adhered to in this regard, apply by airless spray/pipe coater; one coat Two Component Solvent Free Amine Cured Epoxy coating from 350 - 450 micron. Total System Minimum Dry Film Thickness (DFT) = 700 microns.
<u>External</u> (Material/Substrate)	New carbon steel (mill scale) OR previously epoxy/urethane coated. For new steel there is a high probability of oil contamination due to the manufacturing process. (Refer to relevant sections below).
<u>External</u> (Environment)	<ul style="list-style-type: none"> • Non-Aggressive Indoors/Outdoors • Ambient Temperature
<u>External</u> (Surface Preparation and coating)	Abrasive blast-clean to Grade Sa 2.5 (ISO 8501-1). The surface profile as specified by the coating manufacturer.

<u>Generic System</u>	Primer and intermediate coats = Twin Pack Polyamide Cured Epoxy. Finishing coat = High Build Re-coatable Polyurethane Acrylic.
Primer Coat	Apply by spray, one coat Twin Pack Polyamide Cured Epoxy Primer from 60 to 80 microns.
Stripe Coat	After allowing sufficient time (as recommended by coating manufacturer) for the first coat to cure, all edges, weld seams, bolt holes and other crucial areas shall be given an additional stripe coat with the same material as the following coat.
Intermediate Coat	Allowing sufficient time for the primer coat and stripe coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply by spray, one coat Twin Pack, High Build Polyamide Cured Epoxy Intermediate Coat from 120 to 150 microns.
Final Coat	Allowing sufficient time for the intermediate coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply by spray, one coat Twin Pack, High Build Recoatable Polyurethane Acrylic Finish from 50 to 60 microns. Total System Minimum DFT = 230 to 290 microns. The colour of the final/finishing coat shall be as per the requirements of 240-145581571: Standard for the Identification of the Contents of Pipelines and Vessels.
With respect to aspects not mentioned in the above coating specification table (e.g. mixing ratios, pot life, straining, thinning, induction times, over-coating and curing times), the manufacturer's recommendations shall be strictly adhered to.	

This specification caters for, and is applicable to new pipe, old pipe, off-site, on-site, in-situ corrosion protection by coatings of piping 100NB – 800NB. The applicable requirements for each of the above cases as included in this shall apply.

Specific Project Requirements:

1. The piping is new carbon steel. Corrosion protection shall be by abrasive grit blasting (surface preparation) followed by coating.
2. At all times care shall be taken to ensure adequate protection of any surfaces and parts of components or systems not requiring blast cleaning and coating (as an example valve seats/trim, pump inlets) and every effort shall be taken to prevent grit, water and other dirt entering drain systems, tank/vessel inlet/outlet piping or settling on isolating valves seats, shafts etc.
3. Equipment name plates and identification plates shall be protected from coatings. No coatings shall be applied over any surfaces where these will adversely affect the performance of the item or component.
4. All materials, i.e. paint, solvents and cleaning agents for a specific paint system shall be supplied by the same manufacturer. The solvents used shall be those recommended and manufactured by the paint manufacturer. Where the recommended 'solvent' and 'clean-up thinners' for a material differs, the 'clean-up' solvent must not be added to the paint for dilution purposes.
5. The method of surface preparation and coating application shall be by either (1) centrifugal spinning or by (2) "Pipe blaster" and "Pipe coater" as detailed further below. The centrifugal spinning technique is a technique whereby a spinning disc, brush or other device is used to firstly abrasive blast the substrate and secondly to atomise and coat the pipe internal surface. In both cases the blast and coating heads are attached to a retractable lance/boom that is fed all the way through the length of the pipe and then pulled back out of the pipe at a predetermined speed.
6. The selection of techniques/methods depends on the length and diameter range, new or old pipe, location of works i.e. on-site (possibly existing/in-situ) or at the contractors works/shop/yard. Typically the first technique is used where there are multiple lengths

of piping in excess of 6 metres.

7. The second technique is used for limited quantities and/or shorter lengths and smaller diameters for in-situ pipe and/or piping fittings. Furthermore the selection may be a combination of either technique/method depending, on geometries and diameters and whether either straight piping or fittings.
8. The technique/method shall be agreed between the contractor and coating manufacturer and presented in the Method Statement as required further below. The Method Statement shall be reviewed by Eskom for acceptance prior to commencement of any work.
9. Corrosion Protection shall only proceed once all mechanical fabrication/manufacturing activities i.e. cutting and welding have been completed and released in terms of the manufacturing/fabrication Quality Control Plan (QCP).
10. Prior to any surface preparation all surfaces that are, or are likely to be contaminated with oil or grease as a result of the service conditions or fabrication/manufacturing process (new pipe) shall be solvent cleaned with a suitable water-soluble biodegradable alkaline cleaner/detergent or with appropriate organic solvents.
11. Cleaning may be performed by using rags (for small areas), an immersion tank (for small items) or a spray gun (for large areas). The detergent/solvent-cleaned surfaces shall then be thoroughly washed down with fresh/clean water ensuring that the oil-water emulsion formed is completely removed from the metal.
12. Degreased and water washed surfaces shall be checked for residual oil and grease using the atomized water spray test and further degreasing shall be carried out if residual oil or grease is found to be present.
13. A black light test shall be used to check for oil contamination. Zero oil and grease contamination is the acceptable limit. Washing with fresh/clean water containing a suitable degreasing agent of partially painted components shall take place between coats, if surfaces are found to be contaminated.

