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C3.1: EMPLOYER'S WORKS INFORMATION

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1 Description of the works

1.1 Executive overview

Kendal Power Station has Degrit Sumps installed on each of the six Units. The purpose of these sumps is to accumulate the surplus water from the SSC (Submerged Scraper Conveyor). From the Degrit Sump, an ash slurry is pumped back to the SSC. A sump agitation system ensures that ash does not settle in the sump, but is of the correct consistency to be pumped back to the SSC. Furthermore, a trench flushing system cleans the trenches around the SSC.

The water used for both sump and trench flushing is taken from the ash conditioning line and is boosted to the required pressure by the Flushing Pump. The sump and SSC levels are continuously measured and controlled to ensure that neither are flooded.

The Unit 1-5 Degrit Sump systems makes use of a Siemens S5 PLC (Programmable Logic Controller) along with analogue and binary IO (Input/Output) modules, all of which have been declared obsolete by the OEM several years ago, for control. Further to this, there are no spares available and several modules have been scavenged from the each of the Unit 1-5 Degrit Sump control panels.

Consequently, the Unit 1-5 Degrit Sumps are no longer operational with no prospect of salvaging the existing systems and returning them service.

The Unit 6 Degrit Sump PLC system was migrated from S5 to S7 in 2014 with no known issues on the new system. However the electrical portion of it was never resuscitated.

Therefore, the scope of this document focuses on a like-for-like migration of the current Siemens S5 system on the Unit 1-5 Degrit Sumps to an equivalent Siemens S7 system and restoring the functionality and operation of the Unit 1-5 Degrit Sumps. It also entails the electrical works required from unit 1-6 in order to make the Degrit system functional.

1.2 Employer's objectives and purpose of the works

The scope of this document covers the migration of the current Kendal Unit 1-5 Degrit Sump PLC system from the obsolete SIMATIC S5 system to a modern SIMATIC S7 system. It also entails the electrical works that need to be conducted for the system.

The purpose of this document is to capture the detailed requirements for the migration of the current Kendal Unit 1-5 Degrit Sump PLC system from the obsolete SIMATIC S5 system to a modern SIMATIC S7 system. It also to detail full electrical requirements for a system to be functional.

1.3 Interpretation and terminology

The following abbreviations are used in this Works Information:

Abbreviation	Meaning given to the abbreviation
AFC	Approved for construction
OBL	Outside battery limits
C&I	Control and Instrumentation
FBD	Function Block Diagram

IO	Input/Output
IP	Ingress Protection
KKS	Kraftwerks Kennzeichen System
LAD	Ladder diagram
OEM	Original Equipment Manufacturer
OHAS	Occupational Health and Safety ACT
PLC	Programmable Logic Controller
QCP	Quality Control Plan
SHEQ	Safety, Health, Environmental and Quality
SSC	Submerged Scraper Conveyor
STL	Statement List

2 Management and start up.

2.1 Management meetings

Title and purpose	Approximate time & interval	Location	Attendance by:
Planning meetings (including integration meetings with Others)	Within four weeks of contract start date	MS Teams	Employer, Contractor/s Planners and Others as determined by the Project Manager.
Contract Designs Reviews and Acceptance	Monthly	MS Teams	Employer, Contractor, Supervisor, Contractor Manager and Others as determined by the Project Manager and Site Managers
Risk register and compensation events	Bi-Weekly	MS Teams	Employer, Contractor, Supervisor, Contractor Manager and Others as determined by the Project Manager and Site Managers
Overall contract progress and feedback	Monthly	MS Teams	Employer, Contractor, Supervisor, Contractor Manager and Others as determined by the Project Manager and Site Managers
Kendal Contractor's Safety meetings	Fortnightly	Kendal Power Station	Employer, Contractor, Supervisor, Safety Officer and Others as determined by the Project Manager and

			Site Managers
Payment Assessment Meetings	Monthly	Kendal Power Station	Employer, Contractor, Supervisor, Quantity Supervisors and Others as determined by the Project Manager and Site Managers
Quality Meetings	Bi-weekly or as determined by Project Manager	Kendal Power Station	Employer, Contractor, Supervisor, System Engineer, Quality Officer and Others as determined by the Project Manager and Site Managers

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

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

2.2 Documentation control

The *Contractor* shall prepare and supply detailed documents specified on this works information for review and acceptance by *Employer*. All documentation including but not limited to drawings, operating, maintenance and engineering instruction manuals shall be uniquely identified and cross-referenced with all related documents specified in this *Works Information*.

