



NEC3 Engineering & Construction Contract

Between **ESKOM HOLDINGS SOC Ltd**
(Reg No. 2002/015527/30)

and **[Insert at award stage]**
(Reg No. _____)

for **Kriel Power Station Coal Bunkers CO Gas Monitors Installation
and Interface to WinCC and DCS SCADA Systems (Units 1-6)**

Contents:	No of pages
Part C1 Agreements & Contract Data	[•]
Part C2 Pricing Data	[•]
Part C3 Scope of Work	[•]
Part C4 Site Information	[•]

CONTRACT No. [Insert at award stage]

Part C1: Agreements & Contract Data

Contents:	No of pages
C1.1 Form of Offer and Acceptance	[•]
[to be inserted from Returnable Documents at award stage]	
C1.2a Contract Data provided by the <i>Employer</i>	[•]
C1.2b Contract Data provided by the <i>Contractor</i>	[•]
[to be inserted from Returnable Documents at award stage]	
C1.3 Proforma Guarantees	[•]

C1.1 Form of Offer & Acceptance

Offer

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

KRIEL POWER STATION COAL BUNKERS CO GAS MONITORS INSTALLATION AND INTERFACE TO WINCC AND DCS SCADA SYSTEMS (UNITS 1-6) FOR A PERIOD OF 10 MONTHS.

The tenderer, identified in the Offer signature block, has examined the documents listed in the Tender Data and addenda thereto 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.

Options A B, C or D	The offered total of the Prices exclusive of VAT is	R [•]
Option E or F	The first forecast of the total Defined Cost plus the Fee exclusive of VAT is	R [•]
	Sub total	R [•]
	Value Added Tax @ 15% is	R [•]
	The offered total of the amount due inclusive of VAT is ¹	R [•]
	(in words) [•]	

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance 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 (if applicable)

¹ This total is required by the *Employer* for budgeting purposes only. Actual amounts due will be assessed in terms of the *conditions of contract*.

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 C1	Agreements and Contract Data, (which includes this Form of Offer and Acceptance)
Part C2	Pricing Data
Part C3	Scope of Work: Works Information
Part C4	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 Returnable 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.

The tenderer shall within two weeks 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 original copy signed between them of this document, including the Schedule of Deviations (if any).

Unless the tenderer (now *Contractor*) within five working days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the Parties.

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 tenders, use another copy of this Form of Offer and Acceptance.

Schedule of Deviations to be completed by the *Employer* prior to contract award

Note:

1. 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	[•]	[•]
5	[•]	[•]
6	[•]	[•]
7	[•]	[•]

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*(Insert name and address of organisation)**(Insert name and address of organisation)*Name &
signature
of witness

Date

C1.2 ECC3 Contract Data

Part one - Data provided by the *Employer*

[Instructions to the contract compiler: (delete these two notes in the final draft of a contract)]

Completion of the data in full, according to the Options chosen, is essential to create a complete contract.

Clause	Statement	Data
1	General	
	The <i>conditions of contract</i> are the core clauses and the clauses for main Option	
	dispute resolution Option	A: Priced contract with activity schedule
	and secondary Options	W1: Dispute resolution procedure
		X2 Changes in the law
		X7: Delay damages
		X16: Retention
		X18: Limitation of liability
		Z: Additional conditions of contract
	of the NEC3 Engineering and Construction Contract, April 2013 (ECC3)	
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	The <i>Project Manager</i> is: (Name)	Simo Zondi
	Address	Kriel Power Station Private Bag x5009 Kriel 2271
	Tel	0176152122
	Fax	N/A
	e-mail	ZondiSo@eskom.co.za
11.2(13)	The <i>works</i> are	1. General

- The works comprise the complete design, supply, installation, integration, testing, commissioning and handover of Coal Bunkers Carbon Monoxide (CO) Gas Monitoring Systems for Units 1–6.
- Integration of the monitoring system into the existing control and SCADA systems.
- Execution of the works in accordance with NEC3 ECC Option A (Lump Sum with Activity Schedule).

2. Engineering and Design

- Detailed design of the CO Gas Monitoring System for all six units.
- Interface engineering to the existing SPPA-T3000 DCS.
- Interface engineering to the existing WinCC SCADA system.
- Preparation and submission of detailed design reports and data packs.
- Development of control logic, alarm philosophy and HMI displays.
- Submission of drawings and documentation for Employer approval.

3. Supply of Equipment

- Supply of CO Gas Analysers (VICOTEC412 sets) for coal bunkers (±30 units).
- Supply of S7 PLC I/O cards (analog and digital).
- Supply of junction boxes (minimum IP66, Zone 22 compliant).
- Supply of fibre optic cables, splice boxes and demarcation panels.
- Supply of stainless steel cable glands, terminal blocks and marshalling panels.
- Supply of alarm sirens and visual warning lights.

4. Installation Works

- Installation of CO gas detection units at Units 1–6 coal bunkers.
- Installation of junction boxes and marshalling panels.
- Installation of fibre optic communication infrastructure.
- Installation of cabling, trunking, conduits and cable racks where required.
- Cable termination, labelling and earthing in accordance with Eskom and SANS standards.
- Use of existing cable routes where practical.

5. Control and Instrumentation (C&I)

- Integration of field instruments into the existing DCS and SCADA systems.

- Configuration of analog and digital signals.
- Development and configuration of alarms and annunciations.
- HMI development and updates for CO monitoring signals.
- Loop checks, signal testing and diagnostics implementation.

6. Electrical Works

- Provision and installation of power supplies and electrical protections.
- Compliance with applicable SANS, IEC and Eskom electrical standards.
- Installation of cable glands and cable management systems.

7. Testing and Commissioning

- Factory Acceptance Testing (FAT).
- Site Acceptance Testing (SAT).
- Cold and hot commissioning.
- Calibration and performance verification of CO analysers.
- Testing of alarm sirens and visual warning systems from DCS.

8. Documentation and Handover

- Submission of as-built drawings (A0, A2 and electronic formats).
- Provision of operation and maintenance manuals.
- Backup of DCS and SCADA systems.
- Training of Employer personnel.
- Final handover of a fully operational CO Gas Monitoring System

9. Project Management and Compliance

- Full project management and supervision of the works.
- Compliance with Occupational Health and Safety Act and Eskom SHEQ requirements.
- Submission of method statements, risk assessments and quality documentation.
- Coordination of works in line with outage planning and operational requirements.

11.2(14)	The following matters will be included in the Risk Register	High CO Gas Exposure Procurement Delay
11.2(15)	The <i>boundaries of the site</i> are	Kriel Power Station Units
11.2(16)	The Site Information is in	Part 4: Site Information

11.2(19)	The Works Information is in	Part 3: Scope of Work and all documents and drawings to which it makes reference.	
12.2	The <i>law of the contract</i> is the law of	the Republic of South Africa	
13.1	The <i>language of this contract</i> is	English	
13.3	The <i>period for reply</i> is	2 weeks	
2	The <i>Contractor's</i> main responsibilities	Data required by this section of the core clauses is provided by the <i>Contractor</i> in Part 2 and terms in italics used in this section are identified elsewhere in this Contract Data.	
3	Time		
11.2(3)	The <i>completion date</i> for the whole of the works is	31 July 2027	
11.2(9)	The <i>key dates</i> and the <i>conditions</i> to be met are:	Condition to be met	key date
		1 Compliance with IEC, SANS and Eskom technical standards.	
		2 Equipment to meet Zone 22 and minimum IP66 requirements.	
		3 Accurate continuous CO monitoring with built-in diagnostics and alarms.	
		4 Full integration and functionality on SPPA-T3000 and WinCC.	
		5 Compatible PLC I/O and communication interfaces.	
		6 Proper cabling, termination and earthing to standard.	
		7 Successful FAT, SAT, loop checks and calibration before handover.	
30.1	The <i>access dates</i> are:	Part of the Site	Date
		1 Site Establishment	Within 10 days of contract award
		2 Safety File Approval	5 days after contract award
		3 Induction and Access Permit	2 days after safety file

		approval
31.1	The <i>Contractor</i> is to submit a first programme for acceptance within	Two weeks of the Contract Date.
31.2	The <i>starting date</i> is	Contract signature date (date of the last party signing the contract)
32.2	The <i>Contractor</i> submits revised programmes at intervals no longer than	One (1) week
35.1	The <i>Employer</i> is not willing to take over the <i>works</i> before the Completion Date.	If the defects are more than 50% of the section completed
4	Testing and Defects	
42.2	The <i>defects date</i> is	52 weeks after Completion of the whole of the <i>works</i> .
43.2	The <i>defect correction period</i> is	One week
	except that the <i>defect correction period</i> for	Failure of equipment during commissioning is 2 days
	and the <i>defect correction period</i> for	Failure of the whole system is 2 days
5	Payment	
50.1	The <i>assessment interval</i> is	on the 25th day of each successive month.
51.1	The <i>currency of this contract</i> is the	South African Rand.
51.2	The period within which payments are made is	1. 30 days for Contracts with a value less than R50M. 60 days for Contracts with a value greater than R50M.
51.4	The <i>interest rate</i> is	the publicly quoted prime rate of interest (calculated on a 365 day year) charged from time to time by the Standard Bank of South Africa Limited (as certified, in the event of any dispute, by any manager of such bank, whose appointment it shall not be necessary to prove) for amounts due in Rands and (ii) the LIBOR rate applicable at the time for amounts due in other currencies. LIBOR is the 6 month London Interbank Offered Rate quoted under the caption "Money Rates" in The Wall Street Journal for the applicable currency or if no rate is quoted for the currency in question then the rate for United States Dollars, and if no such rate appears in The Wall Street Journal then the rate as quoted by the Reuters Monitor Money Rates Service (or such service as may replace the Reuters Monitor Money Rates Service) on the due date for the payment in question, adjusted <i>mutatis mutandis</i> every 6 months thereafter and as certified, in the event of any dispute, by any manager employed in

the foreign exchange department of The Standard Bank of South Africa Limited, whose appointment it shall not be necessary to prove.

6 Compensation events

60.1(13) The place where weather is to be recorded is:

Areas surrounding Kriel Town; these include Kriel Power Station, Matla Power Station, Rietspruit, adjacent farm areas, etc.

The *weather measurements* to be recorded for each calendar month are,

Temp – Average monthly Temperatures in degrees. Number of days with min air temp will also be recorded.

Pressure – Average atmospheric pressure is the weight of the atmosphere overhead measured in Millibars.

Rainfall – cumulative monthly rainfall in millimetres (sum). The number of days with rain more than 10mm will be recorded.

Wind – Average monthly wind speed measured by metre per second (m/s).

RH (%) - Ratio of the partial pressure of water vapour to the equilibrium vapour pressure of water at a given temperature (average %).

The *weather measurements* are supplied by

Eskom Research, Testing and Development (RT&D)

The *weather data* are the records of past *weather measurements* for each calendar month which were recorded at:

Kriel village monitoring site which is located ±7.8km east of Kriel Power Station and is about 12km east-north-east of Matla Power Station respectively. It is situated centrally in the Kriel Town, on Eskom property at co-ordinates - 26.251193, 29.256426

and which are available from:

RT&D and included in Annexure A to this Contract Data provided by the *Employer*

60.1(13) Assumed values for the ten year return *weather data* for each *weather measurement* for each calendar month are:

As stated in Annexure A to this Contract Data provided by the *Employer*.

Note: If this arrangement is used, delete the rows above for 60.1(13) and delete this note.

7 Title

There is no reference to Contract Data in this section of the core clauses and terms in italics used in this section are identified elsewhere in this Contract Data.

8 Risks and insurance

80.1 These are additional *Employer's* risks

- 1. Labour Unrest**
- 2. Covid 19 restrictions**
- 3. Unavailability of Plant**

9	Termination	There is no reference to Contract Data in this section of the core clauses and terms in italics used in this section are identified elsewhere in this Contract Data.
10	Data for main Option clause	
A	Priced contract with activity schedule	There is no reference to Contract Data in this Option and terms in italics are identified elsewhere in this Contract Data.
60.6	The <i>method of measurement</i> is	. as stated in Part C2.1, Pricing Assumptions.
11	Data for Option W1	
W1.1	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	To be known once the dispute arises
	Tel No.	To be known once the dispute arises
	Fax No.	To be known once the dispute arises
	e-mail	To be known once the dispute arises
W1.2(3)	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.
W1.4(2)	The <i>tribunal</i> is:	arbitration.
W1.4(5)	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	Johannesburg 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.
12	Data for secondary Option clauses	
X2	Changes in the law	There is no reference to Contract Data in this Option and terms in italics are identified elsewhere in this Contract Data.