14. Internal surface preparation by abrasive blasting shall be performed by means of a "pipe blaster" i.e. a self-centralising device with a hollow tipped blasting nozzle capable of removing mill scale, old coating, rust and suitably preparing the substrate to the required cleanliness of Grade Sa 3. Blasting nozzles with only forwards blasting characteristics shall not be permitted.
15. The contractor shall consider the means of ensuring that the device/mechanism as above is capable of manoeuvring around at least half of the bend radius. The blasting process shall be performed from both ends of the component.
16. Removal of dust and debris from the internal surfaces shall be performed by using dry, clean and oil free compressed air. The same method described above shall be used with a suitable nozzle capable of providing a forward angular air flow pattern uniformly around the entire circumference of the component.
17. The dust and debris removal process shall be performed from both ends of the component. The process shall be repeated until the required level of dust and debris removal is achieved.
18. Assessment of the blast cleanliness shall be by visual means as far as is accessible in the component end AND then by suitable length borescope/fiberscope to assess the cleanliness up to and including the bend.
19. Freedom of dust and debris shall be checked from both component ends as far as is accessible to perform the test. The level of cleanliness required shall be less than "dust quality rating" 2 when tested in accordance with ISO 8502-3.
20. Coating application by airless spray shall be performed by means of a "pipe coater" i.e. a self-centralising device with a fan spray tip/nozzle capable of providing a forward angular spray pattern uniformly around the entire circumference of the component. The process shall be performed from both ends of the component. Spray tips/nozzles with only forward spray characteristics shall not be permitted.
21. The contractor shall consider the means of ensuring that the device/mechanism as above is capable of manoeuvring around at least half of the bend radius.

22. Defects and pinholes (discussed later in greater detail) shall be recorded and the length where such defects are detected or observed shall be measured from the pipe end. An additional coat shall be applied in this area. Wherever possible and achievable the pinhole detection and general patch repairs shall be performed before final cure of the coating system. Repair of pinholes and coating damage after full cure will require surface preparation i.e. sanding/abrasion to provide a mechanical key for the repair. This would not be possible in piping where access is not possible.

General Requirements:

1. The contractor shall be wholly responsible for the surface preparation and coating application. The coated surfaces shall meet the DFT as required by this specification and aspects thereof in referenced documents.
2. Rounded edges are required in order to be able to apply the protective coating uniformly and to attain adequate coating DFTs on sharp edges, refer to ISO 12944-3 should more detail be required. All sharp edges from the original fabrication shall be rounded or chamfered and burrs around holes and along other cut edges shall be removed. All edges to be rounded off with a grinder to a radius of 3mm or more.
3. All sharp edges from the original fabrication shall be rounded or chamfered and burrs around holes and along other cut edges shall be removed. All edges to be rounded off with a grinder to a radius of 3mm or more
4. Weld beads with a surface irregularity exceeding 3mm or with sharp crests having a radius less than 3mm shall be ground.
5. Power and hand tool cleaning is only applicable to localised touch ups or patch repairs. Specific requirements for patch repairing a coating system are defined in section 4.8.6 of 240-101712128.
6. Hand-tool cleaning for isolated/localised areas may be utilised provided the required standard of finish is achieved. For all immersion applications final mechanical cleaning shall be by bristle blaster in order to create the required surface profile.
7. Cleaning by means of hand or power-tools, i.e. wire brushes, chipping hammers, scrapers, grinders, sanders, needle descalers, bristle blasters etc. may only be used

where accepted by the Eskom engineer and where the position and condition of the substrate metal is such that efficient cleaning and surface profile can be achieved and where the protective coating system is designed for application to brushed or ground surfaces i.e. specifically formulated surface tolerant coatings.