All storage drives shall be uniquely labelled and contain as a minimum the following:

- Contract number
- *Contract* title
- Storage drive title
- Storage drive revision number
- Documentation reference number

All documentation submitted, by the *Contractor*, is accompanied by an incoming transmittal note. Upon receipt of the transmittal, the *Employer* signs to indicate acknowledgement of receipt and returns this to the *Contractor*.

For consistency, it is important that all documents used within a specific domain follow the same layout, style and formatting standard.

2.3 Health and safety risk management

SHEQ

Contractual requirements means the suppliers will submit the tender returnable during the tender close-out. The evaluation will take place once the mandatory and Functionality evaluation have been completed. Only the shortlisted suppliers who passed mandatory and functionality evaluation threshold will be evaluated. The suppliers will be given only ONE opportunity to submit the outstanding documents within 7 working days.

Failure to submit the outstanding documents within the stipulated time; may result in the tenderer being regarded as non-responsive and ineligible for contract award.

In the event that there are further documents that are required during execution of the contract, these must be made contractual conditions and compliance thereto must be managed in terms of the contract. The SHEQ tender requirements will be communicated in the invitation to tender document and the SHEQ supporting documents will be published in the market. The supplier/contractor will be allowed to commence with work once the SHE file is approved.

HEALTH & SAFETY REQUIREMENTS

The SOW is categorised under High risk so criteria on Annexure C1 will be used to evaluate compliance. Below are the returnable documents for the tender:-

1. Annexure C1 Evaluation Sheet requirement (7 Criteria)
 - Annexure B (Acknowledgement Form)
 - SHE Plan (as per SHE Spec Provided)
 - SHE Costing (including Covid19 costing)
 - Baseline Risk Assessment
 - Letter of good standing (Valid COID Cert)
 - SHE Policy
 - SHE Competence
2. SHE Spec for Degrit Sump together with Eskom Contractor Health and Safety Requirement 32-136
3. Project Based Risk Assessment
4. Covid19 Annexure A PPE Price list
5. Covid19 Directive on Health and Safety in the Workplace Gazette 43400

- Due diligence

2.4 Environmental constraints and management

The *Contractor* shall comply with the environmental criteria and constraints stated in Annexure _____

Item No.	Environmental Description
1.	<p>Environmental Policy in teams of ISO 14001:2015 Environmental Management System, the Environmental (or SHE/SHEQ) Policy must be signed by company Owner/CEO/MD:</p> <p>Commitment to: (1) compliance to environmental compliance obligations; (2) environmental duty of care, (3) Pollution prevention and (4) Continual improvement.</p> <p>Note: compliance to ISO standards will be enforced.</p>
2.	<p>A detailed signed Environmental Management Plan for the scope of work pertaining to site specific activities.</p> <p><i>Identification of Environmental Aspects and Impacts:</i> Identification, assessment and control of activities that have or may have an impact on the environment.</p>
3.	A detailed signed Site Environmental Representative Appointment Letter
4.	Spillage Management Plan for environmental emergencies such as oil, chemical, ash, coal etc
5.	Waste Management Plan - detailing the type of waste that will be generated on site and how will the waste be handled, managed and disposed. Remember the cradle to grave

Item No.	Environmental Description
6.	Proof of training and skills of persons performing significant activities (e.g. oil spills, application of herbicides and asbestos AIA Approval) if applicable

2.5 Quality assurance requirements

Quality requirements for this scope of work is **Category 2** (Degrit sumps)

- The supplier shall complete and sign Form A (Enquiry/Contract/Quality Requirements for Supplier Quality Management Specification 240-105658000/ QM 58 and ISO 9001).
- The supplier shall submit objective evidence of a developed, implemented and maintained QMS that complies with ISO 9001

applicable standard of quality management system (the latest applicable revision ISO 9001:2015).

