



NEC3 Engineering and Construction

# Short Contract (ECSC3)

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

and

for Design, manufacture, supply, delivery, installation, testing and commissioning of fixed hydrogen detection systems at Drakensberg and Ingula Power Stations

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Documentation prepared by: [•]

# C1 Agreements & Contract Data

## C1.1 Form of Offer and Acceptance

### Offer

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

### **Design, manufacture, supply, delivery, installation, testing and commissioning of fixed hydrogen detection systems at Drakensberg and Ingula Power Stations**

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

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

|                                                     |      |
|-----------------------------------------------------|------|
| The offered total of the Prices exclusive of VAT is | R[•] |
| Value Added Tax @ 15% is                            | R[•] |
| The offered total of the Prices inclusive of VAT is | R[•] |
| (in words) [•]                                      |      |

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

Signature(s)

Name(s)

Capacity

**For the  
tenderer:**

*(Insert name and address of organisation)*

Name &  
signature of  
witness

Date

Tenderer's CIDB registration number:

## Acceptance

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

The terms of the Contract, are contained in:

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

Part 2 Pricing Data

Part 3 Scope of Work: Works Information

Part 4 Site Information

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

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

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

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

Signature(s)

Name(s)

Capacity

**for the  
Employer**

*(Insert name and address of organisation)*

Name &  
signature of  
witness

Date

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

## Schedule of Deviations

Note:

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

| No. | Subject | Details |
|-----|---------|---------|
| 1   | [•]     | [•]     |
| 2   | [•]     | [•]     |
| 3   | [•]     | [•]     |
| 4   | [•]     | [•]     |
| 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 Contract Data

### Data provided by the *Employer*

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

1. Please read the relevant clauses in the NEC3 Engineering and Construction Short Contract (April 2013) (ECSC3)<sup>1</sup> before you enter data. The number of the principal clause is shown for most statements however other clauses may also use the same data.
2. Where the following symbol is used "[•]" - data is required to be inserted.]

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

| Clause         | Statement                                                                                                                              | Data                                                                                                                                                               |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General</b> |                                                                                                                                        |                                                                                                                                                                    |
| 10.1           | The <i>Employer</i> is (Name):                                                                                                         | <b>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</b>            |
|                | Address                                                                                                                                | <b>Registered office at Megawatt Park, Maxwell Drive, Sandton, Johannesburg</b>                                                                                    |
| 10.1 & 14.4    | The <i>Employer's</i> representative to whom the <i>Employer</i> in terms of clause 14.4 delegates his actions <sup>2</sup> is (Name): | <b>[•]</b>                                                                                                                                                         |
|                | Address                                                                                                                                | <b>[•]</b>                                                                                                                                                         |
|                | Tel No.                                                                                                                                | <b>[•]</b>                                                                                                                                                         |
|                | Fax No.                                                                                                                                | <b>[•]</b>                                                                                                                                                         |
|                | E-mail address                                                                                                                         | <b>[•]</b>                                                                                                                                                         |
| 11.2(11)       | The <i>works</i> are                                                                                                                   | <b>Design, manufacture, supply, delivery, installation, testing and commissioning of fixed hydrogen detection systems at Drakensberg and Ingula Power Stations</b> |
| 11.2(13)       | The Works Information is in                                                                                                            | <b>the document called 'Works Information' in Part 3 of this contract.</b>                                                                                         |
| 11.2(12)       | The Site Information is in                                                                                                             | <b>the document called 'Site Information' in Part 4 of this contract.</b>                                                                                          |
| 11.2(12)       | The <i>site</i> is                                                                                                                     | <b>Drakenberg and Ingula Power Stations</b>                                                                                                                        |
| 30.1           | The <i>starting date</i> is.                                                                                                           | <b>TBC</b>                                                                                                                                                         |
| 11.2(2)        | The <i>completion date</i> is.                                                                                                         | <b>TBC</b>                                                                                                                                                         |
| 13.2           | The <i>period for reply</i> is                                                                                                         | <b>[•] weeks</b>                                                                                                                                                   |
| 40             | The <i>defects date</i> is                                                                                                             | <b>52 weeks after Completion</b>                                                                                                                                   |
| 41.3           | The <i>defect correction period</i> is                                                                                                 | <b>2 weeks</b>                                                                                                                                                     |

<sup>1</sup> Available from Engineering Contract Strategies Tel 011 803 3008, Fax 086 539 1902 or [www.ecs.co.za](http://www.ecs.co.za)

<sup>2</sup> Except those actions which can only be done by the *Employer* as a Party to the contract.

|                                                                                                                                                                                            |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 50.1                                                                                                                                                                                       | The <i>assessment day</i> is the                                                                                                | <b>[•] of each month.</b>                                                                                                                                                                                                                                                                                                                                                                                          |
| 50.5                                                                                                                                                                                       | The <i>delay damages</i> are                                                                                                    | <b>[•] per day</b>                                                                                                                                                                                                                                                                                                                                                                                                 |
| 50.6                                                                                                                                                                                       | The retention is                                                                                                                | <b>[•]%</b>                                                                                                                                                                                                                                                                                                                                                                                                        |
| 51.2                                                                                                                                                                                       | The interest rate on late payment is                                                                                            | <b>[•]%<br/>[Insert a rate only if a rate less than 0.5% per week of delay has been agreed]</b>                                                                                                                                                                                                                                                                                                                    |
| 80.1                                                                                                                                                                                       | The <i>Contractor</i> is not liable to the <i>Employer</i> for loss of or damage to the <i>Employer's</i> property in excess of | <b>the amount of the deductibles relevant to the event</b>                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                            | Does the United Kingdom Housing Grants, Construction and Regeneration Act (1996) apply?                                         | <b>No</b>                                                                                                                                                                                                                                                                                                                                                                                                          |
| 93.1                                                                                                                                                                                       | The <i>Adjudicator</i> is                                                                                                       | <b>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 <a href="http://www.ice-sa.org.za">www.ice-sa.org.za</a>). If the Parties do not agree on an Adjudicator the Adjudicator will be appointed by the Arbitration Foundation of Southern Africa (AFSA).</b> |
|                                                                                                                                                                                            | Address                                                                                                                         | <b>[•]</b>                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                            | Tel No.                                                                                                                         | <b>[•]</b>                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                            | Fax No.                                                                                                                         | <b>[•]</b>                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                            | e-mail                                                                                                                          | <b>[•]</b>                                                                                                                                                                                                                                                                                                                                                                                                         |
| 93.2(2)                                                                                                                                                                                    | The <i>Adjudicator nominating body</i> is:                                                                                      | <b>the Chairman of ICE-SA a joint Division of the South African Institution of Civil Engineering and the London Institution of Civil Engineers. (See <a href="http://www.ice-sa.org.za">www.ice-sa.org.za</a> ) or its successor body</b>                                                                                                                                                                          |
| 93.4                                                                                                                                                                                       | The <i>tribunal</i> is:                                                                                                         | <b>arbitration.</b>                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                            | The <i>arbitration procedure</i> is                                                                                             | <b>the latest edition of Rules for the Conduct of Arbitrations published by The Association of Arbitrators (Southern Africa) or its successor body.</b>                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                            | The place where arbitration is to be held is                                                                                    | <b>[•] South Africa</b>                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                            | The person or organisation who will choose an arbitrator                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                                                                                                                            | - if the Parties cannot agree a choice or                                                                                       | <b>the Chairman for the time being or his nominee</b>                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                            | - if the arbitration procedure does not state who selects an arbitrator, is                                                     | <b>of the Association of Arbitrators (Southern Africa) or its successor body.</b>                                                                                                                                                                                                                                                                                                                                  |
| <b>The conditions of contract are the NEC3 Engineering and Construction Short Contract (April 2013)<sup>34</sup> and the following additional conditions Z1 to Z11 which always apply:</b> |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                    |

<sup>3</sup> If June 2005 Edition applies, delete April 2013 and insert June 2005

<sup>4</sup> State whether attached as a 'PDF' file in terms of Eskom's licence, or to be obtained from Engineering Contract Strategies Tel 011 803 3008, Fax 086 539 1902 or [www.ecs.co.za](http://www.ecs.co.za).

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

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

**Z3 Confidentiality**

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

**Z4 Waiver and estoppel: Add to clause 12.2:**

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

**Z5 Health, safety and the environment**

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

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

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

**Z7 Notifying compensation events**

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

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

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

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

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

**Z10 Addition to Clause 50.5**

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

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

**Z11 Ethics**

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

|                           |                                                                                                                                                                                                                                                                    |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Affected Party</b>     | means, as the context requires, any party, irrespective of whether it is the <i>Contractor</i> or a third party, such party's employees, agents, or Subconsultants or Subcontractor's employees, or any one or more of all of these parties' relatives or friends, |
| <b>Coercive Action</b>    | 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,                                             |
| <b>Collusive Action</b>   | 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,                                                                                                     |
| <b>Committing Party</b>   | means, as the context requires, the <i>Contractor</i> , or any member thereof in the case of a joint venture, or its employees, agents, or Subcontractors or the Subcontractor's employees,                                                                        |
| <b>Corrupt Action</b>     | 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,                                                                                             |
| <b>Fraudulent Action</b>  | 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,                                      |
| <b>Obstructive Action</b> | 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                                            |
| <b>Prohibited Action</b>  | means any one or more of a Coercive Action, Collusive Action Corrupt Action, Fraudulent Action or Obstructive Action.                                                                                                                                              |

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

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

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

Z11.4 A Committing Party co-operates fully with any investigation pursuant to alleged Prohibited Action.