8. All welds shall be free of slag, slag inclusions and pinholes. Adjacent areas shall be free of weld spatter, which shall be removed by grinding or scraping.
9. Oil and grease deposits shall be removed prior to cleaning as detailed earlier in this specification. Special attention shall be paid to drillings, bolt holes, etc.
10. Burnishing of the surface shall not be permitted.
11. In all cases, after wire brushing or grinding, all traces of loose material shall be removed from the surface by compressed air (internally) and vacuum cleaning (externally). Cleaned surfaces shall not be contaminated with oil, grease, rust or other deposits before coating.
12. Different grades and types of blasting media exist. It is important that the correct abrasive be used in combination with a specific coating system to achieve the specified surface profile. The required blast profile height should be carefully considered. The contractor shall select an appropriate abrasive type and mesh size to attain the specified surface profile.
13. Only inert mineral grit or steel grit abrasives shall be used. Only steel grit may be used in sensitive plant areas such as Water Treatment Plants in order to ensure no contamination of plant processes due to excessive dust.
14. Sand or silica based abrasives shall not be used. Abrasive material for blast cleaning shall be used in line with local environmental regulations.
15. The abrasive shall be used in accordance to the manufacturer's specifications and shall be clean, sound, hard particles free from foreign substances such as dirt, oil, grease, toxic substances, organic matter and water soluble salts. It is important that good quality abrasives are used in order to minimize the amount of waste grit and dust generated and contamination of the surfaces.
16. The use of re-cycled blasting media for the final blast is strictly prohibited.

17. All abrasive media shall be stored in an area that is completely dry, covered and protected from weather.
18. The profile height of the blasted surfaces should be within the range of the specified coating system. Refer to the manufacturers Product Data Sheets. Unless otherwise specified by the coating manufacturer, a profile height of 25 microns to 90 microns is recommended for most coatings systems.
19. It is important that the blast profile does not exceed the specified DFT of the primer or first coat. Blast cleaning of severely corroded surfaces may result in high profiles i.e. > than 100 microns. In these cases, the primer or first coat shall be applied by brush/roller to ensure complete wet-out of the pitted/jagged surface. In addition a different primer or first coat may be required. However, agreement should be reached between the contractor and coating manufacturer as to the most suitable profile range, with due consideration of the application method, for a specific coating system.
20. The contractor shall consider and detail these potential scenarios or eventualities in the required Method Statement which shall be reviewed by Eskom for acceptance/rejection prior to any work. Ultimately, the contractor shall be responsible for any risk that could arise or be attributed to this choice.
21. The requirement for surface preparation of all metallic surfaces for immersion conditions or internal surface is strictly Grade Sa 3 (ISO 8501-1), in which case the surfaces shall be blast cleaned to white metal where all traces of rust, mill scale and other foreign matter are removed.
22. In general, Grade Sa 2 ½ (ISO 8501-1), i.e. very thorough blast cleaning where at least 95% of the mill scale, rust and other matter is removed, is specified in the case of most external protective coating systems for atmospheric exposure.
23. All compressed air for blasting activities shall be free from entrained moisture and oil. All traps shall be in a functional condition. The compressed air shall be tested at regular intervals using clean white clothes to assess cleanliness and dryness. This requirement shall be included in the QCP.
24. After external surface preparation, all dust, grit blasting media or any other deleterious matter shall be removed from the surfaces by vacuuming. In the case of small

components and small bore piping compressed air shall be used to blow all dust/debris out of the pipe. The process shall be repeated until the required level of dust and debris removal is achieved. It is imperative that all surface dirt and contaminants are completely removed before coating or the adhesion of the coating shall be impaired.

25. Cleaned surfaces shall not be contaminated with oil, grease, rust or other deposits before coating. Unnecessary traffic prior to painting shall be avoided.
26. Immediately before coating, blast cleaned steel shall not exhibit more than "dust quantity rating" 2 when tested in accordance with ISO 8502-3.
27. The contractor shall ensure that during surface preparation and coating activities the relative humidity (RH) in open, undercover shop environments is less than 80% RH and for tank/vessels (confined spaces) is less than 60% RH. Ambient temperatures shall be between 5°C and 30°C or as per the manufacturer recommendations, whichever is the more stringent. The maximum/minimum substrate temperature at the time of coating application shall be strictly in accordance with the product data sheet. During stable weather conditions environmental parameters shall be measured and recorded at least 4 times per shift.
28. During periods of inclement or cold weather conditions the environmental parameters shall be measured and recorded hourly. In the event that the latest two readings of any of the parameters indicate a deteriorating trend which would likely exceed parameter/s limit then no final surface preparation or spray application shall be permitted. All measurements shall be recorded at the steel surface. Dew point requirements shall be as per the Product Datasheet or 240-101712128.
29. For all inspections of all surface preparation and coating activities the surfaces shall be clean allowing unhindered visual access to the surface. The contractor shall provide sufficient and adequate lighting (Cool White) to enable inspections. Cell phone lighting is not acceptable.
30. In order to avoid recontamination and flash rusting of the surfaces, the primer or first coat shall be applied within 8 hours after final surface preparation of the steel surfaces. Under no circumstances shall the blast be permitted to stand overnight.
31. Many modern organic coatings can be applied without the use of a primer. However,

should a primer coat be required for holding of the blast, or otherwise, the contractor shall indicate/describe the reasoning for the need of such a primer i.e. as a holding primer or as a means of enhancing adhesion of the system. Details shall be provided in the Method Statement for the type of primer, generic resin, solvent borne or free, maximum DFT and compatibility with subsequent coats. The detailed Method Statement shall be submitted and reviewed by Eskom for acceptance/rejection prior to any work. Ultimately, the contractor shall be responsible for any risk that could arise or be attributed to this choice.