The following documents (approved/ signed copies) shall be submitted:

- Quality Management System manual or a documented information that have defines and describes the QMS and its scope
- Quality Policy, aligned with the supplier's strategic direction (documented information)
- Quality Objectives (documented information)
- Control of documented information (both maintain and retain documented information)
- Internal audit procedure (documented information)
- Control of nonconforming outputs (documented information)
- Nonconformity and Corrective action procedure (documented information)
- The supplier shall submit the latest copy of the management system internal audit reports. The audit reports must include,

if applicable, nonconformity identified, and the resulting remedial actions (correction and/ or corrective action reports).

- The supplier shall submit a draft contract quality plan that is specific to the scope of work as described in the tender documents.

The plan must address the minimum requirements as per ISO 10005.

- The supplier shall submit an example/draft of inspection and test plan (ITP) or quality control plan (QCP) as per the scope of work on similar or previous work done.
- The supplier shall submit documented information for Control of Externally Provided Processes, Products and Services.
- The supplier shall submit a copy of documented information for roles, responsibilities and authorities in relation to the QMS.

Examples of relevant documented information are; organization charts, job descriptions, work instructions, duty statements, manuals, procedures.

- The supplier shall submit documented information retained (records) of management review meetings that include agenda,

meeting minutes, attendance registers, reports, presentations, etc.

Note: specific requirements per tender will be selected using the List of Tender Returnable document (240-12248652).

2.6 Programming constraints

2.6.1 Planning & Programming

The Contractor must submit a detailed programme for approval to the Employer two weeks after contract award. The programme supplied to the Project Manager must clearly show procurement, order and delivery, site establishment, installation and commissioning progress and milestones against time and calendar dates for the project, issuing of as built documentation and project handover.

Each programme must indicate the start and finish dates of all activities, duration, percentage completion and critical path.

The work shall be planned and executed in such a way that there will not be delays of one contractor that are attributable to any other contractor or subcontractor appointed for this project i.e. coordination of plans shall be ensued and maintained at all times, as necessary.

2.6.2 Accepted Programme / Project Network

- a) The *Contractor* submits a single programme that incorporates the services and work (programmes) of all his Subcontractors. All contractual dates are integrated into the *Contractor's* programme. The programme includes the activities performed by Subcontractor(s), the interface points between different Subcontractor's work, the *Employer's* operations, the work of others as well as the interface points between the *Contractor's* work and the individual Subcontractor's work.
- b) The following reports are required as supporting documentation to the Accepted Programme:
 - i. Time analysis print-out
 - ii. Critical activities report
 - iii. Key event report
 - iv. Resource schedules and histograms
- c) All programmes and reports are computer generated (MS project).
- d) The first Accepted Programme (at the Contract Date) serves as a baseline for the Provision of the Works until the *defects date*. This baseline is shown on all subsequent graphical presentations of revised programmes.
- e) The *Contractor*, with each revision, submits a synopsis of all changes to the Accepted Programme. Each revision is uniquely identified by a revision number, which is agreed with the *Project Manager* prior to submission of the first revised programme.
- f) The *Contractor* assesses the available data and knowledge explicitly. Any technical detail, policies, imposed organisational conditions, contract conditions, specifications, overall programme constraints, resource availability, long delivery items or any other factor of significance to Provide the Works, are considered by the *Contractor* in his planning.
- g) The *Contractor* provides work planning bar charts and resource schedules as agreed with the *Project Manager*.
- h) The *Contractor* submits a revised program to the *Project Manager* for acceptance at the interval stated in the Contract Data.
- i) The *Contractor* uses Microsoft Project 2010 to perform all his planning.

NB: Programme must be submitted in MS projects

Programme must be submitted and be accepted within Thirty days after Contract award

Programme must be updated daily and Submitted to the Employer

2.6.3 Sequence of the works

- a) Planned sequence of works should be such that no other parties are delayed.