X7	Delay damages (but not if Option X5 is also used)	
X7.1	Delay damages for Completion of the whole of the <i>works</i> are	R10 000 per day up to a limit of 10% of the contract value
X16	Retention (not used with Option F)	
X16.1	The <i>retention free amount</i> is	90%
	The <i>retention percentage</i> is	10%
X18	Limitation of liability	
X18.1	The <i>Contractor's</i> liability to the <i>Employer</i> for indirect or consequential loss is limited to:	R0.0 (zero Rand)
X18.2	For any one event, the <i>Contractor's</i> liability to the <i>Employer</i> for loss of or damage to the <i>Employer's</i> property is limited to:	the amount of the deductibles relevant to the event
X18.3	The <i>Contractor's</i> liability for Defects due to his design which are not listed on the Defects Certificate is limited to	The greater of • the total of the Prices at the Contract Date and • the amounts excluded and unrecoverable from the <i>Employer's</i> assets policy for correcting the Defect (other than the resulting physical damage which is not excluded) plus the applicable deductible as at contract date.
X18.4	The <i>Contractor's</i> total liability to the <i>Employer</i> for all matters arising under or in connection with this contract, other than excluded matters, is limited to:	the total of the Prices other than for the additional excluded matters. The <i>Contractor's</i> total liability for the additional excluded matters is not limited. The additional excluded matters are amounts for which the <i>Contractor</i> is liable under this contract for • Defects due to his design which arise before the Defects Certificate is issued, • Defects due to manufacture and fabrication outside the Site, • loss of or damage to property (other than the <i>works</i>, Plant and Materials), • death of or injury to a person and • infringement of an intellectual property right.
X18.5	The <i>end of liability date</i> is	(i) 5 years after the <i>defects date</i> for latent Defects and (ii) the date on which the liability in question prescribes in accordance with the Prescription Act No. 68 of 1969 (as amended or in terms of any replacement legislation) for any other

matter.

A latent Defect is a Defect which would not have been discovered on reasonable inspection by the *Employer* or the *Supervisor* before the *defects date*, without requiring any inspection not ordinarily carried out by the *Employer* or the *Supervisor* during that period. If the *Employer* or the *Supervisor* do undertake any inspection over and above the reasonable inspection, this does not place a greater responsibility on the *Employer* or the *Supervisor* to have discovered the Defect.

Z The *Additional conditions of contract* are

Z1 to Z15 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 present divisions or operations which may be converted into separate legal entities as a result of the restructuring of the Electricity Supply Industry.

Z2 Joint ventures

- Z2.1 If the *Contractor* constitutes a joint venture, consortium or other unincorporated grouping of two or more persons or organisations then these persons or organisations are deemed to be jointly and severally liable to the *Employer* for the performance of this contract.
- Z2.2 Unless already notified to the *Employer*, the persons or organisations notify the *Project Manager* within two weeks of the Contract Date of the key person who has the authority to bind the *Contractor* on their behalf.
- Z2.3 The *Contractor* does not alter the composition of the joint venture, consortium or other unincorporated grouping of two or more persons without the consent of the *Employer* having been given to the *Contractor* in writing.

Z3 Change of Broad Based Black Economic Empowerment (B-BBEE) status

- Z3.1 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.
- Z3.2 The *Contractor* is required to submit an updated verification certificate and necessary supporting documentation confirming the change in his B-BBEE status to the *Project Manager* within thirty days of the notification or as otherwise instructed by the *Project Manager*.
- Z3.3 Where, as a result, the *Contractor's* B-BBEE status has decreased since the Contract Date the *Employer* may either re-negotiate this contract or alternatively, terminate the *Contractor's* obligation to Provide the Works.
- Z3.4 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 P1, P2 and P3 as stated in clause 92, and the amount due is A1 and A3 as stated in clause 93.

Z4 Confidentiality

- Z4.1 The *Contractor* does not disclose or make any information arising from or in connection with this contract available to Others. 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 in terms of clause 25.1, the *Contractor* ensures that the provisions of this clause are complied with by the recipient.
- Z4.2 If the *Contractor* is uncertain about whether any such information is confidential, it is to be regarded as such until notified otherwise by the *Project Manager*.
- Z4.3 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.
- Z4.4 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 *Project Manager*. All rights in and to all such images vests exclusively in the *Employer*.
- Z4.5 The *Contractor* ensures that all his subcontractors abide by the undertakings in this clause.

Z5 Waiver and estoppel: Add to core clause 12.3:

- Z5.1 Any extension, concession, waiver or relaxation of any action stated in this contract by the Parties, the *Project Manager*, the *Supervisor*, 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.

Z6 Health, safety and the environment: Add to core clause 27.4

- Z6.1 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.
- Z6.2 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.

Z7 Provision of a Tax Invoice and interest. Add to core clause 51

- Z7.1 Within one week of receiving a payment certificate from the *Project Manager* in terms of core clause 51.1, the *Contractor* provides the *Employer* with a tax invoice in accordance with the *Employer's* procedures stated in the Works Information, showing the amount due for payment equal to that stated in the payment certificate.
- Z7.2 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 core clause 51.2 is then calculated from the delayed date by when payment is to be made.
- Z7.3 The *Contractor* (if registered in South Africa in terms of the companies Act) 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.

Z8 Notifying compensation events

- Z8.1 Delete from the last sentence in core clause 61.3, "unless the *Project Manager* should have notified the event to the *Contractor* but did not".

Z9 Employer's limitation of liability

- Z9.1 The *Employer's* liability to the *Contractor* for the *Contractor's* indirect or consequential loss is limited to R0.00 (zero Rand)
- Z9.2 The *Contractor's* entitlement under the indemnity in 83.1 is provided for in 60.1(14) and the *Employer's* liability under the indemnity is limited.

Z10 Termination: Add to core clause 91.1, at the second main bullet point, fourth sub-bullet point, after the words "against it":

- Z10.1 or had a business rescue order granted against it.

Z11 Addition to secondary Option X7 Delay damages (if applicable in this contract)

- Z11.1 If the amount due for the *Contractor's* payment of delay damages reaches the limits stated in this Contract Data for Option X7 or Options X5 and X7 used together, the *Employer* may terminate the *Contractor's* obligation to Provide the Works using the same procedures and payment on termination as those applied for reasons R1 to R15 or R18 stated in the Termination Table.

Z12 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 Subcontractors 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 Subcontractor 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.

Z12.1 A Committing Party may not take any Prohibited Action during the course of the procurement of this contract or in execution thereof.

Z12.2 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.

Z12.3 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.

Z12.4 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.

Z13 Insurance

Z 13.1 Replace core clause 84 with the following:

Insurance cover 84

84.1 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.

84.2 The *Contractor* provides the insurances stated in the Insurance Table A.

84.3 The insurances provide cover for events which are at the *Contractor's* risk 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
Loss of or damage to the works, Plant and Materials	The replacement cost where not covered by the <i>Employer's</i> insurance The <i>Employer's</i> policy deductible, as Contract Date, where covered by the <i>Employer's</i> insurance
Loss of or damage to Equipment	The replacement cost
Liability for loss of or damage to property (except the works, Plant and Materials and Equipment) and liability for bodily injury to or death of a person (not an employee of the <i>Contractor</i>) caused by activity in connection with this contract	<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 The <i>Employer's</i> policy deductible, as Contract Date, where covered by the <i>Employer's</i> insurance <u>Other property</u> The replacement cost <u>Bodily injury to or death of a person</u> The amount required by 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

Z 13.2

Replace core clause 87 with the following:

The *Employer* provides the insurances stated in the Insurance Table B.

INSURANCE TABLE B

Insurance against or name of policy	Minimum amount of cover or minimum limit 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	Per the insurance policy document

Business Interruption	
Nuclear Material Damage Terrorism	Per the insurance policy document

Z14 Nuclear Liability

- Z14.1 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.
- Z14.2 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*.
- Z14.3 Subject to clause Z14.4 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*.
- Z14.4 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.
- Z14.5 The protection afforded by the provisions hereof shall be in effect until the KNPS is decommissioned.

Z15 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.

- Z15.1 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.
- Z15.2 Upon written request by the *Contractor*, the *Employer* certifies that these conditions prevail. All measurements and reporting are effected 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 Z15.1. Control measures conform to the requirements stipulated in the AAIA-approved asbestos work plan.
- Z15.3 The *Employer* manages asbestos and ACM according to the Standard.
- Z15.4 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.
- Z15.5 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.
- Z15.6 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.
- Z15.7 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.

Annexure A: One-in-ten-year-return weather data obtained from SA Weather Bureau for [weather station]

If any one of these *weather measurements* recorded within a calendar month, before the Completion Date for the whole of the *works* and at the place stated in this Contract Data is shown to be more adverse than the amount stated below then the *Contractor* may notify a compensation event.

	<i>Weather measurement</i>				
Month	Cumulative rainfall (mm)	Number of days with rain more than 10mm	Number of days with min air temp < 0 deg.C	Number of days with snow lying at 08:00 CAT	[Other measurements if applicable]
January	200	6	[•]	[•]	
February	150	6	[•]	[•]	
March	120	5	[•]	[•]	
April	110	4	[•]	[•]	
May	40	3	[•]	[•]	
June	20	2	[•]	[•]	
July	30	2	[•]	[•]	
August	30	2	[•]	[•]	
September	60	3	[•]	[•]	
October	140	6	[•]	[•]	
November	160	7	[•]	[•]	
December	170	6	[•]	[•]	

Relative Humidity

The average relative humidity on an annual base are as follows:

08:00 = 80%

14:00 = 52%

20:00 = 73%

Only the difference between the more adverse recorded weather and the equivalent measurement given above is taken into account in assessing a compensation event.

C1.2 Contract Data

Part two - Data provided by the *Contractor*

Notes to a tendering contractor:

1. Please read both the NEC3 Engineering and Construction Contract (April 2013) and the relevant parts of its Guidance Notes (ECC3-GN)¹ 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 pages 156 to 158 of the ECC3 (April 2013) Guidance Notes.
2. The number of the clause which requires the data is shown in the left hand column for each statement however other clauses may also use the same data
3. Where a form field like this [] appears, data is required to be inserted relevant to the option selected. Click on the form field **once** and type in the data. Otherwise complete by hand and in ink.

Completion of the data in full, according to Options chosen, is essential to create a complete contract.

Clause	Statement	Data
10.1	The <i>Contractor</i> is (Name): Address Tel No. Fax No.	
11.2(8)	The <i>direct fee percentage</i> is The <i>subcontracted fee percentage</i> is	% %
11.2(18)	The <i>working areas</i> are the Site and	
24.1	The <i>Contractor's</i> key persons are: 1 Name: Job: Responsibilities: Qualifications: Experience: 2 Name: Job: Responsibilities: Qualifications: Experience:	

¹ Available from Engineering Contract Strategies Tel 011 803 3008, Fax 011 803 3009 or see www.ecs.co.za

		CV's (and further key persons data including CVs) are appended to Tender Schedule entitled .	
11.2(3)	The <i>completion date</i> for the whole of the <i>works</i> is		
11.2(14)	The following matters will be included in the Risk Register		
11.2(19)	The Works Information for the <i>Contractor's</i> design is in:		
31.1	The programme identified in the Contract Data is		
A	Priced contract with activity schedule		
11.2(20)	The <i>activity schedule</i> is in		
11.2(30)	The tendered total of the Prices is	(in figures) (in words), excluding VAT	
B	Priced contract with bill of quantities		
11.2(21)	The <i>bill of quantities</i> is in		
11.2(31)	The tendered total of the Prices is	(in figures) (in words), excluding VAT	
C	Target contract with activity schedule		
11.2(20)	The <i>activity schedule</i> is in		
11.2(30)	The tendered total of the Prices is	(in figures) (in words), excluding VAT	
D	Target contract with bill of quantities		
11.2(21)	The <i>bill of quantities</i> is in		
11.2(31)	The tendered total of the Prices is	(in figures) (in words), excluding VAT	
F	Management contract		
20.2	Work which the <i>Contractor's</i> will do himself is	Activity	price (lump sum or rate)
	Data for Schedules of Cost Components	Note "SCC" means Schedule of Cost Components starting on page 60, and "SSCC" means Shorter Schedule of Cost Components starting on page 63 of ECC3 (April 2013).	

A	Priced contract with activity schedule	Data for the Shorter Schedule of Cost Components
---	--	--

PART 2: PRICING DATA**ECC3 Option A**

Document reference	Title	No of pages
C2.1	Pricing assumptions: Option A	
C2.2	The <i>activity schedule</i>	

C2.1 Pricing assumptions: Option A

1. How work is priced and assessed for payment

Clause 11 in NEC3 Engineering and Construction Contract, (ECC3) Option A states:

Identified and defined terms	11	
	11.2	(20) The Activity Schedule is the <i>activity schedule</i> unless later changed in accordance with this contract.
		(27) The Price for Work Done to Date is the total of the Prices for - each group of completed activities and - each completed activity which is not in a group. A completed activity is one which is without Defects which would either delay or be covered by immediately following work.
		(30) The Prices are the lump sum prices for each of the activities on the Activity Schedule unless later changed in accordance with this contract.

This confirms that Option A is a lump sum form of contract where the work is broken down into activities, each of which is priced by the tendering contractor as a lump sum. Only completed activities are assessed for payment at each assessment date; no part payment is made if the activity is not completed by the assessment date.

2. Function of the Activity Schedule

Clause 54.1 in Option A states: “Information in the Activity Schedule is not Works Information or Site Information”. This confirms that specifications and descriptions of the work or any constraints on how it is to be done are not included in the Activity Schedule but in the Works Information. This is further confirmed by Clause 20.1 which states, “The *Contractor* Provides the Works in accordance with the Works Information”. Hence the *Contractor* does **not** Provide the Works in accordance with the Activity Schedule. The Activity Schedule is only a pricing document.

3. Link to the programme

Clause 31.4 states that “The *Contractor* provides information which shows how each activity on the Activity Schedule relates to the operations on each programme which he submits for acceptance”. Ideally the tendering contractor will develop a high level programme first then resource each activity and thus arrive at the lump sum price for that activity both of which can be entered into the *activity schedule*.

4. Preparing the *activity schedule*

Generally it is the tendering contractor who prepares the *activity schedule* by breaking down the work described within the Works Information into suitable activities which can be well defined, shown on a programme and priced as a lump sum.