Where the *Employer* does not have a contractual bond with the Committing Party, the *Contractor* ensures that the Committing Party co-operates fully with an investigation.

## Z12 Insurance

### Z\_12.1 Replace core clause 82 with the following:

#### Insurance cover 82

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

**INSURANCE TABLE A**

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

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

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

**INSURANCE TABLE B**

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

### **Z13 Nuclear Liability**

Z13.1 The *Employer* is the operator of the Koeberg Nuclear Power Station (KNPS), a nuclear installation, as designated by the National Nuclear Regulator of the Republic of South Africa, and is the holder of a nuclear licence in respect of the KNPS.

Z13.2 The *Employer* is solely responsible for and indemnifies the *Contractor* or any other person against any and all liabilities which the *Contractor* or any person may incur arising out of or resulting from nuclear damage, as defined in Act 47 of 1999, save to the extent that any liabilities are incurred due to the unlawful intent of the *Contractor* or any other person or the presence of the *Contractor* or that person or any property of the *Contractor* or such person at

or in the KNPS or on the KNPS site, without the permission of the *Employer* or of a person acting on behalf of the *Employer*.

Z13.3 Subject to clause Z13.4 below, the *Employer* waives all rights of recourse, arising from the aforesaid, save to the extent that any claims arise or liability is incurred due or attributable to the unlawful intent of the *Contractor* or any other person, or the presence of the *Contractor* or that person or any property of the *Contractor* or such person at or in the KNPS or on the KNPS site, without the permission of the *Employer* or of a person acting on behalf of the *Employer*.

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

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

## **Z14 Asbestos**

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

|                              |                                                                                                                                                                                                                                                                                                              |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AAIA</b>                  | means approved asbestos inspection authority.                                                                                                                                                                                                                                                                |
| <b>ACM</b>                   | means asbestos containing materials.                                                                                                                                                                                                                                                                         |
| <b>AL</b>                    | 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.                                                     |
| <b>Ambient Air</b>           | 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.                                                                                                                             |
| <b>Compliance Monitoring</b> | 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. |
| <b>OEL</b>                   | means occupational exposure limit.                                                                                                                                                                                                                                                                           |
| <b>Parallel Measurements</b> | means measurements performed in parallel, yet separately, to existing measurements to verify validity of results.                                                                                                                                                                                            |
| <b>Safe Levels</b>           | 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.                                                                                       |
| <b>Standard</b>              | 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.                                                                                                      |
| <b>SANAS</b>                 | means the South African National Accreditation System.                                                                                                                                                                                                                                                       |
| <b>TWA</b>                   | means the average exposure, within a given workplace, to airborne asbestos fibres, normalised to the baseline of a 4 hour continuous period, also applicable to short term exposures, i.e. 10-minute TWA.                                                                                                    |

Z14.1 The *Employer* ensures that the Ambient Air in the area where the *Contractor* will Provide the Services conforms to the acceptable prescribed South African standard for asbestos, as per the regulations published in GNR 155 of 10 February 2002, under the Occupational Health

and Safety Act, 1993 (Act 85 of 1993) ("Asbestos Regulations"). The OEL for asbestos is 0.2 regulated asbestos fibres per millilitre of air as a 4-hour TWA, averaged over any continuous period of four hours, and the short term exposure limit of 0.6 regulated asbestos fibres per millilitre of air as a 10-minute TWA, averaged over any 10 minutes, measured in accordance with HSG248 and monitored according to HSG173 and OESSM.

- Z14.2 Upon written request by the *Contractor*, the *Employer* certifies that these conditions prevail. All measurements and reporting are 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 Z14.1. Control measures conform to the requirements stipulated in the AAIA-approved asbestos work plan.
- Z14.3 The *Employer* manages asbestos and ACM according to the Standard.
- Z14.4 In the event that any asbestos is identified while Providing the Services, a risk assessment is conducted and if so required, with reference to possible exposure to an airborne concentration of above the AL for asbestos, immediate control measures are implemented and relevant air monitoring conducted in order to declare the area safe.
- Z14.5 The *Contractor's* personnel are entitled to stop working and leave the contaminated area forthwith until such time that the area of concern is declared safe by either Compliance Monitoring or an AAIA approved control measure intervention, for example, per the emergency asbestos work plan, if applicable.
- Z14.6 The *Contractor* continues to Provide the Services, without additional control measures presented, on presentation of Safe Levels. The contractually agreed dates to Provide the Services, including the Completion Date, are adjusted accordingly. The contractually agreed dates are extended by the notification periods required by regulations 3 and 21 of the Asbestos Regulations, 2001.
- Z14.7 Any removal and disposal of asbestos, asbestos containing materials and waste, is done by a registered asbestos contractor, instructed by the *Employer* at the *Employer's* expense, and conducted in line with South African legislation.

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

The tendering contractor is advised to read both the NEC3 Engineering and Construction Short Contract (April 2013) and the relevant parts of its Guidance Notes (ECSC3-GN)<sup>5</sup> in order to understand the implications of this Data which the tenderer is required to complete. An example of the completed Data is provided on page 31 of the ECSC3 April 2013 Guidance Notes.

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

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

<sup>5</sup> Available from Engineering Contract Strategies Tel 011 803 3008, Fax 086 539 1902 or [www.ecs.co.za](http://www.ecs.co.za).

## C2 Pricing Data

### C2.1 Pricing assumptions

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

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

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

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

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

## C2.2 Price List

The Price List is as follows / contained in \_\_\_\_\_ (delete the text which does not apply and this note)

| 1        | Drakensberg Hydrogen Detection System               |       |          |      |       |
|----------|-----------------------------------------------------|-------|----------|------|-------|
| Item no. | Description                                         | Unit  | Quantity | Rate | Price |
| 1.1      | Hydrogen Detectors                                  | ea    | 16       |      |       |
| 1.2      | Transmitters                                        | ea    | 16       |      |       |
| 1.3      | Audible& Visual Alarm Notification Devices          | ea    | 2        |      |       |
| 1.4      | Hydrogen Detection Controller                       | ea    | 1        |      |       |
| 1.5      | 24V Power Supply                                    | ea    | 1        |      |       |
| 1.6      | PH 120 Cable                                        | m     | 1000     |      |       |
| 1.7      | Bosal Conduit (6m lengths)                          | ea    | 30       |      |       |
| 1.8      | Fire Retardant Cable (Blue Stripe)                  | m     | 100      |      |       |
| 1.9      | I/O Unit                                            | ea    | 5        |      |       |
| 1.10     | Panel Enclosure                                     | ea    | 1        |      |       |
| 1.11     | Tester                                              | ea    | 1        |      |       |
| 1.12     | Sundries                                            | ea    | 1        |      |       |
| 1.13     | Comms Module                                        | ea    | 1        |      |       |
| 1.14     | Comms Cable                                         | m     | 100      |      |       |
| 1.15     | Delivery Costs                                      | ea    | 1        |      |       |
|          | <b>[1] The total of the Prices (excluding VAT):</b> |       |          |      |       |
| 2        | Resources                                           |       |          |      |       |
| Item no. | Description                                         | Unit  | Quantity | Rate | Price |
| 2.1      | Supervisor x 1                                      | hours | 80       |      |       |
| 2.2      | Technician x 2                                      | hours | 80       |      |       |
| 2.3      | Semi-Skilled Assistant x 2                          | hours | 80       |      |       |
| 2.4      | Safety Officer x 1                                  | hours | 80       |      |       |
| 2.5      | Living Out Allowance x 6                            | days  | 12       |      |       |
| 2.6      | Accommodation Cost x 6                              | days  | 12       |      |       |
| 2.7      | Travelling Cost                                     | km    | 2000     |      |       |
|          | <b>[2] The total of the Prices (excluding VAT):</b> |       |          |      |       |
| 3        | Safety File                                         |       |          |      |       |
| Item no. | Description                                         | Unit  | Quantity | Rate | Price |
| 3.1      | Cost for Safety File                                | ea    | 1        |      |       |
|          | <b>[3] The total of the Prices (excluding VAT):</b> |       |          |      |       |