2.6.4 Procurement and Manufacturing Programme

The *Contractor* is required to submit a procurement and manufacturing programme for review by the *Project Manager*, which identifies as a minimum:

- a) Details of orders and target dates for placing subcontracts
- b) Long Lead delivery items
- c) Hold-points and witness-points for inspection and tests for acceptance and release.

This programme is in sufficient detail to enable the work to be adequately tracked and progressed.

2.6.5 Construction Programme

The Contractor is required to submit a construction programme that is resource loaded for review by the Project Manager. This programme includes the following criteria:

- a) Full details of all electrical and C&I terminal point release requirements
- b) Identify any commissioning activities that may affect other construction activities
- c) Identify when services are required for commissioning purposes.

This programme meets the requirements of the Contractor and others engaged on the project.
The programme shall be based on the following working hours: where applicable

- a) Twenty four (24) hours per day
- b) Seven(7) days per week
- c) Holidays included as working days
- d) Pay weekends to be negotiated(if working 7 day work week)

The Contractor to take into consideration of permit change, rest period, work stoppage when develop construction programme, and shall no warrant any financial compensation claim lodged against Eskom.

Financial penalties shall be enforced on the main contractors for non-conformance/s(identified for the main contractor and/ or its sub-contractor) pertaining to Eskom and/or Statutory SHE requirement/s.

2.6.6 Commissioning Programme

The *Contractor* must submit a detailed testing and commissioning level four programmes to the *Employer* for approval one month prior to the beginning of installation on site.

The *Employer* will evaluate the recommended testing and commissioning level four programmes and reserves the right to change and or add to the test programme.

Holding points will be agreed upon and indicated on the programme. The *Employer* reserves the right to add holding points to the *Contractor's* program

Training programme to be incorporated into the commissioning programme.

The commissioning programme is detailed to sub-system level and is fully integrated with the Construction Programme.

2.7 Contractor's management, supervision and key people

- a) The Contractor provides the Project Manager with a detailed project organisation structure, showing the roles and responsibilities. It must show clear reporting lines between individuals, including individuals from subcontractors or joint ventures.
- b) The Contractor provides the following key personnel as a minimum
 - i. Dedicated Project manager
 - ii. Dedicated Project Planner
 - iii. Dedicated Site Manager
 - iv. Dedicated Quality Manager
 - v. Dedicated Site Safety Manager
 - vi. The contractor to submit brief CV's and certified copies of qualifications of the above key persons including Supervisors (Welding Supervisors, Welders, Boiler Makers, Artisans, Artisans, and Riggers that are used on this project.
- c) The Contractor submits the project organisation structure to the Project Manager for acceptance within two (2) weeks of the Contract Date.
- d) The Contractor ensures that his workforce is trained and competent to perform their respective duties and that a formal health and safety induction-training programme is provided.

- e) The Contractor's inspection personnel familiarise themselves with the content of the Works Information and the Contractor ensure consistency in interpretation and decision-making.
- f) Any new foremen/supervisors appointed by the Contractor after the starting date or during the project are fully conversant with the details of the Contractor's methodology and communication process in use, prior to accessing the working areas.
- g) The Contractor ensures that the rigging personnel are qualified with operating the chain blocks and handling of other related lifting equipment to ensure personnel safety, productivity and prevention of plant damage.
- h) The Contractor employs, in and about the Provision of the Works, only such persons that are careful, competent and efficient in their several trades and callings.
- i) The Contractor ensures that his co-ordinators and employees are fluent in the language of the contract.
- j) Employer working hours: Monday to Thursday 07h15 to 16h30 and Fridays 07h15 to 12h15.
- k) Abnormal working hours are pre-arranged with the Project Manager.
- l) Kendal emergency preparedness (e.g. evacuation, etc.) procedures are obtained from the Project Manager and adherence by the Contractor and his employees is mandatory.
- m) Manager and adherence by the Contractor and his employees is mandatory.
- n) No recruiting of casual labour is done on the Employer's premises, including the area outside the Kendal Power Station Security gate

2.8 Invoicing and payment

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

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

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

Add procedures for invoice submission and payment (e. g. electronic payment instructions)

2.9 Insurance provided by the *Employer*

There are no additional requirements to the risk and insurance clause in section 8 of the core clauses.