The *Employer*, in his Instructions to Tenderers or in a Tender Schedule, may have listed some items that he requires the *Contractor* to include in his *activity schedule* and be priced accordingly.

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 DCS SCADA SYSTEMS (UNITS 1-6) FOR A PERIOD OF 10 MONTHS.

It is assumed that in preparing his *activity schedule* the *Contractor*:

- Has taken account of the guidance given in the ECC3 Guidance Notes pages 19 and 20;
- Understands the function of the Activity Schedule and how work is priced and paid for;
- Is aware of the need to link the Activity Schedule to activities shown on his programme;
- Has listed and priced activities in the *activity schedule* which are inclusive of everything necessary and incidental to Providing the Works in accordance with the Works Information, as it was at the time of tender, as well as correct any Defects not caused by an *Employer's* risk;
- Has priced work he decides not to show as a separate activity within the Prices of other listed activities in order to fulfil the obligation to complete the *works* for the tendered total of the Prices.
- Understands there is no adjustment to the lump sum Activity Schedule price if the amount, or quantity, of work within that activity later turns out to be different to that which the *Contractor* estimated at time of tender. The only basis for a change to the Prices is as a result of a compensation event.

An activity schedule could have the following format:

Item No.	Programme Reference	Activity description	Price

KRIEL POWER STATION COAL BUNKERS CO GAS MONITORS INSTALLATION AND INTERFACE TO WINCC AND DCS SCADA SYSTEMS (UNITS 1-6).

Material No		Base Unit of Measure	Quantity	Price per Unit	TOTAL
	Section A: Contractor 1				
	Bill No. 1: Preliminaries and General				
	Contractor required to list items required under P&G's.	Sum	1		

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1	<i>Note:P&G's not to exceed 15% of the direct cost. Contractor required to list items for fixed charge and time related (P&G's).</i>				
	Total Section 1 Carried to summary				
	Bill No. 2: FIELD INSTRUMENTS				
2	Coal Bunkers CO Gas Monitor Installation				
2.1	Procurement of VICOTEC412 Set	No	30		
2.2	Installation of all units	No	6		
2.3	Callibration checks (test set)	No	1		
2.4	Commissioning (Cold and hot)	No	1		
	Total carried to section summary				
	Total Section A carried to final summary				
Material No	Full Description	Base Unit of Measure	Quantity	Price per Unit	TOTAL
	-				
	Section B: Contractor 2				
	-				
	Bill No. 1: Preliminaries and General				
	-				
1	Site establishment	Days	1		
2	Medical Certificates	Days	1		
3	Police clearance	Days	1		
4	Accomodation + subsistance	Days	42		
5	Transport to site	Days	42		
6	Site de-establishment	Days	1		

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	Total carried to section summary				
2	<u>Section 2: Coal Bunkers CO Gas Monitors Interface to WinCC and DCS SCADA Systems</u>				
2.1	Interface engineering design of the CO gas monitor to the SPPA-T3000 system	hrs	120		
2.2	Interface engineering design of the CO gas monitor to the outside plant WinCC SCANDA system	hrs	120		
2.3	Procurement of the UVG20	No	6		
2.4	Procurement of the UVG16	No	6		
2.5	Procurement of the heavy duty fibre optic cable, splice boxes and patch lead	No	6		
2.6	Procurement of junction boxes	No	12		
2.7	Installation of junction boxes at a coal bunker plant	hrs	80		
2.8	Installation of UVG20 cable to the CO gas monitor analysers	hrs	80		
2.90	Installation of UVG20 cable from the CO gas monitor junction boxes to the equipment room	hrs	80		
2.10	Cable termination of CO gas monitor junction boxes	hrs	80		
2.11	Procurement of terminal connectors	No	12		
2.12	Procurement of unistrat	No	60		
2.13	Procurement of galvanised steel	No	300		

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	tubing				
2.14	Procurement of galvanised steel sadles	No	600		
2.15	Procurement of compressor gland size 2	No	85		
2.16	Procurement of 20AWG terminal point pins	No	32		
2.17	Procurement of 20AWG hook-up wire 100m	No	6		
2.18	Procurement of 12 Prt ST multimode dermacation box	No	12		
2.19	S7 Analog card 6ES7331-7KF02- 0AB0	No	12		
2.20	S7 Digital card 6ES7331-7KF02- 0AB0	No	12		
2.21	S7 Digital output card 6ES7321- 1BL00-0AA0	No	12		
2.22	S7 Digital input card 6ES7321- 1BL00-0AA0	No	12		
2.23	Phoenix contacts 8 level marshallig terminal block (10 piece per box) PTRV 8/GY-marshalling pannel	No	50		
2.24	Fibre optic installation and commission from the units equipment room to the outside plant control room	hrs	80		
2.25	DCS SPPA-T3000 I/O interface engineering of the CO gas monitors signals	hrs	120		

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2.26	DCS SPPA-T3000 HMI development and updating for CO gas monitors signals	hrs	120		
2.27	Commissioning and testing of alarm siren lighting from DCS SPPA-T3000	hrs	80		
2.28	Software engineering of the marshalling PLC to the outside plant control room	hrs	120		
2.29	HMI development of the outside plant control room	hrs	120		
2.30	Commissioning and testing of the CO gas monitors I/O from the outside plant control room	hrs	80		
2.31	Backups of the WinCC and DCS systems	hrs	80		
2.32	Quality inspections	hrs	346		
2.33	Safety inspection	hrs	346		
2.34	Project management	hrs	346		
2.35	Training of Eskom Kriel Power station employees (eight employees)	hrs	80		
2.36	Hand-over of documentations	hrs	80		
	Total carried to section summary				
3	Section 3: Electrical Material				
	Procurement of the UVG20 cable	Each	6		
	Procurement of the UVG16 cable	Each	6		
	Procurement of Junction Boxes	Each	12		
	Procurement of Terminal connectors	Each	12		
	Procurement of Unistrat	Each	60		
	Procurement of Galvanised Steel	Each	300		

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	tubing				
	Procurement of Galvanised Steel saddles	Each	600		
	Total carried to section summary				
	Total carried to section summary				
	Total Section B carried to final summary				

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C2.2 the *activity schedule*

Use this page as a cover page to the *Contractor's activity schedule*.

PART 3: SCOPE OF WORK

Document reference	Title	No of pages
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C3.2	<i>Contractor's</i> Works Information	
	Total number of pages	

C3.1: EMPLOYER'S WORKS INFORMATION

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1 Description of the works

1.1 Executive overview

The Works is for the supply, installation, and commissioning of a complete Coal Bunkers Unit 1 to 6 CO Gas Monitors and Interface to WinCC and DCS SCADA System for Kriel Power Station.

The works scope covered by this specification includes for the development, design, procurement, manufacture, delivery, installation, and commissioning of all items necessary. To install the modification as specified in this specification and hand over a complete working Coal Bunkers Unit 1 to 6 CO Gas Monitors and Interface to WinCC and DCS SCADA System for Kriel Power Station.

1.2 Employer's objectives and purpose of the works

This document specifies Contractor's minimum requirements for engineering work, drawings, procurement, manufacture, quality control & assurance, supply, delivery, installation, commissioning, testing, training, and maintenance and handing over to Kriel Power Station Coal Bunkers Unit 1 to 6 CO Gas Monitors and Interface to WinCC and DCS SCADA System.

1.3 Interpretation and terminology

The following abbreviations are used in this Works Information:

Abbreviation	Meaning given to the abbreviation
AFC	Approved for construction
OBL	Outside battery limits
3PSR	3rd Party System Replacement
AC LvdT	alternating Current Linear Voltage Diff. Transmitter.
AET	Architect Engineer's Tool
AF	Automation Function
AFC	Automation Function Container. Container, which provides the runtime environment for AFIs and HPIs. An AFC controls the execution of AFIs and HPIs.
AFI	Automation Function Instance. Instance of a component, which executes an automation function. Examples are controllers, motors and integrators.
AFT	automation function type. Type of an AFI. The AFT is the template to instantiate an AFI
AI	Analog Input
AO	Analog Output
API	Application Programming Interface
AS	Automation System
ASD	Alarm Sequence Display
ASP	Application Service Provider
B2B	Business 2 Business

BOP	Balance of Plant
CCPP	Combined Cycle Power Plants
CI	Communication Interface
Client	A client is a piece of software and/or a hardware that utilizes certain resources provided by a remote server.
COM	Component Object Model (Microsoft)
COTS	Components of the shelf
CT	Combustion Turbine
DCOM	Distributed Component Object Model (Microsoft)
DCS	Distributed Control System
DDS	Digital Data Storage. An industry standard for data storage on tape drives.
DF	Double Fuel

2 Management and start up.

2.1 Management meetings

Regular meetings of a general nature may be convened and chaired by the *Project Manager* as follows:

Title and purpose	Approximate time & interval	Location	Attendance by:
Kick off meeting	Prior commencement of work on site.	Kriel Power Station, Projects department	<i>Employer, Contractor, Supervisor</i>
Risk registers and compensation events	As soon as the need arises	Kriel Power Station, projects department	<i>Employer, Contractor, Supervisor</i>
Overall contract progress and feedback	Weekly	Kriel Power Station, Projects department	<i>Employer, Contractor, Supervisor,</i>

Meetings of a specialist nature may be convened as specified elsewhere in this Works Information or if not so specified by persons and at times and locations to suit the Parties, the nature, and the progress of the *works*. Records of these meetings shall be submitted to the *Project Manager* by the person convening the meeting within five days of the meeting.

All meetings shall be recorded using minutes or a register prepared and circulated by the person who convened the meeting. Such minutes or register shall not be used for the purpose of confirming actions or instructions under the contract as these shall be done separately by the person identified in the *conditions of contract* to carry out such actions or instructions.

2.2 Documentation control

2.2.1 Document Management

All documents supplied by the Contractor shall be subject to Eskom's approval. The language of all documentation shall be in English. The Contractor shall include Eskom's drawing number in the drawing title block. This requirement only applies to design drawings developed by the Contractor and his Sub-Contractors. Drawing numbers will be assigned by the Employer as drawings are developed. All documentation shall be controlled and managed in accordance with Project/Plant Specific Technical Document and Records Management Procedure (240-53114186).

2.2.2 Document Submission

All project documents must be submitted to the delegated Eskom Representative with transmittal note according to Project / Plant Specific Technical Documents and Records Management Work Instruction (240-76992014). To portray a consistent image, it is important that all documents used within the project follow the same standards of layout, style and formatting as described in the Work Instruction.

The Contractor is required to submit documents as electronic and hard copies and both copies must be delivered to the Eskom Representative with a transmittal note. In addition, the Contractor shall be provided with the following standards which must be adhered to:

- Documentation Management Review and Handover Procedure (240-65459834)
- Technical Documentation Classification and Designation Standard (240-54179170).

2.2.3 SharePoint Transmittal

The Contractor shall submit all documentation to the Eskom Representative as well as the Project's Documentation Centre in the following media:

- Electronic copies shall be submitted to Eskom Documentation Centre through SharePoint transmittal site that will be provided during contract award.
- Hard copies shall be submitted to the Eskom Representative accompanied by the Transmittal Note.

2.2.4 Email Subject

Electronic copies shall be submitted to the Eskom Representative email subject; Project Name_Discipline_Subject. Electronic copies that are too large for email will be delivered on large file transfer protocol and/or hard drives to the Project Documentation Centre. A notification email, with the transmittal note attached, shall be sent to the Eskom Representative.

2.3 Health and safety risk management

The Contractor shall comply with the health and safety requirements contained in Line 6, _Refer to section 6.4___ to this Works Information.

Police Clearance:

"Acceptance of this tender is subject to the condition that both the contracting company's management and its employees will provide Eskom with a clear criminal record not older than thirty (30) days from a reputable screening company. If the principal contractor appoints a subcontractor, the same provisions and measures will apply to the subcontractor. Acceptance of the tender is also subject to the condition that the contractor will implement all such security measures for the safe performance of the work as required in the scope of the contract.

Contractor or consultant

Contractors requiring access to execute contractual work must adhere to the requirement of criminal record screening. Access authorisation will be based on presenting a clear criminal result.

Contractors shall be subject to searches, including vehicles, tools, equipment, objects, or materials, or anything else deemed appropriate for searching, at any time when entering or exiting Eskom premises.

Contractors requiring access to Eskom's sites to execute contractual work must adhere to the Contractor Access Control Standard.

Contractors are required to submit a clearance certificate obtained from South African Police Service (SAPS) Criminal Record Centre (CRC) or an accredited supplier linked to the SAPS Automated Fingerprint Identification System (AFIS), along with a copy of their identity document or passport, to the site security manager.

Contractors entering Eskom's sites must ensure that they are not in possession of any dangerous or illegal objects or substances. It is strictly prohibited for contractors to access Eskom premises while under the influence of alcohol or illicit substances. It is strictly prohibited for contractors to remove equipment or materials from Eskom sites without proper authorisation. The contractor representative is obligated to communicate any resignations or suspensions to the Eskom contract manager and security manager. Verify that replacement personnel have undergone criminal background checks and work permit verifications prior to reporting at all Eskom's sites. Contractors, consultants, and other service providers are required to comply with the access control standard and security instructions to maintain a secure working environment at Eskom's sites.

2.4 Environmental constraints and management

The Contractor shall comply with the environmental criteria and constraints stated in Line 6 Refer to section 6.4_____

All service providers appointed to render any services within Eskom Kriel Power Station are required to comply with the station's Environmental Management System requirements.