32. After allowing sufficient time for the first coat to cure, all edges, weld seams, bolts and nuts, and other crucial areas shall be given an additional stripe coat, by brush application, with the same material as the following coat. Should the use of a primer be omitted, stripe coating shall be carried out between applications of the first coat and the subsequent coat.
33. Multiple coats shall be applied as per the table at the top of this specification. Single coat systems are not permissible.
34. Where more than one coat is applied, the colour of each coat shall be different from the previous coat. In the case where aesthetic requirements are secondary, repairs after final testing shall be carried out using a different colour.
35. In other cases two finishing coats of the same colour may be applied to achieve complete colour uniformity. All finishing colours for external surfaces shall be in accordance with the Eskom requirements; 240-145581571: Standard for the Identification of the Contents of Pipelines.
36. Where more than one coat is being applied in an open exposed yard environment, surface preparation and washing shall be carried out between coats. Where the coating has completely cured or allowed to age before finishing, before application of a subsequent coat the surface shall be prepared by light sanding, scrubbing with potable water using a bristle brush and drying before over-coating.
37. Application of subsequent coats shall be in accordance with the specified system. The required over-coating intervals as mentioned in the latest Product Data Sheet shall be observed and adhered to.

38. The number of coats and DFT per coat required to achieve the total film DFT shall be agreed between the contractor and coating manufacturer and will be dependent upon the method of application chosen.
39. The total DFT of the applied coating system shall comply with the recommended minimum and maximum DFT limits as recommended in the latest Product System Data Sheet and this specification.
40. The range of DFTs of each coat shall be as follows; 90% of random readings shall be equal to or greater than the minimum specified DFT. No individual reading shall be less than 80% of the specified DFT. In the case of solvent borne coatings no individual reading shall be greater than 150% of the manufacturer's maximum specified DFT. All deficient film DFTs shall be rectified prior to release.
41. The coating shall be evenly applied to form a smooth, continuous, unbroken layer free from misses, sags, runs, tears and other defects that could affect the integrity of the coating.
42. Unless otherwise instructed by the Eskom engineer for flange surfaces at least one coat of the coating system shall be brought around onto a third of the surface area of the flange face. In the case of flange face (gramophone surface finish) with compressed fibre gaskets, blasting and coating is not permitted.
43. The contractor shall perform pinhole detection using appropriate "spark" testing equipment at a voltage setting as per the coating manufacturer's requirements. Wet sponge testing shall not be acceptable.
44. It is imperative that wherever possible pinhole detection and general patch repairs are to be performed before final cure of the coating system.
45. With the exception of access limitations or as instructed by the Eskom engineer all areas of coating damage shall be patch repaired by brush application. The extent of the damage shall be carefully inspected to assess which coats in the system have been damaged and which surface preparation methods are most suitable and appropriate. The Eskom engineer shall accept/reject the contractor's recommended method of surface preparation i.e. mechanical power and hand tool cleaning. When more widespread repairs are required and when the damage extends to the steel substrate

abrasive blast cleaning to Grade Sa 3 (ISO 8501-1) is required.

46. All coats in the system shall be re-instated. Areas to be primed shall be cleaned of dust, dirt, grease, salts or other deleterious matter and all edges of existing paint shall be feathered back to a hard edge. The patch primer used shall be in accordance with the requirements of the relevant coating system.
47. The over-coating onto an existing coating by subsequent intermediate and finishing coats (where applicable) shall be stepped at 25 mm intervals to produce a feathered edge. Specifics of such instances shall be assessed on a case by case basis.
48. All shop coated surfaces shall be inspected and examined for coating damage on arrival at site. If the damage is excessive it may be preferable to repair the transport damage before installation/assembly/erection whilst access is easier.
49. Provision shall also be made for the repair of handling damage to the coating after installation/assembly/erection/scaffolding removal. Spot repairs shall reinstate each of the previous coats and shall commence directly after surface preparation.
50. All immersed surfaces shall be pinhole tested (only after completion of all handling, moving and equipment and scaffolding removal) to ensure the coating is pinhole free and if required additional repairs shall be performed and once cured then the repair areas shall be retested. The process to be repeated until a pinhole free coating is achieved.
51. After completion of the coating activities sufficient curing time of the coating system shall be given prior to immersion as per the requirements of the Product Data Sheet. Accelerated curing is not permitted. All coated surfaces shall be adequately ventilated until full cure has been achieved. At the end of the curing period and before immersion the full cure of the applied coating shall be verified by the contractor and/or coating manufacturer.