2.10 Contract change management

The Contract management changes notes depicted below are at all times subjected to NEC3 ECC core clauses 16 and 60 and all clauses referring to the change to the contract. These clauses supersede the notes below:

- Changes to this contract do not automatically grant the Contractor legitimate right to compensation events, claims or proceedings
- Either party may request a contract change provided that such changes are formally communicated prior to implementation
- The Project Manager assesses and documents the potential impact of a proposed contract change before presenting it to the Compensation Events Committee

- The Project Manager has the right to request the Contractor to make reasonable amendments to a contract change request
- The Project Manager has the right to reject a change and specify his reasons
- No proposed contract change will be implemented by the Contractor without prior approval of the Project Manager
- Unless the Project Manager expressly agrees otherwise in writing the Contractor continues to provide the works in accordance with the Works Information and this contract as if the proposed contract change does not apply
- Any discussions, negotiations or other communications which may take place between the Project Manager and Contractor in connection with any proposed contract change, including submission of any change communications is without prejudice to the Employer other rights under this Contract.
- Each party bears its own costs in relation to the preparation and agreement of each change request and impact assessment

Contracts changes executed by any State Owned Enterprise are subjected to control by the Department of National Treasury. The lead-time associated with this department will not justify claim for standing time from the Contractor.

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

There are no additional requirements to the compensation event clauses in Section 6 of the core clauses.

2.12 Training workshops and technology transfer

The *Contractor* shall develop training material for engineering, operating and maintaining the Gas Turbines the *Contractor* shall also develop the Engineering Training Manuals for all relevant engineering disciplines (Mechanical, Electrical, C&I etc.). These engineering training materials shall include as a minimum the Gas Turbine component description, Maintenance Methodology and plant schematic drawings.

The *Contractor* provides training on the Plant regarding operating, maintenance and engineering aspects. The *Contractor* provides training material and a separate training course for operating, maintenance and engineering personnel

3 Engineering and the *Contractor's* design

Detailed Scope Requirements

The Contractor is responsible for providing the procurement, delivery, installation, configuring, testing, commissioning, decommissioning of the old system, documentation and handover of all items of the scope listed in the sections below, as well as all items and consumables required to realise the requirements stated in this document.

3.1 *Employer's* design

3.1.1 Codes and Standards

The following codes and standards are applicable to the design, installation and commissioning of the solution and shall be adhered to at all times and for all of the scope defined in this document:

- 240-56227443 Requirements for Control and Power Cables for Power Stations Standard
- 240-56355754 Field Equipment Installation Standard
- 240-56355815 Control & Instrumentation Field Enclosures and Cable Termination Standard
- 240-56356396 Earthing and Lightning Protection Standard
- 240-86973501 Engineering Drawing Standard
- 240-71432150 Plant Labelling Standard
- 240-93576498 KKS Coding Standard
- 1017822 Functional Location (KKS) Coding and Labelling Work Instruction
- 1024102 Kendal Waste Management Work Instruction

3.1.2 C&I Scope Requirements

The C&I scope includes the decommissioning of the Unit 1-6 S5 PLC systems and replacing them with an S7 PLC system that is identical to that which is installed at the Unit 6 Degrit Sump.

The C&I scope is summarised as follows:

- Decommission Unit 1-6 Degrit Sump S5-100U PLC and IO modules
- Replace Unit 1-6 S5-100U PLC and IO modules with S7-1200 equivalent (same as Unit 6)
- Replace Unit 1-6 220VAC/24VDC Power supply, 15 amps
- Install a PM 1207 stabilised power supply module for Unit 1-6 PLCs
- Copy and modify Unit 6 S7-1200 PLC program for Unit 1-6 Degrit Sump PLC
- Replace all Unit 1-6 field cabling and instrumentation
- Terminate all Unit 1-6 field devices in field control panels
- Replace all Unit 1-6 control panel components
- Unit 1-6 field control panel wiring
- Unit 1-6 full system commissioning (field control panel and field)
- Unit 1-6 documentation pack

For further details on the items listed above, please refer to the following sections.