- NB: Before commencing with any work, the service providers are required to visit the station's environmental section for evaluation. The station's environmental practitioner will evaluate the services to be rendered by the service provider and therefore allocate relevant legal and other requirements documents which the Contractor shall comply with during the works.

Provide Environmental policy and EMP (Environmental Management Plan)

It should always be noted that Kriel Power Station is ISO14001 certified and therefore promotes Integrated Environmental Management (IEM) philosophy which aims to achieve a desirable balance between conservation and development. All activities taking place within Kriel Power Station must consider section 28 of the National Environmental Management Act (107 of 1998) which makes provision for the duty of care approach. The contractor's team must commit to review and to continually improve environmental management, with the objective of improving overall environmental performance. The Contractor must consult with Kriel Environmental section on a regular basis for on-going assistance and advice.

Water Use License

- The station is a holder of a valid and approved Integrated Water Use License and the contractor shall ensure implementation of the conditions of the license that are applicable to the project.

Environmental requirements

- The Contractor ensures that all goods, services or works supplied in terms of the Contract conform to all applicable environmental legislation. Kriel Environmental Management System must be adhered to as a minimum.

Refuse disposal.

- The Contractor is responsible to keep the work area clean of any rubble.
- All waste introduced and/or produced on the Employer's premises by the Contractor for this contract, is handled in accordance with the Norms and Standards for the Disposal of Waste to Landfill, minimum requirements for the Handling and Disposal of Hazardous Waste in terms of Government Legislation as proclaimed by the NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008
- The removal of any hazardous waste is the responsibility of the Contractor.
- The Contractor shall comply with the environmental criteria and constraints as per the Eskom Rules and Regulations.
- The service provider shall comply to, but not limited to, all relevant legal and other requirements including the Kriel Power Station EMS, National Environmental Management Act (Act 107 of 1998) as amended and ISO 14001.

2.5 Quality assurance requirements

Quality Management System

The Contractor shall be required to demonstrate by means of a Contract Quality Plan (CQP) that this organisation is so structured that all the requirements of the specification will be properly monitored and controlled. The Contract Quality Plan (CQP), which must include the Quality Control Plan (QCP), is to be drafted in accordance with QM-58 and the Supplier Quality Management Specification (QM58). The Quality documents are to be submitted for approval to the Quality Engineer within thirty (30) days after a contract has been awarded to the Contractor.

No work may commence unless the Contract Quality Plan and Quality Control Plan documents have been approved in writing and a copy submitted to the Quality Engineer/ Employer. The Contractor, in conjunction with the Quality Engineer must sign off all Quality Control documents after completing all work as per the agreed scope. The Contractor to submit a copy of the final signed off documents/data packages to the Employer within one (1) week after completion of work.

The Contractor shall be required to read and fully understand the contents of the Supplier Quality Management Specification (QM58) and a copy is to be kept in possession or on premises.

The Supplier Quality Management Specification (QM58) shall remain applicable in the event of the contract being extended or modified for reasons permitted.

By signature and acceptance of this contract the Contractor acknowledges and agrees to comply with and adhere to Eskom's policies and procedures (current and/or latest revisions) including the Supplier Quality Management Specification (QM58).

Contract/Project Quality Plan Requirements

The Contractor prepares a contract quality management plan that, where appropriate, indicates the following:

- Indicates the interface with the Contractor's quality system and applicable documents such as procedures and work instructions.
- Establishes communication channels between the Contractor and the Quality Engineer / Employer in respect of quality and the integration of such with the prescribed contract communication channels.
- Indicates how specific subcontractors will be monitored.
- Identifies items or activities for which quality control plans will be prepared.
- Identifies the specifications, drawings, and acceptance criteria for material for which quality control plans are not required.
- Identifies the areas or processes requiring special controls.
- Identifies the Contractor's Management Representative and personnel responsible for the control of quality activities and their relationship to the Contractor's management structure.
- Identifies the documents which are to be submitted to the Employer.
- Indicates the Contractor's quality monitoring programme.

The Contractor periodically updates the contract quality management plan to reflect changes in any of the above details. The frequency of such updates is determined by the Quality Engineer but will not be greater than one year.

Quality Control Plan

The Contractor's or Subcontractor's quality control plans cover inspection and test proposals for items or activities to be supplied as part of the works.

The quality control plan indicates the following as appropriate:

- The identification of the item.
- A list of the sequence of operations including inspections and tests.
- The identification of the specification, drawings, or procedures for each operation.
- The acceptance criteria with reference to the appropriate technical specification, in-house, national, or international standard and relevant clause number.
- The inspections and tests the Contractor has nominated for hold and witness points.
- Provision for inspections and tests nominated by the Quality Engineer.
- Provision for inspection status indication.
- Inspection and test records which are generated by the Contractor.
- Competence of the people-Level II welding inspector, Coded welders, minimum N3 Fitters/Boiler makers
- Personnel qualifications from approved training and accredited institute
- ITPs and welding procedures
- Material certificates
- Organogram indicating the quality person and his/her duties.
- Adhere to the QM58
- Follow the Eskom welding rule book.

The quality control plans are reviewed by the Quality Engineer and Employer to allow for insertion of his specific requirements, including hold and witness points, prior to commencement of work. The Contractor does not commence work until the Employer accepts.

2.6 Programming constraints

The Contractor shall submit the first programme to the Project Manager for acceptance within the period stated in the Contract Data. The programme must be updated as per the intervals prescribed in the Contract Data. The programme shall be submitted in MS Project Format/primavera. The Contractor to Submit a programme as per clause 31.2 of NEC ECC3.

The Accepted Programme at the Contract Date serves as a baseline for the execution of the works until the latter of the defects date or the end of the defect correction period. This baseline shown on all subsequent graphical presentations of revised programmes.

2.7 Contractor's management, supervision, and key people

N/A

2.8 Invoicing and payment

Within one week of receiving a payment certificate from the *Project Manager* in terms of core clause 51.1, the *Contractor* provides the *Employer* with a tax invoice showing the amount due for payment equal to that stated in the *Project Manager's* payment certificate.

The *Contractor* shall address the tax invoice to Eskom Holdings SOC Ltd and include on each invoice the following information:

- Name and address of the *Contractor* and the *Project Manager*.
- The contract number and title.
- *Contractor's* VAT registration number.
- The *Employer's* VAT registration number 4740101508.
- Description of service provided for each item invoiced based on the Price List.
- Total amount invoiced excluding VAT, the VAT and the invoiced amount including VAT.

The Contractor shall address his invoice to the following email address:

- Eskom Development Foundation: invoiceseskomlocal@eskom.co.za

2.9 Insurance provided by the *Employer*

Refer to section Z13. The Contractor to address all insurance related issues to the Project Manager

2.10 Contract change management

The *Contractor* and *Employer* shall use the standard NEC forms for any form of communication in the event of Compensation events applicable form as per NEC to be used by both parties and completed in full.

2.11 Provision of bonds and guarantees

The form in which a bond or guarantee required by the *conditions of contract* (if any) is to be provided by the *Contractor* is given in Part 1 Agreements and Contract Data, document C1.3, Sureties.

The *Employer* may withhold payment of amounts due to the *Contractor* until the bond or guarantee required in terms of this contract has been received and accepted by the person notified to the *Contractor* by the *Project Manager* to receive and accept such bond or guarantee. Such withholding of payment due to the *Contractor* does not affect the *Employer's* right to termination stated in this contract.

2.12 Records of Defined Cost, payments & assessments of compensation events to be kept by the *Contractor*

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.

2.13 Training workshops and technology transfer

There are four (4) categories of training provided by the Contractor:

Maintenance training

Engineering training

Operating personnel training

End user training

2.13.2 Training documentation

- The Contractor supplies all training documentation in hardcopy and software format based on the Employer's version of MS Office after the Project completion.
- The training manuals, prepared by the Contractor, cover all components of the process control and monitoring system, both the hardware and software as well as the works specific settings and configurations and are cross-referenced.
- The supply of draft copies of training material is planned to fit into the requirements.
- The Contractor supplies four copies of all the manuals to the Project Manager and one copy to each of the trainees.
- Contractor shall provide two sessions to Kriel PS to accommodate all departments.

The Contractor supplied manuals must include the following information:

Maintenance training

- OEM maintenance training to be provided for the personnel.
- Training documentation will be provided to the C&I, electrical and mechanical maintenance training sections in electronic and hard copy format.
- Allowance will be made for C&I maintenance, electrical maintenance, and mechanical maintenance. The maintenance training per discipline shall also be provided to the respective engineering departments, to attend accredited training relating to maintenance on all Coal Bunkers Unit 1 to 6 CO Gas Monitors and Interface to WinCC and DCS SCADA System.
- Provision will be made for at least two persons from C&I Maintenance, two from Electrical Maintenance and two from Mechanical Maintenance to be involved during the project processes of detail engineering, up to operational testing, to become competent on the maintenance aspects of the control system.

Maintenance training manuals:

- i. System description.
- ii. Drawing supplements.
- iii. Control philosophies (Analogue, Binary, Protection, and Sequential control)
- iv. Protection philosophies.
- v. Logic and control diagrams.
- vi. Loop checking and marshalling termination drawings up to the I/O cards and database points.
- vii. HMI end user and maintenance specific functions, configuration, set-up, and fault-finding.
- viii. Network topology, devices, and maintenance functions local on the hardware as well as using the engineering station.
- ix. Data Servers maintenance functions, set-up, and fault-finding.
- x. Maintenance inspections / services with intervals specified
- xi. Fault finding with remedial actions to module level using the maintenance diagnostic and engineering stations.
- xii. Maintenance diagnostic station functions.
- xiii. Engineering Station functions. (Engineering Station and Portable Engineering Station)
- xiv. Integrated forward system documentation functions, set-up, and configuration.

2.13.4 Engineering training

- OEM engineering and third-party training to be provided for personnel from each of the engineering departments (C&I Engineering, Aux. Engineering, Electrical Engineering) on the Coal Bunkers Unit 1 to 6 CO Gas Monitors and Interface to WinCC and DCS SCADA System.
- Provision will be made for at least two persons from C&I Maintenance, and two persons from C&I Engineering to be involved during the process from detail design up to operational testing of the system to become competent regarding the engineering aspects of the control system.
- The maintenance and engineering representatives will be involved in all steps of the process including engineering on the system.
- Engineering training documentation will be provided to C&I Engineering, Auxiliary, Engineering and Electrical Engineering departments in an electronic and hard copy format. (Three sets)

Engineering training manuals:

Apart from the scope already defined, detailed information is supplied by the Contractor so that the trainees can independently do any task on the process control and monitoring system components from the field devices up to firewall, both at the hardware and software level at an engineering level. The total scope of the maintenance and operator training manuals are also covered in the engineering training manuals.

2.13.5 OP Operator training

- a) OEM system training on the Coal Bunkers Unit 1 to 6 CO Gas Monitors and Interface to WinCC and DCS SCADA System and monitoring of information on OPCR SCADA to be provided for a quantity of 20 OPCR operating personnel.
- b) Training documentation will be provided to the OPS training section in electronic and hard copy format.

- c) Operating training will be phased in the project execution as to ensure operating personnel competency to operate on the new system before the commissioning and operational testing stages.
- d) Operating personnel working with the system will receive training on the job as each Coal Bunkers Unit 1 to 6 CO Gas Monitors and Interface to WinCC and DCS SCADA System is brought on-line.
- e) Operating training on the OPCR HMI stations regarding the Coal Bunkers CO Gas Monitors response procedure as developed by Kriel Power Station.

Operator training manuals:

- i. System description.
- ii. Drawing supplements.
- iii. Control and operating and protection philosophies.
- iv. Normal operation standby checks, isolation procedures and routine checks.
- v. Abnormal operation procedures.
- vi. Operating technical specifications.
- vii. Sequence and Binary logic diagrams.
- viii. Special emphasis on the HMI functions, displays, supervisory control, logs, reports, user configurable displays, alarming, and navigation.

3 Engineering and the *Contractor's* design

3.1 *Employer's* design

The Works to be performed by the Contractor

Project aims is to ensure efficiency and safe integration of all Coal Bunkers Unit 1 to 6 CO Gas Monitors and Interface to WinCC and DCS SCADA System for Kriel Power Station. On this modification it is required that there are no discrepancies and inaccurate readings to the SCADA Systems and calibration are done as per their related PM's.

- The Contractor performs and assessment of the current Coal Bunkers CO Gas Monitors measurement system to determine the effectiveness and safe integration to SCADA System.
- The Contractor develops a detailed design for the entire Works in accordance with current SANS and Employer Standards.
- The Contractor implements the Works and modifications that may be required from the approved detailed design.
- Design solutions are developed by the Contractor's professional engineer/technologist at detailed design level.
- The Contractor provides methodology for the design execution.
- The Contractor provides an integrated schedule for the assessments, design, and mechanical period.
- The Contractor provides all required certifications and takes full liability and accountability for the Works on the project.
- All Engineering design documentations to be approved and signed by a Professional Engineer/Technologist.

3.1.2 Kriel Power Station Technical Specification

This specification covers a CO Gas Monitoring System. The instrument shall provide for indicating, transmit infrared and control of the CO concentration measurements. The principle of measurement should be used to support extensive options for excellent self-monitoring. When a malfunction occurs, the CO Gas Monitor switches automatically to "Malfunction" mode. The analog outputs are set to the parameter value set for malfunctions, "Live zero", or the last valid value. Operating states are signalled by status signals and entered in a logbook. Each sensor pair of a measuring point has one or two opto-electronic measuring devices that deliver, independent of each other, visibility and/or CO concentration measured values. The CO measuring unit (IR unit) comprises an infrared sender and an infrared receiver.