| 4 Design                                                                               |                          |       |          |      |       |
|----------------------------------------------------------------------------------------|--------------------------|-------|----------|------|-------|
| Item no.                                                                               | Description              | Unit  | Quantity | Rate | Price |
| 4.1                                                                                    | Cost for Design          | ea    | 1        |      |       |
| [4] The total of the Prices (excluding VAT):                                           |                          |       |          |      |       |
| 5 Certification                                                                        |                          |       |          |      |       |
| Item no.                                                                               | Description              | Unit  | Quantity | Rate | Price |
| 5.1                                                                                    | Cost for Certification   | ea    | 1        |      |       |
| [5] The total of the Prices (excluding VAT):                                           |                          |       |          |      |       |
| 6 Manuals & Drawings                                                                   |                          |       |          |      |       |
| Item no.                                                                               | Description              | Unit  | Quantity | Rate | Price |
| 6.1                                                                                    | Cost for Manuals         | ea    | 1        |      |       |
| 6.2                                                                                    | Cost for Drawings        | ea    | 1        |      |       |
| [6] The total of the Prices (excluding VAT):                                           |                          |       |          |      |       |
| 7 Training                                                                             |                          |       |          |      |       |
| Item no.                                                                               | Description              | Unit  | Quantity | Rate | Price |
| 7.1                                                                                    | Training Material        | ea    | 1        |      |       |
| 7.2                                                                                    | Trainer x 1              | hours | 32       |      |       |
| 7.3                                                                                    | Accommodation x 1        | days  | 4        |      |       |
| 7.4                                                                                    | Travelling Cost          | km    | 800      |      |       |
| 7.5                                                                                    | Living Out Allowance x 1 | days  | 4        |      |       |
| [7] The total of the Prices (excluding VAT):                                           |                          |       |          |      |       |
| 8 Issuing of COC                                                                       |                          |       |          |      |       |
| Item no.                                                                               | Description              | Unit  | Quantity | Rate | Price |
| 8.1                                                                                    | Master Electrician x 1   | hours | 16       |      |       |
| 8.2                                                                                    | Accommodation x 1        | days  | 2        |      |       |
| 8.3                                                                                    | Travelling Cost          | km    | 800      |      |       |
| 8.4                                                                                    | Living Out Allowance x 1 | days  | 2        |      |       |
| [8] The total of the Prices (excluding VAT):                                           |                          |       |          |      |       |
| [1] + [2] + [3] + [4] + [5] + [6] + [7] + [8] The total of the Prices (excluding VAT): |                          |       |          |      |       |

| 1        | Ingula Hydrogen Detection System             |       |          |      |       |
|----------|----------------------------------------------|-------|----------|------|-------|
| Item no. | Description                                  | Unit  | Quantity | Rate | Price |
| 1.1      | Hydrogen Detectors                           | ea    | 16       |      |       |
| 1.2      | Transmitters                                 | ea    | 16       |      |       |
| 1.3      | Audible& Visual Alarm Notification Devices   | ea    | 2        |      |       |
| 1.4      | Hydrogen Detection Controller                | ea    | 1        |      |       |
| 1.5      | 24V Power Supply                             | ea    | 1        |      |       |
| 1.6      | PH 120 Cable                                 | m     | 1000     |      |       |
| 1.7      | Bosal Conduit (6m lengths)                   | ea    | 30       |      |       |
| 1.8      | Fire Retardant Cable (Blue Stripe)           | m     | 100      |      |       |
| 1.9      | I/O Unit                                     | ea    | 5        |      |       |
| 1.10     | Panel Enclosure                              | ea    | 1        |      |       |
| 1.11     | Tester                                       | ea    | 1        |      |       |
| 1.12     | Sundries                                     | ea    | 1        |      |       |
| 1.13     | Comms Module                                 | ea    | 1        |      |       |
| 1.14     | Comms Cable                                  | m     | 100      |      |       |
| 1.15     | Delivery Costs                               | ea    | 1        |      |       |
|          | [1] The total of the Prices (excluding VAT): |       |          |      |       |
| 2        | Resources                                    |       |          |      |       |
| Item no. | Description                                  | Unit  | Quantity | Rate | Price |
| 2.1      | Supervisor x 1                               | hours | 80       |      |       |
| 2.2      | Technician x 2                               | hours | 80       |      |       |
| 2.3      | Semi-Skilled Assistant x 2                   | hours | 80       |      |       |
| 2.4      | Safety Officer x 1                           | hours | 80       |      |       |
| 2.5      | Living Out Allowance x 6                     | days  | 12       |      |       |
| 2.6      | Accommodation Cost x 6                       | days  | 12       |      |       |
| 2.7      | Travelling Cost                              | km    | 2000     |      |       |
|          | [2] The total of the Prices (excluding VAT): |       |          |      |       |
| 3        | Safety File                                  |       |          |      |       |
| Item no. | Description                                  | Unit  | Quantity | Rate | Price |
| 3.1      | Cost for Safety File                         | ea    | 1        |      |       |
|          | [3] The total of the Prices (excluding VAT): |       |          |      |       |
| 4        | Design                                       |       |          |      |       |
| Item no. | Description                                  | Unit  | Quantity | Rate | Price |
| 4.1      | Cost for Design                              | ea    | 1        |      |       |
|          | [4] The total of the Prices (excluding VAT): |       |          |      |       |

| 5        | Certification                                                                                 |       |          |      |       |
|----------|-----------------------------------------------------------------------------------------------|-------|----------|------|-------|
| Item no. | Description                                                                                   | Unit  | Quantity | Rate | Price |
| 5.1      | Cost for Certification                                                                        | ea    | 1        |      |       |
|          | <b>[5] The total of the Prices (excluding VAT):</b>                                           |       |          |      |       |
| 6        | Manuals & Drawings                                                                            |       |          |      |       |
| Item no. | Description                                                                                   | Unit  | Quantity | Rate | Price |
| 6.1      | Cost for Manuals                                                                              | ea    | 1        |      |       |
| 6.2      | Cost for Drawings                                                                             | ea    | 1        |      |       |
|          | <b>[6] The total of the Prices (excluding VAT):</b>                                           |       |          |      |       |
| 7        | Training                                                                                      |       |          |      |       |
| Item no. | Description                                                                                   | Unit  | Quantity | Rate | Price |
| 7.1      | Training Material                                                                             | ea    | 1        |      |       |
| 7.2      | Trainer x 1                                                                                   | hours | 32       |      |       |
| 7.3      | Accommodation x 1                                                                             | days  | 4        |      |       |
| 7.4      | Travelling Cost                                                                               | km    | 800      |      |       |
| 7.5      | Living Out Allowance x 1                                                                      | days  | 4        |      |       |
|          | <b>[7] The total of the Prices (excluding VAT):</b>                                           |       |          |      |       |
| 8        | Issuing of COC                                                                                |       |          |      |       |
| Item no. | Description                                                                                   | Unit  | Quantity | Rate | Price |
| 8.1      | Master Electrician x 1                                                                        | hours | 16       |      |       |
| 8.2      | Accommodation x 1                                                                             | days  | 2        |      |       |
| 8.3      | Travelling Cost                                                                               | km    | 800      |      |       |
| 8.4      | Living Out Allowance x 1                                                                      | days  | 2        |      |       |
|          | <b>[8] The total of the Prices (excluding VAT):</b>                                           |       |          |      |       |
|          | <b>[1] + [2] + [3] + [4] + [5] + [6] + [7] + [8] The total of the Prices (excluding VAT):</b> |       |          |      |       |

|                                                                                             |  |
|---------------------------------------------------------------------------------------------|--|
| <b>The total of the Prices for Drakensberg &amp; Ingula Power Stations (excluding VAT):</b> |  |
|---------------------------------------------------------------------------------------------|--|

## C3: Scope of Work

### C3.1 Works Information

#### Executive Overview

Drakensberg Pumped Storage Power Station has a nominal generating capacity of 1000MW which is produced from four 250MW Francis type vertical turbine generator sets. The power station is situated underground, in the Northern Drakensberg Mountains in KwaZulu-Natal, approximately 30km from the town of Bergville. Its four units were commissioned between 1979 and 1981.

The GPS Coordinates for the site are as follows:

-28.56468 (Latitude), 29.08408 (Longitude)

Ingula Pumped Storage Power Station has a nominal generating capacity of 1332MW which is produced from four 333MW Francis type vertical turbine generator sets. The power station is situated underground, in the Northern Ingula Mountains in KwaZulu-Natal, approximately 50km from the town of Ladysmith.

The GPS Coordinates for the site are as follows:

-28.28078 (Latitude), 29.58795 (Longitude)

Drakensberg and Ingula Power Stations contain battery rooms that houses lead acid batteries which provide backup power to essential power station equipment and ancillaries. The respective two battery rooms have been classified as Zone 2 according to *SANS 10108 "The classification of hazardous locations and the selection of equipment for use in such locations"*. The Drakensberg Pumped Storage Scheme battery room houses lead acid batteries manufactured by First National Batteries (Faure-x) FHP21, FCP13, YHP21 respectively consisting of 304 cells, with a cell capacity of 1310 Ah, 192 Ah, 1072 Ah respectively. The Ingula Pumped Storage Scheme battery room houses lead acid batteries manufactured by Hoppecke VM 2 consisting of 212 cells, with a cell capacity of 1920 Ah.

The purpose of the *Works* is to ensure that the battery rooms at Drakensberg and Ingula Power Stations have fully functional fixed hydrogen detection systems to detect and alert upon release of hydrogen and prevent an explosive atmosphere from being generated.

The *Employer's* objective is to equip the battery rooms with a means of hydrogen detection and alarming for the sites by installing fixed hydrogen detection systems in the battery rooms at Drakensberg and Ingula Power Stations. The new fully functional systems shall comply with all relevant battery room hydrogen detection safety standards and regulations.

#### 1. Description of the works

The *Works* make provision for the design, manufacture, supply, delivery to the site, installation, testing and commissioning of the complete, fully functional and fully integrated solutions at Drakensberg and Ingula Pumped Storage Schemes that consists of the following:

- A Fixed Hydrogen Detection System for the Drakensberg Power Station Battery Room.
- A Fixed Hydrogen Detection System for the Ingula Power Station Battery Room.