Safety Requirements and Considerations:

1. During the application of all coatings/linings, care shall be taken to ensure adequate ventilation and lighting, to allow for good visibility and proper curing of the coatings and to avoid/minimise health and safety risks.

2. Special care needs to be taken when working with all organic coatings. Prior to the use of any coating material, the Material Safety Data Sheets shall be obtained from the relevant coating manufacturer.
3. The contractor shall be familiar with the contents of these safety data sheets and ensure that the necessary safety precautions are taken in order to comply with local and national safety and health requirements such as the OHS Act.
4. The contractor shall ensure that the abrasive materials used conform to all National Health and Safety Standards.
5. Any solid waste materials or liquids stripped or generated during the coating operations shall be discarded in accordance with the requirements of the appropriate national and/or local authorities or the requirements of Eskom.
6. The contractor shall ensure compliance with all statutory regulations, municipal by-laws, etc. concerning pollution and the health and safety of personnel and/or members of the public who may be affected by the work. The contractor shall provide the personnel with the appropriate required PPE.
7. The contractor shall provide for all necessary safety precautions and risk assessments.
8. The contractor shall advise Eskom of all hazardous materials to be brought on site.
9. All painting materials on site shall be stored in designated areas in storage facilities that meet the storage requirements of the paint manufacturer and the safety requirements of the specific site. The contractor shall be responsible for the provision of appropriate storage/shipping containers as required.
10. These containers shall include the appropriate refrigeration/conditioning systems for temperature control. This requirement shall be dependent on where the container will be located (indoors/outdoors), typical ambient temperature for the particular season of the year and the maximum storage temperature limits as per the manufacturers recommendations.
11. The contractor's Safety File for the area to be worked it shall address all the hazardous activities of abrasive blast cleaning and spray painting. The contractor shall verify that the personnel carrying out these activities are suitably qualified.

Pre-job Method Statement and Quality Documentation review and acceptance:

1. The coating manufacturer/contractor shall supply individual product data sheet for all products, comprising the system which shall contain the following as a minimum:
 - A description of the generic type of paint.
 - Confirmation that the coating is suitable for the intended method of application.
 - Recommended and non-recommended uses.
 - Maximum recommended service temperature which shall be a minimum of 30% greater than the maximum temperatures as is indicated in the table at the top of this specification. The coating rating shall consider the above temperatures as continuous service i.e. not intermittently.
 - Chemical resistance limits.
 - Surface preparation.
2. Application conditions and details including but not limited to: application temperatures, dilutions, pot-life, application techniques and DFT for the particular application method, over-coating intervals, and curing times required before immersion.
3. Prior to the application of any of the corrosion protection systems, the Product Data Sheet/s shall be signed by the manufacturer and contractor. This is to ensure that the manufacturer is aware of this specification, the conditions under which it will be applied and to allow for technical back-up where required.
4. The signed Product Data Sheet/s shall be deemed to be a binding reference document (as part of the QCP). It shall be specific to this project any further/other subsequent revisions of the Product Data Sheet/s shall be submitted to Eskom for reacceptance clearly stating the variations/deviations. No further use/application of the related product, for this project, is permitted until acceptance is granted by Eskom.
5. A detailed Method Statement explaining all required steps as specified in this specification shall be provided at the time of tender. The steps to be considered includes:
 - Grease decontamination and washing.

- Soluble salt decontamination.
 - The reason for selection and then parameter setup for blasting and coating techniques i.e. conventional airless spray, dual/plural spray, "Pipe blaster, Pipe Coater", flow coating, pigging etc. shall also be included in the Method Statement.
 - Methods for dust and debris removal, maintaining and ensuring cleanliness between coats shall be described.
 - The Method Statement shall detail the precise sequence and breakdown of work areas/activities in order to apply the system with due consideration of dust contamination, and possible overspray onto adjacent surfaces still requiring additional coats.
 - The Method Statement shall also consider the most efficient methods and sequencing to avoid unnecessary delays between coats that may have an impact i.e. time required for removal of spent abrasive grit and dust/debris, delay due to material handling, time required to handle, rig and move the component etc.
 - All inspection interventions during and after completion of final coats shall be considered and included.
 - The detailed Method Statement shall be submitted to Eskom for review and acceptance/rejection prior to the commencement of any work. Eskom reserves the right to request further revision, clarification or additions in accordance with or as required by this specification.
6. The contractor shall submit a detailed, project specific QCP. The QCP shall be based on the detailed Method Statement and shall contain all intervention points and relevant criteria as per the information as described in the Product Data Sheet/s and this specification. Eskom reserves the right to request further revision, clarification or additions in accordance with or as required by this specification.
7. Under no circumstances shall any work be performed until the QCP and Method Statement have been accepted by the Eskom engineer.
8. The coating manufacturer shall provide technical surveys during the execution of the project. The contractor shall commit to this requirement in the Method Statement.