The visibility measuring unit (VIS unit) is arranged in parallel and comprises a sender/ receiver unit and a triple reflector.

3.1.3 Compliances

- The technical version of this device complies with the following EU directives and EN standards:
- EU Directive: LVD (Low Voltage Directive)
- EU Directive: EMC (Electromagnetic Compatibility)
- Applied EN standards:
- EN 61010-1, Safety requirements for electrical equipment for measurement, control, and laboratory use
- EN 61326, Electrical equipment for measurement, control, and laboratory use – EMC requirements

3.1.4 Electrical Protections

- Insulation: Protection class 1 in accordance with EN 61010-1
- Insulation coordination: Measuring category II in accordance with EN61010-1.

- Contamination: The device operates safely in an environment up to contamination level
- 2 in accordance with EN 61010-1 (usual, non-conductive contamination and temporary conductivity by occasional moisture condensation).
- Electrical energy: The wiring system to the mains supply voltage of the system must be installed and fused according to the relevant regulations.

3.1.5 Laws, standards, guidelines complied with

- EC Directive 2006/95/EC
- EC Directive EMC 2004/108/EC
- EN61010-1
- EN61326
 - and usable in accordance with guidelines and recommendations of the
- RABT (Directive for Construction and Operation of Road Tunnels)
- ASTRA (Swiss Federal Roads Authority)
- RVS (Standards and Regulations for Road Traffic)
- EC Directive 2004/54
- PIARC (Permanent International Association for Road Construction)

3.1.6 Standards and their significance

Short description	Document No
Directive 2006/95/EC	RL 2006/95/EC
EMC Directive/2004/108/EC	RL 2004/108/EC
Safety Requirements Electrical Equipment	EN 61010-1
Electrical Equipment for Measurement	EN61326

3.1.7 Technical data overview

Technical overview	data	VICOTEC411	VICOTEC412	VICOTEC414
General Data				
Measured variable		Extinction coefficient: Heat transmission coefficient	CO concentration: ppm	Extinction coefficient: Heat transmission coefficient CO concentration: ppm
Measuring principle		Scattered light	Negative gas correlation	VIS: Scattered light CO: Negative gas correlation
Measuring path	10 m (±0.5 m)			
Measuring range		VIS: K = 0 to 15 1/km	CO: 0 ... 300 ppm	VIS: K = 0 ... 15 1/km CO: 0 ... 300 ppm
Repeat accuracy		VIS: ± 0.1 1/km	CO: ± 2 ppm	VIS: ± 0.1 1/km CO: ± 2 ppm
Ambient temperature	-30 to +60 °C			
Storage temperature	-30 to +85 °C			
Connections				
Interfaces	CAN bus, sensors electrically isolated, RS422 electrically isolated, RS 232 PROFIBUS DP			
Analog outputs1	2 channels, 0 - 20 mA, Live Zero selectable 0, 2, 4 mA			
Relays1)	3 outputs for CO malfunction, visibility malfunction, display maintenance/contamination/ warning Switching voltage 125 V AC; max. switching current 60 VA Switching voltage 150 V AC; max. switching current 30 VA			
Digital input	5 V max., 2 mA. External maintenance switch			
Power supply				
Connection unit2	190 V to 260 V AC; 50 Hz or			

	95 V to 130 V AC; 60 Hz		
Evaluation unit	190 V to 260 V AC; 50 Hz or 95 V to 130 V AC; 60 Hz		
Power input for evaluation unit with sensor	Max. 45 VA typical 20 VA	Max. 80 VA typical 45 VA	Max. 90 VA typical 50 VA
Protection class, dimensions			
Protection class	IP65		
Dimensions (W x H x D)	190 x 259 x 541 mm		
Sensor	230 x 110 x 280 mm		
Evaluation unit			

3.1.7.1 Dimensions, VICOTEC410 sensor and evaluation unit

Dimensions, VICOTEC410 sensor

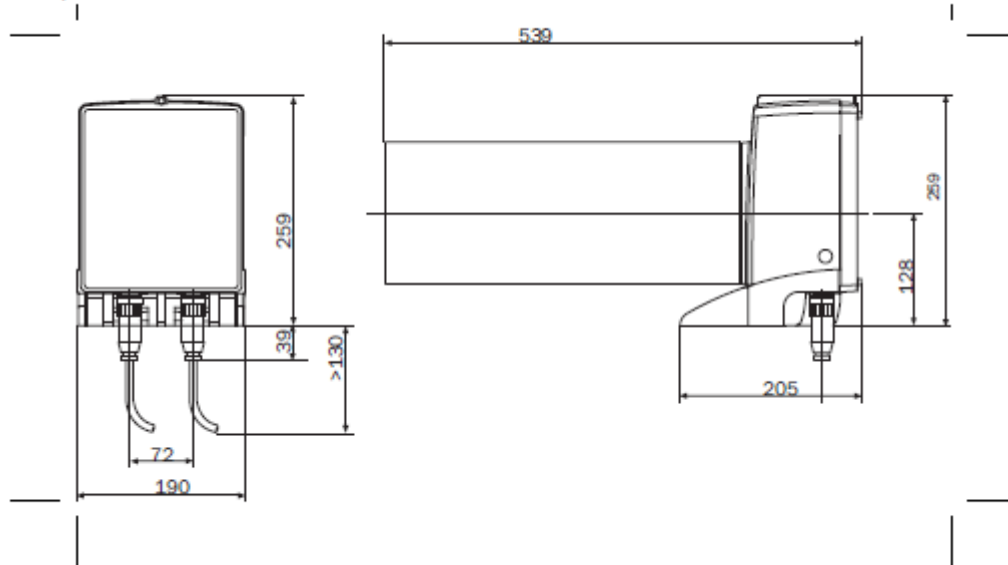


Fig.1 Dimension, VECOTEC410 sensor

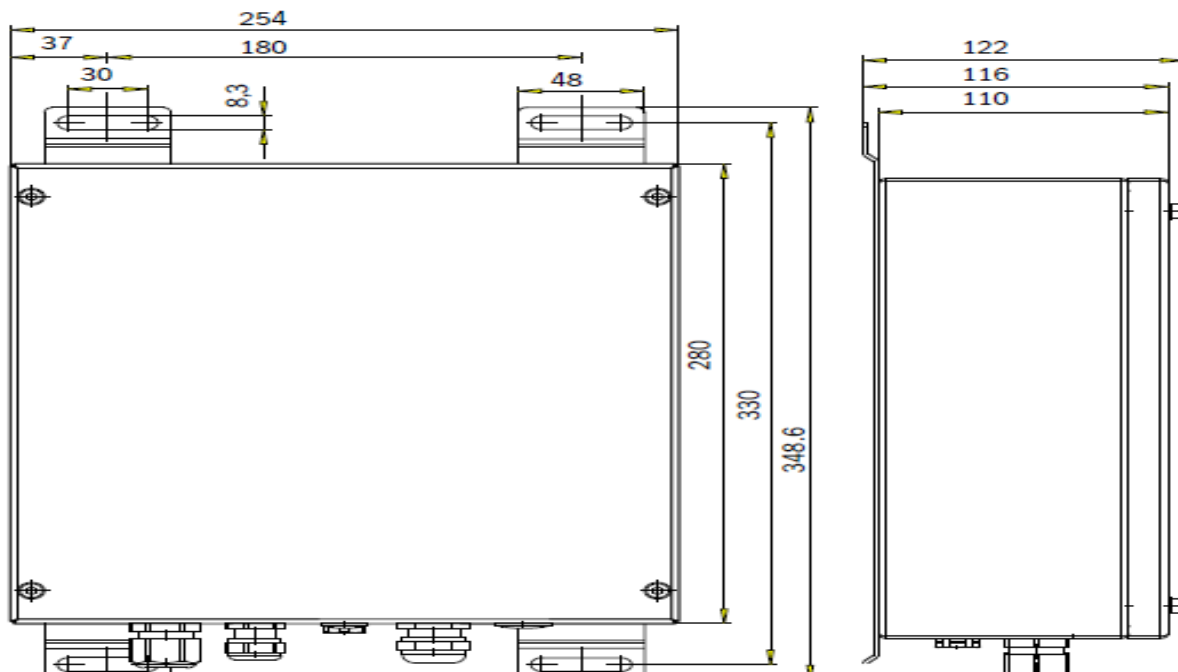


Fig.2 Dimension, evaluation unit RCU 410 (in mm)

3.1.7.2 Dimensions, connection unit

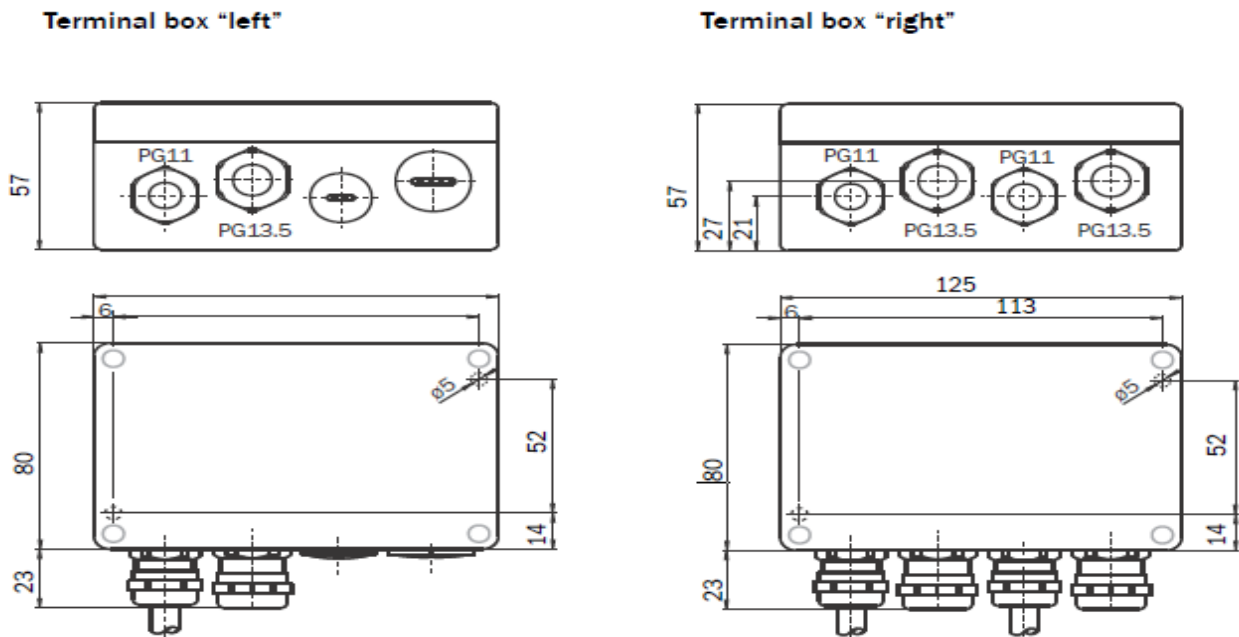


Fig.3 Terminal Boxes

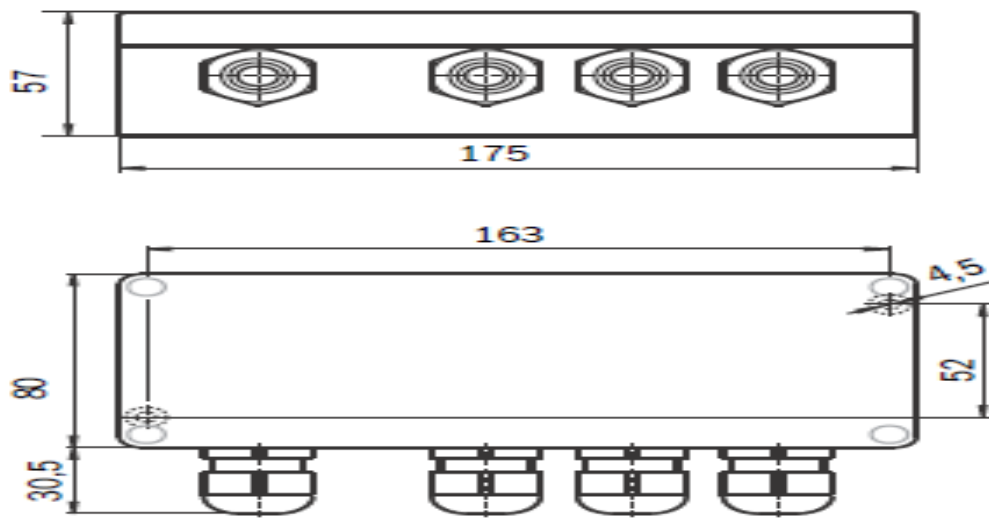


Fig.4 Connection unit with separate voltage supply

3.1.8 MANUFACTURER

The measuring instrument shall be a CO Gas concentration measuring monitor as manufactured by different supplies and warranted against defects in materials and workmanship.

3.1.9 Wherever possible, use is to be made of existing plant structures if the Contractor determined it would form part of the CO Gas Monitor measurement system necessary for the reliable operation of the system proposed.

3.1.10 The scope of work of the Contractor includes the following:

- Make modifications to existing plant.
- Install the new equipment.