## 1.1 Contractor's scope of supply

The scope of supply includes, but is not limited to the following:

- a) Design, manufacture, transport and delivery to site, offloading and installation, testing and commissioning of a fully functional hydrogen detection system for the battery room at Drakensberg Power Station, consisting as a minimum of:
  - Explosion-Proof Fixed Point Type Hydrogen Detectors
  - Explosion-Proof Transmitters
  - Hydrogen Detection Controller
  - Audible and Visual Alarm Notification Devices
  - 24V DC Power Supply with Battery Back-up
  - Bosal Conduit
  - Fire Alarm Cabling
  - Power Supply Cabling
  - Comms Module & Interface Cabling
  - Interface Modules
  - Isolator/Zener Barrier
- b) Design, manufacture, transport and delivery to site, offloading and installation, testing and commissioning of a fully functional hydrogen detection system for the battery room at Ingula Power Station, consisting as a minimum of:
  - Explosion-Proof Fixed Point Type Hydrogen Detectors
  - Explosion-Proof Transmitters
  - Hydrogen Detection Controller
  - Audible and Visual Alarm Notification Devices
  - 24V DC Power Supply with Battery Back-up
  - Bosal Conduit
  - Fire Alarm Cabling
  - Power Supply Cabling
  - Comms Module & Interface Cabling
  - Interface Modules
  - Isolator/Zener Barrier
- c) Provide all technical documentation (drawings, manuals, other documentation, etc.).
- d) Provide detailed fault-finding guides of the Hydrogen Detection Systems that includes:
  - All of the different types of faults
  - The indications relating to the faults
  - Probable causes
  - Corrective action
- e) Provide labelling of equipment.

- f) Provide all necessary equipment, tools & material required to complete the *Works*.
- g) Provide PPE (Personal Protective Equipment) for each *Contractor* person working on site.
- h) Provide supervision and resources to complete the *Works*.
- i) Provide safety file, method statements, installation procedures, check sheets and quality plans prior to installation, allowing for enough time to be reviewed by the *Employer*.
- j) Provide operating, maintenance and engineering training.
- k) Provide technical data sheets for all equipment.
- l) Provide certification of the equipment.
- m) Cold commission the entire systems.
- n) Hot commission the entire systems.
- o) Provide a maintenance plan for the hydrogen detection systems. The maintenance plan includes procedures for:
  - Condition monitoring
  - Preventative maintenance
- p) Provide a complete list of spares
- q) Provide Operations, Maintenance and Training Manuals.
- r) Provide As-Built Drawings.
- s) Provide testing equipment.
- t) Provide Training for Operations and Maintenance Personnel.
- u) Provide a Certificate of Compliance (COC) after installation of the Hydrogen Detection System

**NOTE:** The schedule A&B (The *Contractor* populates Column/Schedule B) must be returned with the tender documents.

## 1.2 Contractor's scope of work

The scope of work includes, but is not limited to the following:

- Transportation of hydrogen detection equipment, tools, materials, and consumables required for the installation of the *works*.
- Loading and offloading of the equipment, tools, and materials.
- Installation of the hydrogen detection system.
- Provide integration of the Hydrogen Detection System with the following systems:
  - a. Stations Fire Alarm System
    - i. This role requires the design of the following:
      - The integration of all hardwired signals between the Hydrogen Detection Controller and the existing Aritech FP2000 Fire Alarm Panel (for Drakensberg) and Ziton ZP3 Fire Alarm Panel (for Ingula).
      - The integration of all hardwired signals between the 24V DC Power Supply and the existing Aritech FP2000 Fire Alarm Panel (for Drakensberg) and Ziton ZP3 Fire Alarm Panel (for Ingula).

- Provision is made for integration of the Hydrogen Detection Controller to an I/O module to enable future integration with the Station Fire Alarm System. The Contractor ensures full installation up to the I/O Unit.
  - Provision is made for integration of the fault conditions from the 24V DC Power Supply to an I/O module(s) to enable future integration with the Station Fire Alarm System. The Contractor ensures full installation up to the I/O Unit.
- b. Uninterruptable Power Supply (UPS) / Essential System
- i. This role requires the design, testing and commissioning of the following:
- The integration of the Controller Power Supply with the Essential Supply Services (Inverter) to enable essential supply for the panel.
- c. SCADA System
- i. This role requires the design, testing and commissioning of the following:
- The integration of the Hydrogen Detection Controller with the SCADA System to enable display of alarms and fault indications on the SCADA.
- Commissioning and functional testing of newly installed hydrogen detection system as per OEM requirements.
  - Labelling of installation as per Eskom Labelling Standard.
  - Submission of "As Built" drawings on completion of all works.
  - The verification and certification of the hydrogen detection system installation in the hazardous location is performed by a registered person as Master Installation Electrician in terms of regulation 11(2) of Electrical Installation Regulations in the OHS Act. which shall issue a Certificate of Compliance.

## 2. Drawings

| Drawing number   | Revision | Title                                   |
|------------------|----------|-----------------------------------------|
| 0.48/3216        | --       | Drakensberg Battery Room Layout Drawing |
| 0.83/24102 Sht-4 | --       | Ingula Battery Room Layout Drawing      |
|                  |          |                                         |

## 3. Specifications

| Title                                                                | Date or revision | Tick if publicly available |
|----------------------------------------------------------------------|------------------|----------------------------|
| <b><u>General Specifications:</u></b>                                |                  |                            |
| OHS Act - Occupational Health and Safety Act No. 85 of 1993          |                  |                            |
| 240-105658000 - Supplier Contract Quality Requirements Specification |                  |                            |
| 240-150642762 - Generation Plant Safety Regulations                  |                  |                            |
| 240-56227413 - Hydrogen System Standard                              |                  |                            |

|                                                                                                                                                                         |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| 240-62196227 - Eskom Life-saving Rules Directive 23-421                                                                                                                 |  |  |
| ARP 0108:2018 - Guide to the Regulatory Requirements for Explosion-protected Apparatus                                                                                  |  |  |
| SANS 10108:2023 - The classification of hazardous locations and the selection of equipment for use in such locations                                                    |  |  |
| SANS 10086-2:2013 - The installation, inspection and maintenance of equipment used in explosive atmospheres Part 2: Electrical equipment installed underground in mines |  |  |
| SANS 60079-25:2020 - Explosive Atmosphere Part 25: Intrinsically safe electrical systems                                                                                |  |  |
| SANS 60079-29-1 - Explosive atmospheres Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases                                            |  |  |
| SANS 60079-29-2 - Explosive atmospheres Part 29-2: Gas detectors - Selection, installation, use and maintenance of detectors for flammable gases and oxygen             |  |  |
| SANS 60079-29-3 - Explosive atmospheres - Part 29-3: Gas detectors - Guidance on functional safety of fixed gas detection systems                                       |  |  |
| SANS 60079-29-4 - Explosive atmospheres - Part 29-4: Gas detectors - Performance requirements of open path detectors for flammable gases                                |  |  |
|                                                                                                                                                                         |  |  |

#### 4. Constraints on how the *Contractor* Provides the *Works*

##### 4.1 General Design Requirements

- The *Employer's* battery room layout drawings, ventilation system arrangement and information from an on-site engineering study are the basis for the *Contractor's* design of the *Works*.
- The *Contractor* performs a site evaluation to obtain an indication of the room layout, environmental conditions, ventilation arrangements, possible detector location, and location for mounting of detectors, controller and panels.
- Based on the site evaluation and information contained in this Technical Specification, the *Contractor* develops a design of the Hydrogen Detection System that includes calculations, specifications, integration requirements, layout drawings, termination diagrams, procedures, manuals, etc. that is provided to the *Employer* for review and acceptance.
- The Hydrogen Detection System is listed as a complete system suitable for use in explosive gas atmospheres with Factory Mutual, EX and ATEX Certification and is designed to meet the requirements of:
  - 240-56737448 - Fire Detection and Life Safety Design Standard
  - 240-56227413 - Hydrogen System Standard
  - 240-56177186 - Battery Room Standard
  - ARP 0108:2018 - Guide to the Regulatory Requirements for Explosion-protected Apparatus

- SANS 10108:2023 - The classification of hazardous locations and the selection of equipment for use in such locations
- SANS 10086-2:2013 The installation, inspection and maintenance of equipment used in explosive atmospheres Part 2: Electrical equipment installed underground in mines
- SANS 60079-25:2020 Explosive Atmosphere Part 25: Intrinsically safe electrical systems
- SANS 60079-29-1 Explosive atmospheres Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases
- SANS 60079-29-2 Explosive atmospheres Part 29-2: Gas detectors - Selection, installation, use and maintenance of detectors for flammable gases and oxygen
- SANS 60079-29-3 Explosive atmospheres - Part 29-3: Gas detectors - Guidance on functional safety of fixed gas detection systems
- SANS 60079-29-4 Explosive atmospheres - Part 29-4: Gas detectors - Performance requirements of open path detectors for flammable gases
- SANS 60079-14:2014 Explosive atmospheres Part 14: Electrical installations design, selection and erection
- SANS 10139:2021 Code of practice for design, installation, commissioning and maintenance of fire detection and alarm systems in non-domestic premises
- The hydrogen detection system architecture comprises of the following components:
  - An explosion proof controller that is positioned outside the battery room.
  - A 24V DC Power Supply with battery back-up of not less than 24 hours and the availability to operate for a further period of 1 hour in full alarm mode.
    - The power supply incorporates dry contacts for fault purposes to be interfaced to the Station Fire Alarm Panel.
  - Explosion proof fixed hydrogen detectors consisting of the detector and transmitter.
  - Explosion proof Audible & Visual Alarm Initiating Devices that are installed both internal and external to the battery room.
  - PH 120 Cabling
  - Bosal Conduit
  - Interface Modules enabling future interfacing with the Station Fire Alarm System
  - Fire Retardant Power Supply Cabling
  - Comms Module & Cabling
  - Panel Enclosure (Hub Enclosure) for housing 24V DC Power Supply and I/O Modules
  - Isolator or Zener Barrier
- The hydrogen detection systems comprise of single fixed-point type detectors connected to a display control unit located outside of the protected area, designed to provide.
  - Indication of gas concentration
  - Audible and visual alarms
  - Outputs for alarming and monitoring
- The hydrogen detectors can detect hydrogen in the 0% to 4% by volume (0% to 100% LEL) in air.