Reference Documents:

The Eskom Standards 240-106365693: Standard for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings and 240-101712128: Standard for the internal corrosion protection of water systems, Chemical Tanks and Vessels and Associated Piping with Coatings were compiled in 2016 and are due for revision in 2020. Since 2016 there have been changes in terms of the referenced documents i.e. some documents have been withdrawn, replaced or superseded. The following list of references shall apply in addition to the requirements of 240-106365693 and 240-101712128. The latest revision of the referenced standards shall apply.

Where conflict exists between any of these documents the more stringent requirement shall apply.

1. 240-101712128: Standard for the internal corrosion protection of water systems, Chemical Tanks and Vessels and Associated Piping with Coatings.
2. 240-106365693: Standard for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings.
3. 240-145581571: Standard for the Identification of the Contents of Pipelines.
4. BS EN ISO 16961: Petroleum, petrochemical and natural gas industries — Internal coating and coating of steel storage tanks.
5. ISO 9001: Quality Management Systems - "is defined as the international standard that specifies requirements for a quality management system (QMS). Organizations use the standard to demonstrate the ability to consistently provide products and services that meet customer and regulatory requirements."
6. ASTM D4414: Standard practice for measurement of wet film DFT by notch gauges.
7. ASTM D4541: Standard Method for Pull-off Strength of Coatings using Portable Adhesion Testers.
8. ASTM D5162: Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates.
9. ASTM E376: Measuring coating DFT by magnetic field or eddy current electro-

- magnetic test Methods.
10. ASTM F21: Standard Test Method for Hydrophobic Surface Films by the Atomizer Test.
 11. ISO 2409: Paints and varnishes – Cross cut test.
 12. ISO 4624: Paints and varnishes – Pull-off test for adhesion.
 13. ISO 4628 – 1: Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 1: General introduction and designation system.
 14. ISO 4628 – 3: Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 3: Assessment of degree of rusting.
 15. ISO 8501-1: Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings.
 16. ISO 8502-3: Preparation of steel substrates before application of paint and related products – Test for the assessment of surface cleanliness – Part 3: Assessment of dust on steel surfaces prepared for painting (pressure sensitive tape method).
 17. ISO 8502-6: Preparation of steel substrates before application of paint and related products – Test for the assessment of surface cleanliness – Part 6: Extraction of soluble contaminants for analysis – The Bresle method.
 18. ISO 8503-4: Preparation of steel substrates before application of paint and related products – Surface roughness characteristics of blast-cleaned steel substrates.
 19. Part 4: Method for the calibration of ISO surface profile comparators and for the determination of surface profile – Stylus instrument procedure. (May be used as an alternative to SANS 5772).
 20. ISO 12944-3: Paint and varnishes – Corrosion protection of steel structures by protective paint systems. Part 3: Design considerations.
 21. ISO 9223: Corrosion of metal and alloys – Corrosivity of atmospheres – Classification.

2. Drawings

Drawing number	Revision	Title
Not applicable		

3. Specifications

Title	Date or revision	Tick if publicly available
<u>General Specifications:</u>		
Health and Safety requirements		
Environmental requirements		
Site regulations and access control		
<u>Technical specifications:</u>		
As per the referenced documents (Annexures A-D)		

4. Constraints on how the Contractor Provides the Works

4.1 Meetings

Title of Meeting	Frequency	Location	Attendees
Progress and Feedback	Bi-weekly	Camden Power Station	PM/Contractor/Engineering/Others
SHEQ Meetings	As and when required	Camden Power Station	PM/Contractor/Engineering/Others
Early Warning / Risk Reduction	When an event arises	Camden Power Station	PM/Contractor/Engineering/Others
Compensation Events	When an event arises	Camden Power Station	PM/Contractor/Engineering/Others

4.2 Use of standard forms

Only the use of NEC3 ECSC standard forms/letters/templates is allowed by the Contractor in the administration of this contract in order for this contract obligations to be met.

4.3 Invoicing and payment

The Z clauses make reference to invoicing procedures stated here in this Works Information

In terms of core clause 50 the Contractor assesses the amount due and applies to the Employer for payment. The Contractor applies for payment with a tax invoice addressed to the Employer as follows:

The Contractor includes the following information on each tax invoice:

- Name and address of the Contractor
- The contract number and title.
- Contractor's VAT registration number.

- The *Employer's* VAT registration number 4740101508.
- The total Price for Work Done to Date which the *Contractor* has completed.
- Other amounts to be paid to the *Contractor*.
- Less amounts to be paid by or retained from the *Contractor*.
- The change in the amount due since the previous payment being the invoiced amount - excluding VAT, the VAT and including VAT.
- (Add other as required)

The *Contractor* attaches the detail assessment of the amount due to each tax invoice showing the Price for Work Done to Date for each item in the Price List for work which he has completed.