3.1.11 The Contractor includes all allowances for the complete installation of the Contract Works which shall include, but not be limited to the following:

- The services of skilled engineers to supervise the installation of the complete contract of the CO Gas Monitor measurement.
- The supply of all closure pieces and the connections to all designated and other agreed termination points.
- All management, supervision, labour, installation tackle, gear and tools, cranes, vehicles, consumables, workshops and site offices, stores and any other facilities, equipment and cleaning materials required.
- The opening and closing of all cable trenches and entries.
- Platforms, stands and pedestals.
- Everything else required, whether necessary or specified, for the installation of the complete CO Gas Monitor measurement as required.

3.1.12 Design Philosophy

The new System must be designed for an operational life of 7 years. Preference must be given to equipment with high availability or reliability and with the lowest possible maintenance cost.

The System must be designed for continued operation and must be required to run unattended for long periods of time. The Contractor must detail the operating and maintenance requirements.

3.1.13 Engineering and Design

The Contractor is responsible for the design, engineering, manufacture, supply, delivery to site, offloading, installation, commissioning and handing over to the Employer of a complete Coal Bunkers CO Gas Monitoring System and Interface to WinCC / DCS SCADA System.

The Contractor provides all equipment, services, material, and all associated engineering activities to fulfil and execute the requirements and functions of this specification.

The works comprises of the following items:

- Design, engineering, manufacture, quality control, procurement, handling, shipment and transport to/from site, storage, offloading, construction and erection, painting and finishing, installation, commissioning, testing, optimisation and handover of equipment, tools and materials for the entire Works related to the Kriel Power Station Coal Bunkers CO Gas Monitoring Project.
- The Contractor constructs and erects the Works in accordance with the Contractor's accepted design and takes cognisance of SANS 2001 and SANS 1200.
- The Works are designed for constructability, reliability, operations, and maintainability.
- The Contractor designs and procures all construction material and equipment required to perform the Works.
- The Contractor identifies and includes all items required to form a complete, reliable, fit for purpose operating Works, which complies with the requirements as stipulated in this Works Information.
- The Contractor provides all engineering calculations, drawings (hard and soft copy) models, inspection/quality reports, construction records, commissioning test reports, and other documentation as required by the Works information.
- The Contractor provides dimensioned general arrangement drawings of the designed remedial Works and detailed drawings of all components of the Works, sufficiently detailed for the preparation of maintenance and operating procedures.
- The Contractor supplies drawings and documentation as specified in the Works Information. This includes, but is not limited to, GA drawings, fabrication drawings, construction drawings, as built

drawings, commissioning and handover documentation, maintenance and operating manuals for the fabrication and installation of the Works.

- The Contractor's appointed Professional Engineer provides technical oversight during fabrication and construction.
- The Contractor provides Operating and Maintenance Instruction Manuals.
- The Contractor provides Training of Employer's operating and maintenance staff.
- Other Plant and Materials or items associated with this Works is utilised with prior approval from the Project Manager.
- The Contractor performs Factory Acceptance Testing (FAT) and Site Acceptance Testing (SAT) of the Plant and Materials.
- The Contractor designs and provides all falsework and formwork and any other necessary temporary Works for the safe execution of the Works.
- The Contractor shall ensure that he/she has a qualified professionally registered mechanical, electrical and C&I engineer that will oversee the works.
- The Contractor shall design, supply, install, secure, test and commission the circuits inclusive of all required accessories on the LV switchgear. The existing Coal Bunkers CO Gas Monitoring distribution system is a 220Vac and converted to 24Vdc.
- All manufacturing will adhere to the standards as specified in this document.
- The Contractor shall take on site measurements for installation of the equipment of the system and produce complete Workshop drawings for fabrication and installation.
- The Contractor submits quality assurance documents such as quality control procedures and method statements to the Employer to request witness, hold and review points as is necessary and the Contractor accommodates inspections that will be done by the Employer in his project schedule.
- The Contractor provides construction and "As-built" drawings.
- The Contractor must apply the standards listed in this document as well as any other standards or legislation not specifically mentioned that may be relevant.
- The Contractor must accommodate that a design review will be conducted with the Employer before any construction occurs.
- The Employer shall conduct a final inspection of the installed system prior to its commissioning to render it safe for use and issue a certificate to the Contractor to commence commissioning.
- The Contractor shall ensure a safe working environment and that all work practices comply with Eskom's SHEQ requirements.
- The Contractor submits a detailed method statement for the installation prior the installation for approval by the employer. The Method Statement explains in sufficient detail the following:
 - Information of the activities being performed by other Contractors.
 - Provide test certificates that indicate properties of materials required.
 - Explanation of the sequence/order of work areas. The information to be detailed by narrative and to be indicated on drawings.
 - QCP

3.1.14 Junctions boxes

Protected against corrosion.
IP 66/68 rating inside station.

3.1.15 System Requirements

The Contractor supplies fully proven equipment, suitable to perform the functions required in the location and environment specified.

The system is to be constructed using industrial or higher-grade hardware. The Contractor must guarantee the quality of item used, together with the availability of spares.

All equipment to be installed for this project must be to the Employer's approval. The Contractor lists all equipment, types, specifications, and manufacturers in his tender.

3.1.16 Electrical Equipment

Power supplies

The Employer must provide (220 Vac, 24 Vdc) upon which the contract will be able to terminate his equipment. The Contractor must provide details of his power requirements upon which the Employer must indicate the nearest points of supply. These points can be identified after the site visit or during detail design.

3.1.17 Cable Termination Protection

Cable terminating facilities on equipment must be designed to be dust and vermin-proof and impervious to liquid ingress to IP 65 once the cables have been fitted.

317.18 Fitting

All labels must, wherever possible, be fitted horizontal and parallel to each other and as close as possible to the equipment with which they are associated.

All labels must be positioned so that these can be easily read by viewers from the operating floors, platforms, and galleries.

Labels must be pop riveted onto the back plates and fitted to the equipment with a strap and buckle type of clamp. The use of a tensioning tool is necessary for this method of fitting.

With the Employer's approval some labels may be pop riveted directly onto the equipment without the use of back plates, or otherwise glued onto the equipment.

Type of glue to be approved by the Employer.

Labelling devices must neither penetrate the equipment housing nor constitute a potential source of corrosion.

"Slip-in" holders must be used for indoor labels. Where slip-in holders are used, the labels must depend on the label frames to hold them firmly in position. In addition to this the holder edges must be bend around. Masking of the label by the holder must not exceed 3 mm per edge.

Where stand plates are used for fitting of mimic panels, stand plates must be permanently fitted to the ground and be made from epoxy coated mild steel.

It is suggested that riveting of labels onto back plates being done on site, although some labels must be fixed without the use of back plate. Any removal of labels from back plates must nevertheless also be regarded as part of the scope of work of this specification.

In most of the situations this specification spells out the requirement. In some cases, however, fitting could fall out of the specification. Sound engineering practices must be applied for fitting in both described and non-described situations.

3.1.19 Instrument labels

Labels for instruments must be mounted alongside the devices on the rack or mounting and must not be fixed to the device itself. Labels must not be fitted directly on to equipment.

All equipment and components mounted or housed in boxes or cubicles (e.g., terminals, modules, relays, etc.) must be suitably labelled, and labels must be consistent with all associated documentation.

Every instrument installed in the plant must be identified with the AKZ number by a durable label of approved material permanently attached next to the instrument. Dymo tape is not acceptable as a permanent label material.

3.1.20 Lightning Protection of Equipment

The Contractor must provide lightning surge protections and any other lightning protection that is necessary for the entire system supplied under this contract.

The electrical requirements are detailed as follows:

- (1) Eskom Voltage Supplies to Power Conditioners.
 - A. 380 V AC +/- 10% 2 phase (L1 + L2).
 - B. 220 V AC +/- 10% 1 phase (L1 + N).
- (2) Line Current to Power Conditioners.

To be determined by Contractor.
- (3) Protection Modes.
 - A. L1 + L2 to Neutral/Earth.
 - B. L1 to Neutral/Earth.
 - C. Neutral to Earth.
- (4) RF Filter range.

150 kHz – 30 MHz (CMNM) 1.
- (5) Energy Absorption Capability.
 - A. 1 400 Joules CM.
 - B. 750 Joules NM.

Note 1 CM = Common Mode NM = Normal Mode.

3.1.21 Protection of Employer's plant

Provision must be made by the Contractor to protect the contents and equipment in the Works area against the weather during the period of construction.

All other services and machinery within the Works area must not be disturbed and any damage to these services stemming from the Contractors occupancy of the site or activity must be the responsibility of the Contractor.

3.1.22 Mechanical Requirements

Flanges

Flanges must comply to BS 4504 standard for pipe flange Nominal Bore 20mm carbon steel as a preference. If these specifications have a significant input on delivery or cost, flanges to ANSI standard will be considered by the Employer and must be agreed to in writing.

3.2 Parts of the works which the Contractor is to design

3.2.1 Investigation

The Contractor must carry out an investigation to determine where the equipment is to be installed for optimal reliability.

3.2.2 Contractor's Scope of Work

It is not the intention of this scope of work to specify in detail all the activities to be performed by the Contractor or the plant to be supplied by the Contractor. This scope of work only covers suggested activities and items of plant without prescribing what the Contractor must do. The Contractor is responsible for carrying out all activities and supplying everything necessary to complete the installation of Coal Bunkers CO Gas Monitoring System measurement in all respect, irrespective of whether such an activity or item of plant is specifically mentioned in the contract document or not. The Contractor must price all activities and material needed for this project, everything including items not mentioned in this specification but needed to complete this project as per the specification's requirements and the contractors offered design.

3.2.3 The Contractor must carry out the following activities:

- Survey and evaluate existing plant

- Detail design
- Project management
- Procurement
- Manufacture
- Delivery and storage at site
- Site establishment, maintenance thereof and removal
- Dismantle, replacing and modifying of existing plant
- Erection and installation
- Codification and labelling of plant
- Training of the Employers staff
- Commissioning
- Optimisation
- Testing
- Quality assurance
- Issue of operating and maintenance manuals
- Issue of final documentation
- Issue of final as build documentation
- Update Employer existing drawings

3.3 Procedure for submission and acceptance of *Contractor's* design

All the Designs shall be submitted to the Project Manager for acceptance by the Engineer prior to placement of any order or procurement of the designs.

3.3.1 Design Review Procedure

Where the Contractor has design work in their scope, the Contractor is the Design Authority as defined in the Design Review Procedure (240-53113685). The Contractor is responsible for following this design procedure and conducting all the design reviews as specified in this procedure. The Contractor is responsible for conducting the following design reviews:

- a) Detail Design Freeze Review
- b) Integrated Design Review
- c) Construction Completion Review
- d) Acceptance Testing Review

3.3.2 Project Engineering Change Procedure

The Contractor takes note of the Employer's Project Engineering Change Procedure (240-53114002). An engineering change includes any proposed change originating from engineering, Contractor, project management or construction management.

The Project Engineering Change Procedure applies to the Employer's personnel or Contractor performing engineering or engineering related work where the quality of the engineering work performed is the direct responsibility of the Project Manager.

3.3.3 Drawing Format and Layout

The creation, issuing and control of all Engineering Drawings will be in accordance with the latest revision of 240-86973501 Engineering Drawing Common Requirements Standard. Drawings issued to Eskom will be a minimum of one hardcopy and an electronic copy.

All Contractors are required to submit electronic drawings in Micro Station (DGN) format, and scanned drawings in pdf format. No drawings in TIFF, AUTOCAD or any other electronic format will be accepted. Drawings issued to Eskom may not be "Right Protected" or encrypted.

3.4 Other requirements of the *Contractor's* design

3.3.1 System Requirements

General

The contractor makes use of proven equipment, which has proven reliability and low mean time to repair (MTTR). It must incorporate ease of maintenance; calibration plus includes in built test/ calibration facilities where applicable.

3.3.2 General Design

- The system will be using a (UVG02 cables)
- The system will consist of CO Gas Monitor measurements on the Coal Bunkers on all units.
- The system will be connected to the WinCC and Distributed Control System SPPA T3000.
- The system will consist of Power Cable and Trunk Cable (m)

3.5 Use of *Contractor's* design

The *Employer* may use and copy the *Contractor's* design for any purpose connected with Construction, use, alteration, or demolition of the works unless otherwise stated in the Works information and for other purposes as stated in the Works Information.

3.6 Design of Equipment

None

3.7 Equipment required to be included in the works

None

3.8 As-built drawings, operating manuals, and maintenance schedules

3.8.1. "AS BUILT" Marked up documentation

Two sets of photocopies of the marked up As Built Plant-usable documentation, must be supplied by the Contractor at the date of "Hand-over" of plant to the Employer. In the event of the supplied documentation is incomplete or insufficient, the Employer reserves the right to refuse "Take-Over" until such a time that the defect is corrected.

Should the Employer identify it after "Take-Over" of plant and during the guarantee/maintenance period that the documentation supplied is incomplete or insufficient, the guarantee/maintenance period must be adjusted.

3.8.2 Drawing Numbers

Numbers for drawings to be obtained from the local Drawing Office at the start of each project. In other words, the Contractor must put the Eskom drawing number on all the drawings done for Eskom. These numbers can be supplied in 'block' form if required. If only an estimate is available e.g., it is expected that the contract must consist of ± 36 drawings, a block of say 40 numbers can be allocated to that project. Once the project has been completed the unused numbers can be booked back into the system.