- Given that the Lower Explosive Limit (LEL) for hydrogen is 4% by volume in air, the detection and alarming is set at 1% by volume hydrogen concentration in air, equivalent to 25% of the low explosive limit (LEL).
- The selection and quantity of detectors for the area and spacing is based on the coverage provided per detector in relation to the room area, construction and layout of the room and equipment and the environmental conditions in the room.
- Detectors are located at the highest point where hydrogen build-up can most likely occur.
- Hydrogen detectors, transmitter and controllers are explosion proof and are FM, Ex and ATEX Certified.
- The *Contractor* provides a Declaration of Conformity to demonstrate that the equipment installed in the hazardous location is FM, Ex & ATEX Certified and in conformance with SANS 10086-2:2013, SANS 60079-25:2020, SANS 60079-29-1, SANS 60079-29-2, SANS 60079-29-3, SANS 60079-29-4 and SANS 60079-14:2014.
- Provision is made for protection against loss of main power supply to ensure unrestricted operation of gas detection equipment and alarm functions are guaranteed.
- The hydrogen detection controller must support Modbus TCP/IP protocol to enable integration with the SCADA. The preference for the use of comms cabling is to use CAT6 STP cabling for runs up to 100m and fiber optic cable for runs exceeding 100m. The *Contractor* make provision for interfacing with the *Employer's* SCADA.
- The *Contractor* issues a Certificate of Compliance (CoC) for the hydrogen detection system performed by a registered person as Master Installation Electrician in terms of regulation 11(2) of Electrical Installation Regulations in the OHS Act.

#### 4.1.1 Hydrogen Detector

- The Hydrogen detector is explosion proof and of the single fixed-point type.
- For purposes of standardisation and spares interchangeability, consideration must be given to similar devices used elsewhere in Eskom at Arnot Power Station, which use the Catalytic Sensor Model CGS that is compatible with FlexVu Model UD10 and Transmitter Model 505.

#### 4.1.2 Hydrogen Transmitter

- The Hydrogen detection transmitter is explosion proof.
- For purposes of standardisation and spare interchangeability, consideration must be given to similar devices used elsewhere in Eskom at Arnot Power Station, which use the Transmitter Model 505 that is compatible with Controller FlexVu Model UD10.

#### 4.1.3 Hydrogen Detection Controller

- The Hydrogen detection controller is explosion proof.
- For purposes of standardisation and spare interchangeability, consideration must be given to similar devices used elsewhere in Eskom at Arnot Power Station, which use the Controller FlexVu Model UD10.
- The controller is visually unobstructed, mounted externally to the battery room at the entrance and is integrated with other associated equipment that are in a panel enclosure (hub enclosure) and the detectors and alarm-initiated devices.
- An isolation barrier or Zener barrier is installed externally to the battery room to ensure that all detection and alarm entering the battering conforms to requirements of **SANS 60079-25:2020 Explosive Atmosphere Part 25: Intrinsically safe electrical systems** and **SANS 60079-**

**14:2014 Explosive atmospheres Part 14: Electrical installations design, selection and erection.****4.1.4 Power Supply**

- For purposes of standardisation and spare interchangeability, consideration must be given to similar devices used at Drakensberg, which use the 24V EN54-44 Switch Mode Power Supply Unit Part No.: BF562-5 on the fire protection systems.
- The power supply is sized according to the design of the system.

**4.1.5 Alarm Initiating Devices**

- Visual and audible alarm initiating devices are installed both internal and external to the battery room.
- An isolation barrier or Zener barrier is installed to prevent devices from generating a spark.

**4.1.6 Cabling**

- Fire alarm cabling is of the enhanced fire resistance (PH120 rating) type.
- Fire alarm cabling is sized according to the design of the system.
- Power supply cabling is sized according to the design of the system.
- Power supply cabling is of the flame-retardant type comprising of the blue cable trace colour (Low halogen emission PVC bedding and sheath).
- All cabling is fitted with approved cable and core numbers.
- All cable screens are terminated on standard terminals at one end of the cable, or both ends depending on the design. Cable screens are earthed throughout the loop.

**4.1.7 Conduit**

- Conduits shall comply with SANS 1065 part 1 and 2
  - Screwed metallic conduit and accessories
  - Plain-end metallic conduit and accessories
- Cabling is run in close-ended galvanised mild steel conduit that is in accordance with SANS 32 & 121.

**4.1.8 Integration**

- The *Contractor* is responsible for the integration of hydrogen detection system onto the SCADA. Standard communication protocols are to be used to communicate with the Employer's SCADA system in the following order of preference: (1) IEC 60870-5-104, (2) IEC 61850, (3) Modbus TCP/IP, (4) Modbus RTU.
- The *Contractor* is responsible for the + integration between the inverter/essential supply and the new hydrogen detection system.
- The *Contractor* is responsible for the supply, installation, terminating and testing of the wiring between the inverter/essential supply and the new hydrogen detection system.
- The *Contractor* is responsible for the supply, installation, terminating and testing of the wiring between the new fire zones and the existing Station Fire Alarm system.
- The *Contractor* is responsible for the integration of hydrogen detection system with the I/O Units that would allow for future integration with the Station Fire Alarm System.

- The *Contractor* is responsible for the integration of 24V DC Power Supply with the I/O Units that would allow for future integration with the Station Fire Alarm System.

## 5. Procedure for submission and acceptance of *Contractor's* design

The *Contractor* is made aware that all documents or designs submitted for review to the *Employer* for acceptance requires a process of review as stipulated in the Engineering Change Management Procedure (240-53114002). This process consists of:

- Submission of the tender returnable
- Technical Evaluation
- Contract Award
- Submission of Detail Design by *Contractor*
- *Employer's* Project team reviews
- Updates Detail Design review by *Contractor*
- Detail Design Scope Freeze review
- Procurement of material
- Manufacturing of associated components
- Factory acceptance tests
- Delivery of equipment and associated components to the Power Station
- Implementation.
- Commissioning
- Handover and Final acceptance by the *Employer*

## 6. Other requirements of the *Contractor's* design

### 6.1 Plant coding and labelling

- Labelling is the responsibility of the *Contractor* and is done by the *Contractor* in accordance with the *Employer's* standard Eskom Standard 240-71432150 [Plant Labelling and Equipment Description Standard].
  - a) Plant codification is done in accordance with the KKS-system as used at Drakensberg Power Station. The *Employer* in conjunction with the *Contractor* does the codification.
  - b) The *Employer* only supplies codification numbers to the *Contractor* where-after the *Contractor* ensures that the labelling is done.
  - c) The *Contractor* ensures that the KKS codes are applied in a uniform and consistent way and that all codes allocated are unique.
  - d) The *Contractor* is responsible to supply identification labels to provide the *works*.
  - e) The *Contractor* ensures that all plant, materials, component and documentation to supply the *works* is codified correctly.

- f) The *Contractor* uses all levels of the coding system to ensure clear identity of signals on the control and indicating equipment. As a minimum, 17 characters are used in the KKS code to uniquely identify each detector signal.

## 6.2 General

- The *Contractor* ensures that he is fully familiar with the standards and concepts of the KKS system as applied by the *Employer*.
- The specific KKS codes for each item of the *works*, equipment, components, measuring points, junction boxes, cables etc., appears on all documents, instruction manuals, schedules, drawings, (i.e. zone diagrams, general arrangements, schematic diagrams, cable diagrams etc.), and labels, name plates and instruction plates for the *works*, equipment and components.

## 6.3 Labels and cable numbering

- For control and indicating equipment panels, cubicles, and equipment, labels are made according to the *Employer's* Eskom Standard 240-71432150 [Plant Labelling and Equipment Description Standard].
- All control and indicating equipment, and all associated equipment that is located, manipulated or identified is appropriately and clearly labelled.
- Where new cables are installed, a range of cable numbers is issued by the *Employer*. The *Contractor* completes the schedules included in the cable numbering information manual. All existing cable numbers connected to the new equipment are to be included in the new drawings.

## 7. Use of *Contractor's* design

All Designs, drawings, specifications, instructions, manuals and other documents created, produced by or on behalf of the *Contractor* for the purposes of Providing the *Works* (collectively, the "*Contractor's* Copyright Documents") and copyright therein and all intellectual property rights relating thereto, are, will be, and will remain the property of the *Contractor*.