4.4 Records of Defined Cost

In order to substantiate the Defined Cost of compensation events, the *Employer* may require the *Contractor* to keep records of amounts paid by him for people employed by the *Contractor*, Plant and Materials, work subcontracted by the *Contractor* and Equipment. [See clause 11.2(5) and 63.2].

4.5 **BBBEE and preferencing scheme**

Specify constraints which *Contractor* must comply with after contract award in regard to any Broad Based Black Economic Empowerment (B-BBEE) or preferencing scheme measures.

4.7 Facilities to be provided by the *Contractor*

The *Contractor* will make provision for all temporary accesses and utilities required to ensure completion of the Works. This will include but is not limited to:

- Temporary access roads (if required)
- Provision for temporary site offices
- Provision for temporary supply of potable water and electricity (lighting). On-site water and electricity connection points will be provided
- Storage and/or stockpiling of construction material (if required)
- Shall make his own allowance for adequate ventilation of the work
- Telecommunication – the *Contractor* is responsible for all his telecommunication connections, rental, and any monthly phone bills
- Security – if the *Contractor* deems this necessary (the *Employer* is not held liable/responsible for any loss/damage of equipment or material)

4.9 Design by the *Contractor*

All the required designs (if applicable), manufacturing and installation works shall be in accordance with the Technical Specification 383-CMDN-AABZ28-SP0004-31

5. Requirements for the programme

The *Contractor* is to compile and submit a high-level detailed programme for the *Employer's* acceptance as per the contract requirements (two weeks before the starting date of the works). The detailed programme should be on MS Projects, this programme should show the starting dates, access dates, key dates, planned completion dates of activities and important milestones. To note would be the two units bag change that needs to be conducted off-load.

The programme needs to be updated weekly and sent to the Employer.

6. Services and other things provided by the *Employer*

The employer shall provide power, water, waste disposal areas, lighting and ablution. Any additional lighting requirements around the work area shall be provided by the *Contractor*. The *Contractor* shall provide everything else necessary for providing the Works.

The *Employer* will ensure access to the site for personnel qualifying as per the *Employers* requirements for access control.

The *Employer* will do the induction training for the *Contractor*.

Contractor has submitted the valid Certificate of Compliance.

The *Contractor* adheres to the site services requirements and procedure

Potable Water Supply

- The *Employer* supplies, free of charge, reasonable quantities of potable water required for the purposes of this contract from the existing points. The *Contractor* provides, at his own cost, all connection fittings, pipe work, temporary plumbing, and pumps necessary to lead the water from the *Employer's* points of supply to the various points where it is required.

Electrical Power Supply

- Power is available at the existing points.
- The *Contractor* provides his own portable 380V electrical distribution boards, and supply cables to and from the boards, for all his power supply requirements to execute the works.
- *Contractor's* Electrical Distribution Boards complies with OHSA as referred to in the Electrical Installation Regulations and the Electrical Machinery Regulations. Each board brought onto site has a Certificate of Compliance issued by an accredited person.
- The *Contractor's* electrical distribution boards are installed at the works on a time negotiated with the Supervisor, prior to the possession date.
- The *Employer* connects distribution boards to a 380V three-phase AC power supply, only after the *Contractor* has submitted the valid Certificate of Compliance. All *Contractors'* Electrical Distribution Boards are earthed to the steel structure of the plant.

Toilet Facilities

- The *Employer* provides the *Contractor* access to identified existing toilet facilities.

Medical Facilities

- The *Contractor* provides a First Aid service to his employees and sub-Contractors. In the case where these prove to be inadequate, like in the event of a serious injury, the *Employer's* Medical Centre and facilities will be available.

- Outside the Employer's office hours, the Employer's First Aid Services are only available for serious injuries and life threatening situations
- The *Employer* recovers the costs incurred, in the use of the above *Employer's* facilities, from the *Contractor*.

Site yard

- The *Employer* will provide a site for the *Contractor's* yard at a location that is indicated to the *Contractor*. The *Contractor* provides all the facilities required by him for such a site at his cost (Including fencing of area as per requirements).

The *Contractor* maintains the site to meet the requirements of the health and safety requirements as per the requirements of the *Project Manager*. The *Contractor* restores the site to its original state i.e , clean and no rubble. Inspection will be held by the *Supervisor* and signed off.

C4: Site Information

C4.1: Information about the *site* at time of tender which may affect the work in this contract

1. Access limitations

The *Contractor* makes his own assessment of, and allows in his rates for those access problems that may be encountered. No extra payment or claim of any kind is allowed on account of difficulties of access to the works, or for the requirement of working adjacent to or in the same area as others.