3.8.3 Electronic Format

Different companies use different CAD systems. Eskom, in most cases, use Intergraph Micro station. This CAD programme has file extensions of *.DGN. Obviously, we prefer that the Micro station programme be used. When it is not possible though it is imperative that the Contractor use a programme with an electronic file extension that must be completely compatible to Micro station. Generally, the extensions *.DXF and

*.DWG can be imported in Micro station but it is advised that contact be established between the draughtsperson(s) of the Contractor and this office to clarify this matter.

All future revisions must be done on these electronic files

For starters the Contractor must supply this drawing office with between two and five drawings on a CD very early in the contract period so that it can be converted to Micro station files where applicable, and prints be made. Should anything not be compatible, the problem could be addressed right then and by doing so a huge amount of work could be avoided.

3.8.4 Border

A reference border is a requirement for all drawings. It must include a title block with all the detail as prescribed by Eskom.

Note that the drawing sizes must conform to national standards (i.e., A0 A1, A2, A3 or A4)

3.8.5 Symbols

Symbols for drawings have been standardised quite extensively throughout Eskom. Electronic files of these symbols are available on request. Please refer to drawing number 28.45/33490 as well.

3.8.6 Electronic File Name

If the electronic file name is not the same as the Eskom number, especially when a project consists of a large number of drawings, the workload for this office is enormous. It is therefore of the utmost importance that the Eskom drawing number be used as the electronic filing name.

3.8.7 Drawing Index

A list of the drawings on electronic format must accompany the drawings. This file should preferably be done in Microsoft Excel. The list must include at least the following:

- Eskom drawing number
- Title
- Revision number
- Sheet number
- Contractor drawing number.

3.8.8 Hard Copies (paper copies)

A hard copy (paper copy) of each drawing must be supplied to Eskom. This copy must be printed in the original size it has been drawn in. (E.g., A0, A1, etc)

Scanned signatures on electronic copies of drawings are not legally recognised the hard copy must be signed according to the requirements in the title block. These copies are then being stored at Megawatt Park for legal purposes.

At the end of the guarantee period but before closure of the contract, the Contractor must supply to the Employer a copy of the CAD software reflecting the latest revisions of the Plant-Usable Documentation.

3.8.9 Modifications

The Contractor must provide additional and amended pages, sufficient for all copies of manuals and drawing sets to ensure that they are complete with details of modifications made up to the time of taking over.

4 Procurement

4.1 People

4.1.1 Minimum requirements of people employed on the Site

N/A

4.1.2 BBBEE and preferencing scheme

N/A

4.1.3 Accelerated Shared Growth Initiative – South Africa (ASGI-SA)

The *Contractor* complies with and fulfils the *Contractor's* obligations in respect of the Accelerated and Shared Growth Initiative - South Africa in accordance with and as provided for in the *Contractor's* ASGI-SA Compliance Schedule stated below

[Insert the agreed ASGI-SA Compliance Schedule here]

The *Contractor* shall keep accurate records and provide the *Project Manager* with reports on the *Contractor's* actual delivery against the above stated ASGI-SA criteria. [Elaborate on access to and format of records and frequency of submission etc.]

The *Contractor's* failure to comply with his ASGI-SA obligations constitutes substantial failure on the part of the *Contractor* to comply with his obligations under this contract.

4.2 Subcontracting

4.2.1 Preferred subcontractors

N/A

4.2.2 Subcontract documentation, and assessment of subcontract tenders

N/A

4.2.3 Limitations on subcontracting

N/A

4.2.4 Attendance on subcontractors

N/A

4.3 Plant and Materials

4.3.1 Quality

All inspections and testing to be performed in accordance with the Quality Control Procedure developed by the Contractor. The specified Materials and Equipment are to be new, unused, and free from defects and imperfections. No Reconditioned Materials and/or Equipment are regarded as new under any circumstances. The Contractor will not use Materials or Equipment which are generally recognised as being unsuitable or otherwise to be avoided for the purpose for which they are intended.

Only components of high reliability will be utilised, with a proven operating history, to enable the Plant to achieve required reliability and availability. Equipment design, engineering and manufacture will be done in accordance with the best modern practice applicable to high-grade products of the type to be furnished, to ensure the efficiency and reliability of the Works and the strength and suitability of the various parts for the Works.

Materials and equipment withstand ambient conditions and the variations of temperature arising under working conditions without distortion, deterioration, or undue strains in any part. All parts and components are made accurately, and where practicable, to acceptable standards to facilitate replacement and repairs. Repair of defective material and/or equipment will be done only with the Employer's approval and any such repair, if approved, will be carried out to the satisfaction of the Employer.

The Contractor ensures that co-ordinated and formally documented management system is in place for the assurance of quality. The Employer is to specify hold and witness points during the manufacturing, installation, and on-site testing stages of the project. The Contractor issues preliminary notification of such hold and witness points by ten working days in advance to the Employer and confirms such hold and witness points at least five working days prior to the activity.

Typical hold points are listed below:

- Design Review
- Factory Acceptance Test
- Delivery to Site
- Erection
- Site Acceptance Test
- All manuals and drawings (in the specified format)
- Commissioning

In addition to maintaining appropriate inspection and test records to substantiate conformance to requirements, the following records are safely stored for a minimum period of seven years following the final completion of the Works:

- Construction, layout, and component approvals/acceptance
- Type and routine test certificates
- Design drawings and approvals/acceptance

After this period, the Contractor offers these records to the Employer (in writing) and obtains a disposal instruction. Documentation regarding quality procedures is submitted within thirty days of Contract Award. The Employer will review and comment on the acceptability of these documents in a time frame as per the requirements of the contract for contractual correspondence. If controlled copies of these documents have been submitted to the Employer, then the controlled copy numbers may be quoted in the submission.

The Contractor adheres to:

- Vendor Document Submittal Schedule (the schedule to be issued to the *Contractor* by the *Employer*)
- Limits of Supply and Services (LOSS to be agreed upon for interfaces and roles and responsibilities)

4.3.2 Plant & Materials provided “free issue” by the *Employer*

- Kriel PS will provide CO Gas Monitoring measurements to the Contractor.
- ‘All other Plant and Materials are to be provided by the *Contractor*’.

4.3.3 *Contractor's* procurement of Plant and Materials

The Contractor is to order, codify, expedite, freight, import, transport to Site as per the requirement of this scope work and the agreed project plan.

4.3.4 Spares and consumables

The Contractor supplies a complete listing of the components and consumables supplied and installed with technical description, model number and other technical detail as required by the Employer's SAP system and the Project Manager. This is used to update or create technical specifications for spares, by the Employer (in the SAP system), and facilitate ease of ordering spares when required.

- The Contractor is to supply a list of all spares that will be required to maintain the plant in the future as well as the number of spares to be kept on site.
- The Contractor will also specify the maintenance requirements for each installed component, stipulating the frequency of maintenance, action to be carried out, tools required, and risks involved.
- The spares list must be submitted to the Employer as soon the Contractor has placed orders for all the equipment.

4.4 Tests and inspections before delivery

4.4.1 Factory acceptance testing (FAT) and delivery stage

Instrument Checks

All instruments or equipment's must be calibrated before installation and must be accompanied with test certificates before commissioning is to start.

Loop Checks

Each complete measuring loop must be subject to a systematic operational and calibration check after installation of the equipment.

It must be the responsibility of the *Contractor* to check that each measuring loop falls within the specified loop accuracy. Equipment out of calibration must be recalibrated in situ.

The results of these tests are to be included on the test certificates supplied by the *Contractor*.

A point-to-point check must be carried out for each loop and must be signed off as correct per the commissioning drawing on the drawing by all parties.

4.5 Marking Plant and Materials outside the Working Areas

As per Clause 71.1 should the Supervisor mark the plant and equipment outside the Work areas for payment purposes, the Contractor shall prepare them for Marking as per the Works Information.

4.6 Contractor's Equipment (including temporary works).

N/A

4.7 Cataloguing requirements by the Contractor

N/A

5 Construction

All newly installed equipment must be catalogued. The Contractor shall supply all technical information required for cataloguing an equipment.

5.1 Temporary works, Site services & construction constraints

5.1.1 Employer's Site entry and security control, permits, and Site regulations

Kriel Power Station is a national key point with very strict entrance requirements that must always be complied with.

5.1.2 Restrictions to access on Site, roads, walkways, and barricades

The Contractor shall comply to the restrictions as per site rules relating to roads, walkways, and barricades. There are areas marked as red zones at which the Contractor should comply.

5.1.3 People restrictions on Site; hours of work, conduct and records

The Contractor shall comply to the working hours at Kriel Power Station which are from: 7:00 till 16:15 from Monday to Thursday and 7:00 to 12:00 on a Friday. The Contractor to cater for weekends due to access restrictions in certain areas or due to outages that may fall over the weekend. In addition to the above the Contractor shall ensure that resting periods are complied with should their programme indicate working hours above the norm.

It is very important that the Contractor keeps records of his people on Site, including those of his Subcontractors which the Employer or Supervisor have access to at any time. These records may be needed when assessing compensation events.

5.1.4 Health and safety facilities on Site

Refer to clause 2.4.

On requiring medical attention, the Contractor must notify the Employer and be taken to the medical centre to be evaluated further and administered First Aid if necessary. Any emergency experienced by the Contractor must be reported to the Employer promptly.

5.1.5 Environmental controls, fauna & flora, dealing with objects of historical interest

Refer to paragraph 2.4 above.

5.1.6 Title to materials from demolition and excavation

The Contractor has no title to materials from excavation and demolition. All reusable equipment will remain the property of the Employer. All identified scrap material to be scrapped daily and disposed at the Employer's scrap yard.

5.1.7 Cooperating with and obtaining acceptance of Others

N/A

5.1.8 Publicity and progress photographs

Kriel Power Station is a national key point and taking of photos is not allowed onsite. Should there be a need to take pictures/photos on site, permission should be requested in writing from the head of security.

5.1.9 Contractor's Equipment

The contractor must provide all the equipment required to execute the scope of work.

5.1.10 Equipment provided by the Employer

The Employer will not provide any equipment, The Contractor shall ensure all equipment as per the scope of work is catered for.

5.1.11 Site services and facilities

Employer will provide power, water, waste disposal, ablutions, fire protection, lighting etc. The Contractor shall provide everything else necessary for providing the Works. Upon approval of safety file, a site will be allocated to the Contractor for establishment.

5.1.12 Facilities provided by the Contractor

5.1.12.1 Electrical equipment/appliances, lighting, and power

Any electrical equipment or appliances used by the Contractor must comply with all relevant safety regulations and requirements as detailed in Eskom Procedures and be maintained in safe and proper working condition.

The Supervisor has the right to stop the Contractor's use of any electrical equipment or appliance which, in the Supervisor's opinion, does not conform to the foregoing.

The Contractor provides at his own expense any temporary local lighting and ensures that it is in accordance with the requirements of the Factories Inspector.

The Contractor provides, at his own expense, all temporary wiring and cabling to lead power from the point of supply to the various points where it is required, maintain same and remove on completion.

5.1.12.2 Security

The Contractor is responsible for all security on site, viz., fencing of, night watch and access control in order to secure all plant, materials and the works itself. All these measures must be in accordance with any relevant regulations and standards and are subject to the Supervisor's acceptance.

It is also the Contractor's responsibility to ensure the security of all completed portions of the works prior to Completion.

5.1.12.2 Accommodation of employees

The Contractor is responsible for the provision of accommodation or meals of his own personnel, and the cost thereof to be included in his Price.

5.1.12.3 Sanitary facilities

The Contractor provides services, maintains, and removes on Completion any facilities required and allow for same in his Price.

5.1.12.4 Housekeeping

The Contractor's equipment does not impair the operation of the surrounding plant or access to the surrounding plant.

5.1.12.5 Plant and materials

The Contractor is to recommend the keeping of any additional stocks of spare parts based on experience gained by him during the execution of the works.

5.1.13 Survey control and setting out of the *works*

Risk assessments must be conducted in each area before performing the installation.

5.1.14 Excavations and associated water control

Not applicable.

5.1.15 Control of noise, dust, water, and waste

The Contractor maintains a high standard of cleanliness during the conduct of his activities at Kriel Power Station. This includes areas allocated for storage of materials, site offices etc. to the satisfaction of the Project Manager. The Contractor keeps these areas clean and free from accumulation of waste materials and refuse regardless of the source.

The Contractor ensures during sweeping and dusting, that a minimum amount of dust is liberated into the atmosphere. Cleaning by vacuum cleaners is preferred and the use of compressed air for cleaning is prohibited.

The Contractor is responsible for the prompt removal of all waste to a designated disposal area. The disposal area will be on or in the vicinity of the Power Station and be indicated by the Project Manager.

For the purpose hereof, "waste" any matter, whether liquid or solid or any combination thereof, which is a by-product, emission, residue or remainder of any process or activity carried out in connection with the works and which is not reused on the Site in the ordinary course of carrying out the works within seven days of production.

The Contractor provides an adequate number of marked bins and containers at offices, in yards, at workshops and on the Site for the temporary storage of waste. These bins and containers are subject to approval by the Project Manager. The Contractor is required to segregate certain items of waste by type as designated by the Project Manager.

Bins and containers are emptied, and waste removed to the designated area at least once a week. All the temporary storage areas for bins and containers are kept tidy and must not constitute a nuisance to others. The Contractor takes all required steps to avoid spillage of waste alongside the bins and containers during removal and disposal thereof.

All waste that cannot be contained in either a bin or container is placed on a temporary waste site which the Project Manager identifies. The waste is removed as soon as possible but, in any event, at least once a week. No burning of waste is allowed at the Power Station.