The *Contractor* hereby grants to the *Employer*, with effect from the Contract Date or in the case of documents or other matter not yet in existence, with the effect from the creation thereof (and notwithstanding the Completion or abandonment of the *Works* or termination of this Agreement) an irrevocable, royalty-free, non-exclusive and perpetual licence to use those of the *Contractor's* documents and other matter supplied to the *Employer* under this contract, for any purpose whatsoever connected with the works, including for the purpose of maintenance, operation, construction, retrofit, refurbishment, upgrade, repair or demolition of the works or any parts thereof.

The *Employer* uses the *Contractor's* Copyright Documents and all intellectual property rights relating thereto for the sole purpose of all its needs at Drakensberg Power Station, which includes any *Employer* processes and procedures pertaining to use, maintenance, operation, construction, retrofit, refurbishment, upgrade, repair or demolition of the *Works*.

The *Employer* may copy and submit, without restriction, all documentation to others employed or contracted by the *Employer* who has duly signed a confidentiality agreement with the *Employer*.

The *Contractor* may not use any Copyright Documents (and the copyright therein and all intellectual property rights relating thereto), which are owned by the *Employer* and/or Others and provided to the *Contractor*, for any other purpose than to Provide the *Works*. The *Contractor* may not copy and therefore not retain copies of any such Copyright Documents. At Completion of the whole of the *Works*, or earlier termination, the *Contractor* returns to the *Employer* all such documentation provided to him by the *Employer* and/or Others.

## 8. Design of Equipment

Not Applicable.

## 9. Equipment required to be included in the works

- The *Contractor* supplies and delivers all Equipment, Plant and Materials, design drawings, labour, tools, scaffolding, consumables, storage facilities and accommodation and anything deemed necessary to provide the *Works*.
  - a) All measuring and calibration equipment used by the *Contractor* to Provide the *Works* are provided with a SANAS (South African National Accreditation System) Calibration Laboratory test certificate.
  - b) The *Contractor* supplies all special or dedicated test Equipment for testing, commissioning, fault finding and maintenance of the systems as part of the requisite criteria for Completion of the section of the *Works*.
  - c) The *Contractor* furthermore, describes the operation and use of the equipment in the relevant operating, maintenance and training manuals.
  - d) The *Contractor* supplies all special or dedicated test equipment to the *Employer* new, as part of the requisite criteria for Completion of the section of the *Works*.
  - e) The *Contractor* supplies all special tools and Equipment required for the engineering and to Provide the *Works*. All Equipment other than normal hand tools, measuring and test Equipment are considered special tools.

## 10. As-built drawings, operating manuals and maintenance schedules

1. All documentation and drawings to comply with the latest Eskom's Classification and Designation of Technical Documentation Standard, 240-54179170; Eskom's Documentation Management Standard, 32-44 Revision 1 and Eskom's Engineering Drawing Standard – Common Requirements, 240-86973501 Revision 3, respectively.
2. All drawings issued to Eskom are in an electronic format, MicroStation (DGN), pdf format and a hardcopy of the original size drawing.
3. The *Contractor* updates all relevant mark-ups or changes to drawings for all defects during the defects period after Completion of the *Works*.
4. All documentation submitted are indicated 'approved' by the *Contractor* and sent to the *Employer* for review and acceptance.
5. The *Employer* reviews all documentation.
6. The *Contractor* uses one relational database drawing system.
7. In conjunction with the electronic DGN copies the *Contractor* also provides a merged set of \*.pdf electronic copies upon first issue and each time drawing updates are required. All drawings are signed, and the revisions noted as per *Employer's* specifications.

8. All detail design drawings have the pre-approved title blocks and borders as provided by the *Employer*. The *Employer* provides samples of the pre-approved title blocks to be used by the *Contractor*. The *Contractor* completes the title block information as per drawing standard listed.
9. Graphical symbols are used in accordance with the NRS002 standard.
10. All drawings are submitted to the *Project Manager* for his acceptance.
11. When drawings are submitted to the *Employer* for review, a registered Engineer will approve the drawings and designs. This information by the engineer is included on the drawings (CAD file) by the *Contractor* when the final drawings are submitted.
12. The *Contractor* produces as build drawings within 4 weeks of each site acceptance tests and submits to the *Project Manager* for his acceptance.
13. The *Contractor* produces the following types of drawings:
  - a) General layout drawing of the proposed devices and panels
  - b) General assembly drawing for the hydrogen detection system
  - c) Conduit arrangement drawing
  - d) Layout drawings indicating the position of all components.
  - e) Single line diagram
  - f) Block diagram of the system
  - g) Circuit/Loop Diagram
  - h) Panel internal wiring drawings, including cross referencing and wire numbers
  - i) Cable block diagrams with termination points
  - j) Termination Schedule/Diagram
14. The *Contractor* updates drawings until after the final commissioning of the last unit when the *Employer* has signed off and approved the final "As Built" state of the drawings. After commissioning of each unit, the *Contractor* supplies two sets of drawing hardcopies within two separate files and in A3 format as well as DGN and PDF formats (as indicated above).

## **11. Procurement**

### **11.1 Plant and Materials**

#### **11.1.1 Quality**

The *Contractor* procures, fabricates, and delivers all the material necessary to complete the *Works*. All structural and constructional material is new and of the best quality, of the class most suitable for the purpose specified and governed by the following internationally recognised standards: ASME, DIN, BS, IEC, and SANS. Other standards are submitted to the Project Manager for approval. Furthermore, all such materials can withstand the variations of temperature and pressure, arising under working conditions without distortion or deterioration or the setting up of

undue strains in any part, such as to affect the efficiency and reliability of the hydrogen gas detection system assembly and its control system.

- The *Contractor* to comply with the requirements of Eskom Supplier Quality Management Specification 240-105658000 under Category 1.
- The *Contractor* notifies the *Employer* of any proposed changes to the quality management system that will affect the contract quality requirements, prior to implementing such changes.
- The *Contractor* provides a complete solution in the event of specialized work based on the *Contractors* own design and their standard manufacturing product in the *Works* being defective or any components used found to be defective due to manufacturing defects and thus forcing any improvement to be implemented to rectify such inherent defects.
- In case of specialized work based on the *Contractors* own design and their standard manufacturing product in the *Works* being defective or any components used found to be defective due to manufacturing Defects and thus forcing, any improvement to be implemented to rectify such inherent Defects, the cost of such an undertaking would be the responsibility of the *Contractor*.
- A *contract*-specific Quality Management Programme, Inspection and Test Plans (ITPs), and Quality Control Plans (QCPs) shall be submitted to Eskom for acceptance prior to commencement of work. Eskom reserves the right to audit the Contractor and its subcontractors, witness inspections and tests, and review quality records.
- The *Contractor* shall provide all required certification, FAT and SAT reports, calibration certificates, declarations of conformity, as-built drawings, operating and maintenance manuals, training records and Certificates of Compliance as part of the handover data package. Any non-conformance affecting contract quality requirements shall be reported to Eskom and corrective actions implemented prior to acceptance.

#### **11.1.2 Guarantee Inspection**

Not Applicable.

#### **11.1.3 Product Support**

Not Applicable.

#### **11.1.4 Defects correction**

The defects correction period is 12 months.

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

No new Plant and Materials will be free issued by the *Employer*.

#### **11.1.6 *Contractor’s* procurement of Plant and Materials**

*Contractor* is responsible to procure all plant and materials that is required for them to complete the *Works*.

The *Contractor* shall ensure that the Hydrogen gas detection system and its associated equipment is adequately packaged and crated for transportation and delivered to the Power Stations, undamaged.

#### **11.1.7 Spares and consumables**

A complete recommended spares list includes the following details:

- Detailed description, including dimensions and material specification
- Part number
- Special storage requirements

- Replacement part or routine maintenance part
- Quantity
- Cost
- Lead time
- Supplier full contact details and address
- Applicable test/calibration/material certificates.

## 12. Tests and inspections before delivery

Copies of all type test certificates, indicating the result of all type tests performed, are submitted for acceptance by the *Employer*. These tests are required to verify that the design of the equipment to be supplied meets with the *Employer's* requirements.

## 13. Marking Plant and Materials outside the Working Areas

- All Plant and Material paid for by the *Employer* must be clearly labelled as being the *Employer's* property.
- The *Contractor* marks all identified items of Plant and Material with the Contract and Order numbers.
- Plant and Material is delivered to either the Site or the *Contractor's Works*.

## 14. Contractor's Equipment (including temporary works).

The *Contractor* to provide all necessary equipment to complete the *works*.

## 15. Cataloguing requirements by the Contractor

N/A.

## 16. Construction

### 16.1 Temporary works, Site services & construction constraints

#### 16.1.1 Contractor's equipment

- The *Contractor* provides the *Employer* with a complete list of materials, tools, Equipment and or machinery before bringing it onto Site.
- Records are to be kept of Equipment on Site including whether it is owned or hired. The *Contractor* is responsible to provide his own scaffolding, lifting equipment, mobile cranes and fork lifts where required.
- The *Contractor* provides and maintains all test and measuring Equipment required for all tests to the required accuracy. The accuracy of test Equipment is required to be better than  $\pm 0.1\%$ .
- The type and class of Equipment used is subject to the Acceptance by the *Employer*.
- The *Contractor's* measuring Equipment is accompanied by valid calibration certificates from an approved authority.
- The Project Manager may at any stage during the Contract require such Equipment to be checked by an approved laboratory or the South African Bureau of Standards.