Access to site shall be in line with the Camden Power Station's access procedure. The *Contractor* shall be required to make an application to enter site for the duration of the contract, including the warranty and defect period. A permit shall only be issued once the *Contractor* has attended the safety induction and has undergone medical checks.

All the assets must be declared and registered with security upon entering site. This includes portable assets such as a laptop. The record must be kept on the OV18 form. No asset shall be removed from site if the OV18 form is not attached.

The *Contractor* shall have no claim against the *Employer* in respect of delay at the security main gate.

All *Contractors'* permits must be returned to Protective Services on completion of the works.

Equipment

Any equipment, or appliances, used by the *Contractor* conforms to the applicable OHS Act safety standards and is maintained in a safe and proper working condition. The *Project Manager* has the right to stop the *Contractor's* use of any equipment which, in the opinion of *Project Manager*, does not conform to the foregoing.

Off-loading and material handling equipment is not available on site and if required, is to be provided by the *Contractor*.

Site Regulations

Note that the speed limit on the site is 40 Km/h. The vehicle permit of any persons contravening any traffic act on site is cancelled.

The *Contractor* complies with the Camden Site Regulations, a copy of which is available for perusal at the *Project Manager's* offices.

Any subject within the authority of the *Project Manager* may be addressed by a Site Regulation. Before work starts on site, an inaugural meeting is held with the *Contractor* and the *Project Manager* to explain all requirements of the Site Regulations.

The *Contractor* allocates staff to be trained and authorised as Responsible Persons according to *Employer's* Plant Safety Regulations and/or High Voltage Regulations. These Responsible Persons are available on site as and when required to take out permits to work.

Permits

Daily meetings shall be held and chaired by the production department to discuss the next days permit requirements. All permit requests are required by 15.00 on the day prior to the permit being required. A 'no work' period between 06.00 and 07:00 is enforced during which the requested changes to the permit take place.

No work commences without the acceptance of the permit to work by the *Contractor's* responsible person and all workers sign the workman's register. The *Contractor* arranges for three people to be appointed as responsible persons for permit requirements. The plant safety regulations course can be done at any Eskom power station but the practical course is Camden specific.

Accommodation and Transportation

The *Contractor* provides his own accommodation and transport for all his employees engaged in the execution of the works. This includes the needs of his subcontractors. The cost for accommodation, as well as for transportation to and from site is included in the Prices. No accommodation is available at Camden Power Station.

Security

The *Contractor* provides security necessary for the protection of the works at all times until the completion of the whole of the works.

The *Contractor* is informed of the access procedures through Site Regulations and note that such procedures may change depending on the prevailing security situation.

All persons entering the Camden site pass through the control points at the main access gate and are required to have temporary permits that are issued to *Contractor's* staff on request. All persons submit ID documents with the application for temporary permits. If it is necessary to bring equipment onto site a list is submitted which is verified by security staff prior to equipment entering the security area.

If any *Contractor's* staff are transferred from Camden or leave site, the person's permit is handed over to the *Supervisor*. The *Contractor* ensures that personnel leaving site are transported out of the security area and that the permit is returned.

No firearms, weapons, alcohol, illegal substances and cameras (including cell phones with cameras) are permitted on site. Any person suspected of being under the influence of alcohol is tested and if proved positive, is refused entry to the security area.

No "private work" is carried out for or on behalf of any Eskom employee.

The generator area and the other units are barricaded and out of bounds and only authorised persons are permitted. Areas outside the site are out of bounds to the *Contractor's* staff.

Under no circumstances shall the *Contractor* recruit outside Camden Power Station's security gate. An applicable local office for recruitment shall be used.

Safety

The *Contractor* implements a safety plan and maintains the safety system until the completion of the whole of the works. The plan, will as a minimum, contain PPE information, written safe work procedures, job specific risk assessments, safety meetings, etc. The plan will be to the *Employer's* satisfaction and will be accepted prior to the commencement of any work.

The *Contractor* will be subject to periodic audits by the *Employer* in order to ensure compliance with the plan. Any deviations will be corrected to the *Employer's* satisfaction.

The *employer* has the right to stop the *Contractor's* work activities which, in the opinion of *employer*, is unsafe. The *Contractor* may only continue with work activities when all safety deficiencies have been corrected to the *Project Manager's* satisfaction. The *Contractor* shall have no claim against the *Employer* in respect of delay due to the above.

ENVIRONMENT

The *Contractor* shall comply with Camden Power Station's environmental management system. This includes the identification, collection, storage, transportation and disposal of waste. Hazardous waste shall be disposed off in line with the applicable environmental legislation. It is important to note that all spillages must be cleaned immediately and reported to the *employer* as soon as possible. It is the responsibility of the polluter to clean all spillages and for the rehabilitation of the polluted land.