Hazardous waste is dealt with in accordance with the safety, health and/or environmental requirements of the works and the Contractor is solely responsible

5.1.16 Sequences of construction or installation

None

5.1.17 Giving notice of work to be covered up

The Contractor shall report any day-to-day issues to the Supervisor when matters arise. The Supervisor shall be given an opportunity to resolve the issue before it is escalated to the Project Manager/Employer.

5.1.18 Hook ups to existing works

The adjacent plant and equipment may not be modified without written permission from the Project Manager. The Contractor complies with Eskom Life Saving Rules and will report any non-conformance.

5.2 Completion, testing, commissioning, and correction of Defects

5.2.1 Work to be done by the Completion Date

On or before the Completion Date the *Contractor* shall have done everything required to Provide the Works except for the work listed below which may be done after the Completion Date but in any case, before the dates stated. The *Project Manager* cannot certify Completion until all the work except that listed below has been done and is also free of Defects which would have, in his opinion, prevented the *Employer* from using the *works* and Others from doing their work.

	Item of work	To be completed by
	As built drawings of CO Gas Monitor measurement work executed	Within 30 days after Completion

5.2.2 Use of the *works* before Completion has been certified

Employer may use any part of the works before Completion has been certified but if he does so he takes over the part of the works except if the use is for a reason stated in the Works Information

5.2.3 Materials facilities and samples for tests and inspections

Testing

All equipment must be factory tested prior to shipment. Independently of any tests which may have been carried out at the Manufacturer's Works, test must be carried out by the Contractor after erection prior to commissioning to prove compliance with the Works Information. (Cold and hot commissioning)

Provision must be made for the Employer's design staff to participate at specific stages of the system development. Accommodation and transport, for these activities, must be the responsibility of the Employer.

Software Development Checks

Proposed stages in the development of the software at which software criteria should be checked are listed below.

Criteria

The criteria must include the following:

- Ease of modification of programmes and database
- Ease of change of parameters
- Ease of addition of new programmes
- Ease of access to system variables by new programme
- Ease of addition of input/output

Inspection and testing

The Employer reserves the right to appoint a representative or representatives to:

- Inspect all parts during manufacture and erection
- Be present at any of the tests specified

5.2.4 Commissioning

Commissioning is required before completion for all Mechanical, Control & Instrumentation and Electrical equipment/ installations work.

Commissioning shall be conducted on completion of each section. Commissioning will be performed according to the Low Voltage Switchgear and Control Gear Assemblies and Associated Equipment for Voltage up to and including 1000V AC and 1500V DC Standard 240-56227516.

5.2.5 Take over procedures

Takeover is after or at the same time as Completion. The Employer may require the Contractor to provide assistance, security personnel on a temporary basis etc.

Refer to the Employer's Procedure, Commissioning and Completion of Power Station Projects, 240-85416341

5.2.6 Access given by the *Employer* for correction of Defects

The Employer shall provide access to the Contractor for corrections of defects

5.2.7 Performance tests after Completion

The Contractor must perform and document on-site acceptance tests.

Tests must be carried out to ensure the correct performance of the equipment, safety of plant and personnel, and to determine compliance with Specifications, before being taken over.

5.2.8 Training and technology transfer

Refer to section 2.13

6 Plant and Materials standards and workmanship

6.1 C&I, Electrical & Mechanical engineering works

- [1] SANS 1574 - Electric cables-flexible cords
- [2] SANS 9000 to 9004 - Quality management systems and standards.
- [3] SANS 60269 - Low-Voltage Fuses
- [4] SANS 10142-1 - The wiring for premises Part 1: low-voltage installations.
- [5] SANS 10177-2 - Fire testing of materials, components and elements used in buildings Part 2: Fire resistance test for building elements.
- [6] SANS 10198-1 - The selection, handling, and installation of electric power cables of rating not exceeding 33kV Part 1: Definitions and statutory requirements, South African Bureau of Standards, Pretoria.
- [7] SANS 10198-2 - The selection, handling, and installation of electric power cables of rating not exceeding 33kV Part 2: Choice of cable type and methods of installation, South African Bureau of Standards, Pretoria.
- [8] SANS 10198-3 - The selection, handling, and installation of electric power cables of rating not exceeding 33kV Part 3: Earthing systems - general provisions, South African Bureau of Standards, Pretoria.
- [9] SANS 10198-4 - The selection, handling, and installation of electric power cables of rating not exceeding 33kV Part 4: Current ratings, South African Bureau of Standards, Pretoria.
- [10] SANS 10198-5 - The selection, handling, and installation of electric power cables of rating not exceeding 33kV Part 5: Determination of thermal and electrical resistivity of soil, South African Bureau of Standards, Pretoria.
- [11] SANS 10198-6 - The selection, handling, and installation of electric power cables of rating not exceeding 33kV Part 6: Transportation and storage, South African Bureau of Standards, Pretoria.
- [12] SANS 10198-7 - The selection, handling, and installation of electric power cables of rating not exceeding 33kV Part 7: Safety precautions, SABS of Standards, Pretoria.
- [13] SANS 10198-8 - The selection, handling, and installation of electric power cables of rating not exceeding 33kV Part 8: Cable laying and installation, South African Bureau of Standards, Pretoria.
- [14] SANS 10198-9 - The selection, handling, and installation of electric power cables of rating not exceeding 33kV Part 9: Jointing and termination of extruded solid dielectric insulated cables up to 3,3 kV, South African Bureau of Standards, Pretoria.
- [15] SANS 10198-12 - The selection, handling, and installation of electric power cables of rating not exceeding 33kV Part 12: Installation of earthing system, South African Bureau of Standards, Pretoria.
- [16] 0.00/10335 Power and control wiring terminations
- [17] 0.00/1310 - Standard Power and Control Cable Code
- [18] 0.00/2713 - Instrument Cable Code
- [19] 0.54/393, C12 - Earthing: Metal cladding
- [20] 0.54/393, C16 - Earthing: Tanks and bases
- [21] 0.54/393, C19 - Earthing: All single core cable sealing ends
- [22] 0.54/393, C20 - Earthing: Switchboards with thermoplastic insulated cables
- [23] 0.54/393, C21 - Earthing: Switchboards with paper insulated cables
- [24] 0.54/393, C22 - Earthing: Armoured multi-core control and power cables
- [25] 0.54/393, C23 - Earthing: Gland plate earthing details
- [26] 0.54/393, C26 - Earthing: Bolted connection between copper strap and copper rods
- [27] 0.54/393, C22 - Earthing of process control computers
- [28] 0.54/393, C30 - Earthing of electrical enclosures
- [29] 0.54/393, P1 - Earthing of oil type transformers in power stations
- [30] 0.54/393, P2 - Earthing: Motors fed by XLPE or thermoplastic cables
- [31] 0.54/393, P3 - Earthing: Motors fed by MICC, conduit or PILCSWA cables mounted on earthed material
- [32] 0.54/393, P4 - Earthing: Motors fed by MICC, conduit or PILCSWA cables mounted on unearthed material
- [33] 0.54/393, P5 - Earthing: Steel enclosures mounted on earthed material and connected with un-earthed cables
- [34] 0.54/393, P6 - Earthing: Control equipment and local motor starters
- [35] 0.54/393, P7 - Earthing: Power station auxiliary bay signal earth terminal box
- [36] 0.54/393, P9 - Earthing of smaller 3-phase consumer without neutral with 4-core cable
- [37] 0.54/393, C1, C2 & C3 - Earth mat and details
- [38] 0.66/3355 - Cable route marker
- [39] 0.66/3356 - Typical section of cable trenches
- [40] ISO 9001 Quality Management Systems

[41] 32-727 - Eskom Safety, Health, Environment and Quality (SHEQ) Policy

[42] 240-105658000 (QM58) - Supplier Quality Management: Specification

[43] Occupational Health and Safety Act No. 85 of 1993

[44] Environmental Aspects and Impacts Register

[45] Method Statement Template-Ref 240-126469599

[46] ISO 45001 Occupational Health and Safety Management Standard

6.2 Process control and IT works

None

6.3 Other [as required]

None

7 List of drawings

7.1 Drawings issued by the *Employer*

This is the list of drawings issued by the *Employer* at or before the Contract Date and which apply to this contract.

Note: Some drawings may contain both Works Information and Site Information.

Drawing number	Revision	Title
0.45/BHM/COAL/001	-	Coal handling Plant General Layout of Conveyors
0.45/706	-	Coal Handling Plant Conveyors 2A2B4A4B Arrangement
36-944	-	General Standard Instruction for General Drawing Software Configuration
36-945	0	Generation Standard Instruction for P&ID Draughting
36-946	0	Generation Standard Instruction for Electrical Draughting
36-947	0	Generation Standard Instruction for Instrumentation Draughting
32-9	-	Definition of Eskom Documents
EPC001	-	Eskom Documentation Management Procedure
36-1	1	Standard for Management System Documents, Correspondence And Records
36-2	0	Writing And Controlling Management System Documents.
LIM 103	11	AKZ Identification System
GGG 0445	0	Drawing Number System
GGG 1016	-	KKS Identification System
OPS 0014	1	KKS Key Parts
GGG 0442	1	Abbreviation Standard for Chemistry related items for power stations
GGG 0443	2	Abbreviation Standard for Labelling of plant at power stations
GGG 0445	1	Drawing Number System
ISO 128: 1982	-	Technical Drawings – General Principles of Presentation
ISO 129 Part I: 2004	-	Technical Drawings - Dimensioning
ISO 406: 1987	-	Technical Drawings – Tolerancing of Linear and Angular Dimensions
ISO 1101: 2004	-	Technical Drawings – Geometrical Tolerancing
ISO 1660: 1996	-	Technical Drawings – Profile Dimensioning
ISO 3040: 1990	-	Technical Drawings – Cone Dimensioning
ISO 3098 Part I: 2000	-	Technical Drawings - Lettering
ISO 5455: 1995	-	Technical Drawings - Scales

ISO 5459: 1981	-	Technical Drawings – Datum Systems for Geometric Tolerancing
ISO 6410 Parts I – III: 1996	--	Technical Drawings – Representation of Threaded Parts
ISO13567		CAD Layering Standards

8 APPENDIXES

PART 4: SITE INFORMATION

Document reference	Title	No of pages
C4	This cover page Site Information	1
	Total number of pages	

PART 4: SITE INFORMATION

1. General description

The Site is located at Kriel Power Station, a coal-fired power generation facility operated by Eskom in Mpumalanga, South Africa. The Works will be carried out within the power station premises, specifically at the Coal Bunkers for Units 1 to 6.

The project involves the installation and integration of CO Gas Monitoring Systems within existing plant infrastructure, including interfacing with the station's Distributed Control System (DCS) and WinCC SCADA system.

Kriel Power Station is a National Key Point, with strict access control, security procedures, and operational constraints. The Site is an operational facility, and all works must be executed without disrupting ongoing power generation activities.

Access to various areas may be restricted, including designated red zones, and work may need to be aligned with planned outages or controlled access periods.

2. Existing buildings, structures, and plant & machinery on the Site

The Site comprises existing operational infrastructure, including:

- Coal bunkers and associated material handling systems
- Existing CO Gas Monitoring systems (to be assessed, modified, or replaced)
- Electrical distribution systems (220Vac and 24Vdc supply)
- Cable trenches, routing systems, and termination points
- Control and instrumentation systems connected to the DCS and SCADA platforms

The Works involve modification, integration, and interfacing with these existing systems. The Contractor is required to:

- Survey and evaluate existing plant conditions prior to installation
- Integrate new equipment with existing plant and control systems
- Utilize existing structures where feasible for mounting and installation
- Avoid damage or disruption to existing services and machinery

All hook-ups to existing systems require approval, and no modifications to adjacent plant may be made without written consent.

3. Subsoil information

No specific geotechnical or subsoil investigation data is provided for this contract.

The majority of the Works are related to installation within existing plant areas and structures. Any minor civil works, if required (e.g., mounting structures, cable routing), shall be based on:

Existing infrastructure conditions
Contractor's site investigations and assessments

Excavation works are generally not applicable under this contract scope.

4. Hidden services

The Site contains numerous existing underground and concealed services, including:

- Electrical cables and cable trenches
- Instrumentation and control cables
- Underground services associated with plant operations

Detailed and fully accurate records of all hidden services may not be available. Therefore, the Contractor shall:

- Assume the presence of existing underground and concealed services throughout the Site
- Conduct site surveys and use detection methods prior to any drilling, excavation, or installation
- Exercise extreme caution when working near existing infrastructure
- Obtain necessary permits and approvals before disturbing any area

Any damage to existing services due to Contractor activities shall be the Contractor's responsibility

5. Other reports and publicly available information

The following information is available or applicable to the Site:

- Eskom standards, procedures, and specifications
- Environmental Management System (EMS) requirements (ISO 14001 compliant site)
- National Environmental Management Act (Act 107 of 1998) requirements
- Eskom Safety, Health, Environment and Quality (SHEQ) policies
- Applicable SANS standards for electrical, mechanical, and instrumentation works

The Site operates under strict environmental, safety, and operational regulations. Contractors are required to:

- Comply with all applicable legislation and Eskom standards
- Engage with the station's environmental and safety departments prior to commencing work
- Consider operational constraints such as working hours, access restrictions, and outage schedules

Additional technical and operational data may be obtained from:

- Existing as-built drawings
- Plant documentation
- Site inspections and stakeholder consultations