#### 16.1.2 Equipment provided by the Employer

No equipment will be provided by the *Employer*.

#### 16.1.3 Site services and facilities

The services available is confirmed by the *Employer* on site and are not necessarily available at point of *Works*.

#### 16.1.4 Facilities provided by the *Contractor*

The *Contractor* makes provision for their own accommodation, vehicles, kitchen - and office space (mobile container) and Equipment etc.

The *Contractor* removes all equipment and waste which was generated during the installation process, within 24 hours after completion.

#### 16.1.5 Existing premises, inspection of adjoining properties and checking work of Others

N/A.

#### 16.1.6 Survey control and setting out of the works

Full survey of the battery rooms plant area and dimension verification to be performed by the *Contractor* prior to start of the works.

#### 16.1.7 Excavations and associated water control

N/A.

#### 16.1.8 Underground services, other existing services, cable and pipe trenches and covers

N/A.

#### 16.1.9 Sequences of construction or installation

All activities are performed according to the Programme accepted by the *Employer*.

#### 16.1.10 Hook ups to existing works

*Contractor* notifies *Employer* before interfacing with existing *Works*.

### 17. Completion, testing, commissioning and correction of Defects

#### 17.1 Work to be done by the Completion Date

|  | Item of work                                                                                         | To be completed by                    |
|--|------------------------------------------------------------------------------------------------------|---------------------------------------|
|  | As built drawings of Hydrogen Gas Detection System in the Battery Room Floor Plan                    | Within 60 days after Completion       |
|  | Performance testing of the <i>works</i> in use as specified in paragraph 17.8 of this <i>Works</i> . | See performance testing requirements. |
|  | Commissioning of the <i>Works</i>                                                                    | See section 17.4                      |

#### 17.2 Use of the *works* before Completion has been certified

The *Employer* may use any part of the *Works* before completion has been certified but in doing so the *Employer* takes over the part of the *Works* except if the use is for a reason stated in the *Works*.

#### 17.3 Materials, facilities and samples for tests and inspections

Samples of components may be requested by the *Employer* for pre-acceptance, where deemed necessary.

#### 17.4 Commissioning

Commissioning will not start until the following documents, required for the commissioning of the equipment, to be accepted by the *Employer*:

- (a) All relevant drawings
- (b) All relevant site acceptance test reports completed and signed

(c) All installation related defects are cleared.

(d) All QCP's signed at the relevant steps.

(e) All safety clearance certificates signed.

### **17.5 Start-up procedures required to put the works into operation**

The *Contractor* is on site when the first live operation of the plant commences. All operating will be done by the *Employer* under the supervision of the *Contractor* as per the agreed commissioning program.

### **17.6 Take over procedures**

Take-over is when all testing, inspections and commissioning as specified in Section 17.1, 17.4, 17.5 are successfully completed.

The *Contractor* shall aid the *Employer* on a temporary basis on Completion.

### **17.7 Access given by the *Employer* for correction of Defects**

For the correction of defects after completion, the *Contractor* is to request an opportunity for correction a minimum of 4 weeks in advance and provide full details on the work to be executed.

### **17.8 Performance tests after Completion**

The *Contractor* tests the *Works* in accordance with the accepted testing procedures.

### **17.9 Training and technology transfer**

All pre-FAT training is conducted at the *Contractor's* local test facility and all operating and maintenance training is conducted at Drakensberg & Ingula Pumped Storage Schemes.

### **17.10 Operational maintenance after Completion**

N/A.

## **18. Meetings**

- Daily morning meetings will be held during implementation to assess the progress according to the schedules and to discuss other matters such SHE (Safety Health and Environment) etc.
- Meetings for compensation events will be held separately.
- Attendees for the meetings include the *Contractor Supervisor* and *Safety Officer*.

## **19. Use of standard forms**

- Standard forms are to be used by the *Contractor* in the administration of the contract.
- The *Employer* will supply the *Contractor* with drafts of the standard forms which will be used for early warning and compensation event notifications.

## **20. Invoicing and payment**

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

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The *Contractor* includes the following information on each tax invoice:

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

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

## 21. Records of Defined Cost

The *Contractor* to provide adequate proof of incurred expenses should a compensation event arise.

## 22. 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 *Employer* 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.

## 23. BBBEE and preferencing scheme

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

## 24. Facilities to be provided by the *Contractor*

N/A

## 25. Management and Startup

### 25.1 Engineering quality assurance requirements

The *Contractor* submits a detailed Quality Management Programme in accordance with the requirements of Eskom's Supplier Quality Management Specification – 240-105658000: Category 1 as a tender returnable. QMP includes additional activities not covered in the Supplier Quality Management Specification but not limited to:

- Documentation and Detail Design

- Procurement of components
- Inspection and Test plan
- Factory Acceptance Testing
- Installation & Commissioning
- Hand Over to Employer.

## 25.2 Training workshops and technology transfer

The *Contractor* provides all necessary manuals, drawings, and notes with regards to the operation and maintenance of the hydrogen gas detection system assembly including the control system. An instructor shall be provided by the *Contractor* to train the *Employer's* operations and maintenance personnel on the documents as specified under section 25.1 and on how to operate and perform maintenance on the hydrogen gas detection system assembly and accessories when required. The training takes place at Drakensberg Power Station & Ingula Power Station. All training material to be included in the hand over data pack and proof of competence provided in accordance with the Contractor Quality Management System.

## 26. Requirements for the programme

The *Contractor* submits a bar (Gantt) chart program in MS Project format, detailing how the *Works* is executed within the stipulated dates, and required resources including rest days, weekends and public holidays.

The program indicates the following phases:

- Design.
- Manufacture.
- Supply of equipment.
- Submission of execution documentation for review and acceptance.
- Submission of safety file.
- Site Inductions.
- Installation of the *Works*.
- Testing, Commissioning, and Inspections.
- Signing off the *Works*.

The programme indicates links between activities.

## 27. Services and other things provided by the *Employer*

### 27.1 Overhead Crane

- A 360 Ton main hook and an 8 and 5 Ton auxiliary hook is available in the station main Machine Hall. It is the *Contractor's* responsibility to ensure that all necessary arrangements and preparations are made for the use of this crane.
- The *Contractor* ensures that the crane is capable of handling the loads to be lifted and any limitations with respect to height and operation.
- The crane is to be operated by the *Employer* only.

## 27.2 Electricity Supply

- All points of supply are provided in terms of availability and location
- The *Employer* indicates which supply points may be used.
- 220V electrical supply is generally available in the power station complex. 380V supply is also available – the *Contractor* shall ensure they have the correct matching plugs.
- The *Contractor* verifies extension lead requirements.

## 27.3 Water Supply

- All points of supply are provided in terms of availability and location
- The *Employer* indicates which supply points may be used.

## 27.4 Compressed Air Supply

- All points of supply are provided in terms of availability and location
- The *Employer* indicates which supply points may be used.
- The *Contractor* verifies air compression hose requirements

## C4: Site Information

Site Information is information about the *site* at the time of tender which the tendering contractor needs to allow for in his rates and Prices. The information does not change after contract award, nor does it describe or specify anything which the Parties do during the contract. It is only referred to during administration of the contract if the *Contractor* encounters conditions which are different to those described here. The *Contractor* will then make a comparison between actual conditions encountered and those described here in his assessment of any additional cost or time he may need to be compensated for in order to complete the works. Disputes about the difference between the effects of conditions encountered and those which the *Contractor* allowed for in his Prices will be minimised if the information given here is complete and relevant. If no information is given the tendering contractor will need to guess what he may encounter thus tendering higher Prices to allow for conditions that may not even exist.

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

#### 1. Access limitations

State if there is any physical, time or other “third party” constraint associated with gaining access to and doing work on the *site* that may not be immediately apparent from an inspection of the *site*.

#### 2. Ground conditions in areas affected by work in this contract

If earthworks are included in the Scope of Work, provide details of the ground conditions the *Contractor* is likely to encounter when doing the work. This could vary from indicating where a test pit has been opened up for the *Contractor* to make his own observations to providing full borehole logs and associated geotechnical report.

#### 3. Hidden and other services within the *site*

Provide details of underground or other hidden services which the *Contractor* may encounter whilst doing the work. Instructions about how to deal with them if encountered should be included in the Works Information.

#### 4. Details of existing buildings / facilities which *Contractor* is required to work on

If work is to be carried out on existing buildings or facilities Site Information would be the ‘as-built drawings’ of those buildings or facilities. If these are not a correct statement or not available other means of describing the existing buildings or facilities would have to be used, such as providing photographs

**APPENDIX 1: SCHEDULE A/B****TECHNICAL REQUIREMENTS****1.1 GENERAL**

The technical requirements of this section specified under 'Schedules A and B' shall form part of the *Employer's* enquiry documentation. Schedule B shall be completed by the *Contractor* and submitted with his tender.

**1.2 SCHEDULES A AND B**

**Schedule A:** Particular of *Employer's* Requirements

**Schedule B:** Guarantees and technical particulars of equipment offered by the *Contractor*.

**1.3 FILLING IN INSTRUCTIONS**

- 1.3.1 Where the *Contractor* does not fully comply with the *Employer's* requirement, any deviations must be clearly indicated in Schedule B and listed in the Deviation Schedule (Annexure A).
- 1.3.2 Where there is a need to substantiate or further describe an item in Schedule B, especially in instances of non-compliance with Schedule A, particulars are furnished on a separate sheet clearly marked with the notation of the Schedule A item referred to.
- 1.3.4 Some areas in Schedule A are intentionally left blank as shown by legend xxxxxxxx . Tenderer to provide the relevant information in Schedule
- 1.3.5 If a blank space is left in Schedule B next to *Employer's* requirements listed in Schedule A it is assumed that the Tenderer does not comply with this requirement.

**Schedule A: Particulars of Eskom's requirements****Schedule B: Guarantees and technical particulars of equipment offered**

| <b>2</b>   | <b>REQUIREMENTS</b>                                                                                                                                       | <b>100.00%</b> |                             |                   |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------|-------------------|
| <b>2.1</b> | <b>High Level Layouts</b>                                                                                                                                 | <b>15.00%</b>  | <b>Schedule A</b>           | <b>Schedule B</b> |
| 2.1.1      | Tenderer submits preliminary high-level layout drawing indicating the hydrogen detectors, cabling, controller, power supply and interface modules         | 50.00%         | Yes                         |                   |
| 2.1.2      | Tenderer submits preliminary high-level wiring and termination diagrams detailing connection of detectors, controller, power supply and interface modules | 50.00%         | Yes                         |                   |
| <b>2.2</b> | <b>Hydrogen Detector</b>                                                                                                                                  | <b>15.00%</b>  | <b>Schedule A</b>           | <b>Schedule B</b> |
| 2.2.1      | Detector is compatible with the corrosive environment.                                                                                                    | 7%             | Yes                         |                   |
| 2.2.2      | Detector material type.                                                                                                                                   | 7%             | Stainless Steel             |                   |
| 2.2.3      | Forced air movement have no impact on the type of detector.                                                                                               | 7%             | Yes                         |                   |
| 2.2.4      | Type of detector.                                                                                                                                         | 7%             | Point Type                  |                   |
| 2.2.5      | Technology type.                                                                                                                                          | 8%             | xxxxxxx                     |                   |
| 2.2.6      | Brand                                                                                                                                                     | 7%             | xxxxxxx                     |                   |
| 2.2.7      | Model                                                                                                                                                     | 7%             | xxxxxxx                     |                   |
| 2.2.8      | Supply voltage                                                                                                                                            | 7%             | 10V - 30V DC                |                   |
| 2.2.9      | Measuring range                                                                                                                                           | 7%             | 0-100% LEL                  |                   |
| 2.2.10     | Temperature range                                                                                                                                         | 7%             | xxxxxxx                     |                   |
| 2.2.11     | Humidity range                                                                                                                                            | 7%             | 0 to 99% RH, non-condensing |                   |
| 2.2.12     | Detection coverage (square meters)                                                                                                                        | 7%             | xxxxxxx                     |                   |
| 2.2.13     | Explosion proof                                                                                                                                           | 7%             | Yes                         |                   |
| 2.2.14     | ATEX, Ex & FM Certified                                                                                                                                   | 7%             | Yes                         |                   |
| <b>2.3</b> | <b>Hydrogen Detection Transmitter</b>                                                                                                                     | <b>15.00%</b>  | <b>Schedule A</b>           | <b>Schedule B</b> |
| 2.3.1      | Transmitter is compatible with the corrosive environment.                                                                                                 | 11%            | Yes                         |                   |
| 2.3.2      | Transmitter material type.                                                                                                                                | 11%            | Stainless Steel             |                   |
| 2.3.3      | Brand                                                                                                                                                     | 11%            | xxxxxxx                     |                   |
| 2.3.4      | Model                                                                                                                                                     | 11%            | xxxxxxx                     |                   |
| 2.3.5      | Supply voltage                                                                                                                                            | 11%            | 10V - 30V DC                |                   |
| 2.3.6      | Brand                                                                                                                                                     | 11%            | xxxxxxx                     |                   |
| 2.3.7      | Model                                                                                                                                                     | 11%            | xxxxxxx                     |                   |
| 2.3.8      | Explosion proof                                                                                                                                           | 11%            | Yes                         |                   |
| 2.3.9      | ATEX, FM Certified                                                                                                                                        | 12%            | Yes                         |                   |
| <b>2.4</b> | <b>Hydrogen Detection Controller</b>                                                                                                                      | <b>15.00%</b>  | <b>Schedule A</b>           | <b>Schedule B</b> |
| 2.4.1      | Operating voltage.                                                                                                                                        | 10.00%         | 24V DC                      |                   |
| 2.4.2      | Operating temperature                                                                                                                                     | 10.00%         | xxxxxxx                     |                   |
| 2.4.3      | Humidity range                                                                                                                                            | 10.00%         | 0 to 99% RH, non-condensing |                   |
| 2.4.4      | LCD Display                                                                                                                                               | 10.00%         | Yes                         |                   |
| 2.4.5      | Technology used.                                                                                                                                          | 10.00%         | xxxxxxx                     |                   |

|            |                                                                                                                                             |               |                                                                                                                                                                                                              |                   |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 2.4.6      | Brand                                                                                                                                       | 10.00%        | xxxxxxx                                                                                                                                                                                                      |                   |
| 2.4.7      | Model                                                                                                                                       | 10.00%        | xxxxxxx                                                                                                                                                                                                      |                   |
| 2.4.8      | Communications Protocol                                                                                                                     | 10.00%        | Standard communication protocols are to be used to communicate with the Employer's SCADA system in the following order of preference: (1) IEC 60870-5-104, (2) IEC 61850, (3) Modbus TCP/IP, (4) Modbus RTU. |                   |
| 2.4.9      | Explosion proof                                                                                                                             | 10.00%        | Yes                                                                                                                                                                                                          |                   |
| 2.4.10     | ATEX, FM Certification                                                                                                                      | 10.00%        | Yes                                                                                                                                                                                                          |                   |
| <b>2.5</b> | <b>Visual &amp; Audible Alarm Initiating Devices</b>                                                                                        | <b>15.00%</b> | <b>Schedule A</b>                                                                                                                                                                                            | <b>Schedule B</b> |
| 2.5.1      | Operating voltage.                                                                                                                          | 20.00%        | 24V DC                                                                                                                                                                                                       |                   |
| 2.5.2      | Operating temperature                                                                                                                       | 20.00%        | xxxxxxx                                                                                                                                                                                                      |                   |
| 2.5.3      | Humidity range                                                                                                                              | 20.00%        | 0 to 99% RH, non-condensing                                                                                                                                                                                  |                   |
| 2.5.4      | Brand                                                                                                                                       | 20.00%        | xxxxxxx                                                                                                                                                                                                      |                   |
| 2.5.5      | Model                                                                                                                                       | 20.00%        | xxxxxxx                                                                                                                                                                                                      |                   |
| <b>2.6</b> | <b>24V Power Supply</b>                                                                                                                     | <b>15.00%</b> | <b>Schedule A</b>                                                                                                                                                                                            | <b>Schedule B</b> |
| 2.6.1      | Input voltage                                                                                                                               | 15.00%        | 230V                                                                                                                                                                                                         |                   |
| 2.6.2      | Output voltage                                                                                                                              | 15.00%        | 24V DC                                                                                                                                                                                                       |                   |
| 2.6.3      | Brand                                                                                                                                       | 15.00%        | xxxxxxx                                                                                                                                                                                                      |                   |
| 2.6.4      | Part number                                                                                                                                 | 15.00%        | xxxxxxx                                                                                                                                                                                                      |                   |
| 2.6.5      | Status LED Indication                                                                                                                       | 15.00%        | Yes                                                                                                                                                                                                          |                   |
| 2.6.6      | Power supply fault monitoring                                                                                                               | 15.00%        | Yes                                                                                                                                                                                                          |                   |
| 2.6.7      | Battery fault monitoring                                                                                                                    | 10.00%        | Yes                                                                                                                                                                                                          |                   |
| <b>2.7</b> | <b>Cabling</b>                                                                                                                              | <b>10.00%</b> | <b>Schedule A</b>                                                                                                                                                                                            | <b>Schedule B</b> |
| 2.7.1      | Detector cabling is of the enhanced fire resistant (PH120 rating) type                                                                      | 25.00%        | Yes                                                                                                                                                                                                          |                   |
| 2.7.2      | Power supply cabling is of the flame-retardant type comprising of the blue cable trace colour (Low halogen emission PVC bedding and sheath) | 25.00%        | Yes                                                                                                                                                                                                          |                   |
| 2.7.3      | Cabling is run in close-ended galvanized mild steel conduit                                                                                 | 25.00%        | Yes                                                                                                                                                                                                          |                   |
| 2.7.4      | Provide datasheets and certification for all cabling                                                                                        | 25.00%        | Yes                                                                                                                                                                                                          |                   |

**ANNEXURE A: DEVIATION SCHEDULE**

Any deviations/modifications/alternatives offered shall be listed below with reasons for the departures.

No deviations/modifications/alternative offered will be recognized unless listed on this schedule

If no deviations/modifications/alternatives are offered, this schedule must be marked **"None"**

| Page Ref. | Specification / Schedule / or clause number | Proposed deviation/ modification/ alternative | Cost of deviation or alternative |
|-----------|---------------------------------------------|-----------------------------------------------|----------------------------------|
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