3.1.2.1 Current System – Unit 1-6

In an effort to provide context to this document, the existing Degrit Sump control system installed on Kendal Unit 1-6 is detailed in this section. Each of Kendal Unit 1-6 currently has the following C&I system installed (refer to **Error! Reference source not found.** for full details):

PLC

- 1x CPU 103 SIMATIC S5-100U PLC
- 8x Digital Input modules (431-8MA11)
- 7x Digital Output modules (440-8MA21)
- 3x Interface module (316-8MA12)

Instrumentation

- 1x Ultrasonic level sensor for sump level
- 1x Sump Flush Control Valve open limit switch
- 1x Sump Flush Control Valve closed limit switch
- 1x Trench Flush Control Valve open limit switch
- 1x Trench Flush Control Valve closed limit switch
- 1x Flow switch on flushing line to drains
- 1x SSC call for water signal

Field (Control) Panel (*0HYW65GH001)

- Switches and push-buttons
- Indicator lights need
- 1x 220V_{AC}/24V_{DC}, 15 A power supply
- 1x Sump Flush timer
- 1x Trench Flush timer
- 1x Level controller

3.1.2.2 Current System – Unit 6

Similar to the above, the existing Degrit Sump C&I system installed on Kendal Unit 6 is detailed in this section. In 2014, the previous S5-100U system on Unit 6 was replaced with a S7-1200 system.

Kendal Unit 6 currently has the following C&I system installed (refer to **Error! Reference source not found.** for full details):

PLC

- 1x CPU 1214C SIMATIC S7-1200 PLC (6ES7214-1AE30-0XB0)
- 1x PM 1207 stabilised power module (6EP1332-1SH71)
- 2x SM 1223 Digital IO module (6ES7223-1BL30-0XB0)
- 1x SM 1234 Analogue IO module (6ES7234-4HE32-0XB0)

Instrumentation

- 1x Ultrasonic level sensor for sump level
- 1x Sump Flush Control Valve open limit switch
- 1x Sump Flush Control Valve closed limit switch

- 1x Trench Flush Control Valve open limit switch
- 1x Trench Flush Control Valve closed limit switch
- 1x Flow switch on flushing line to drains
- 1x SSC call for water signal

Field (Control) Panel (*0HYW65GH001)

- Key-switches and push-buttons
- Indicator lights
- 1x 220V_{AC}/24V_{DC}, 15 A power supply
- 4x Circuit breakers - 1x 25 A, 2x 6 A, 1 x 3 A (the drawings in **Error! Reference source not found.** only indicate 3 breakers)
- 3-pin power socket with 220 V_{AC} supply

3.1.2.3 PLC Replacement

The Contractor is required to replace the current PLC and IO modules installed at the Kendal Unit 1-5 Degrit Sumps. The new systems must be of the same type, design, configuration and control philosophy as the Unit 6 Degrit Sump PLC system (see **Error! Reference source not found.**). The Contractor's scope is as follows (note that the scope below must be provided for each of the 5 units even though it is written for a single unit):

- Decommission existing S5 PLC system, including IO modules, timers and interface modules.
- Package and return all decommissioned equipment to Kendal C&I Maintenance. The Contractor must provide a delivery note and an equipment list which Kendal C&I Maintenance is required to sign upon handover of the decommissioned equipment.
- Provide and install an S7-1200 PLC system along with IO modules. The system design shall match the system currently installed on Unit 6 (see **Error! Reference source not found.**), i.e.:
 - 1x CPU 1214C SIMATIC S7-1200 PLC (6ES7214-1AE30-0XB0)
 - 1x PM 1207 stabilised power module (6EP1332-1SH71)
 - 2x SM 1223 Digital IO module (6ES7223-1BL30-0XB0)
 - 1x SM 1234 Analogue IO module (6ES7234-4HE32-0XB0)
- Provide all accessories, consumables for a fully installed and functioning system.
- Copy the Unit 6 Degrit Sump S7 program, modify the program, IO and labels to align with each of the Unit 1-5 Degrit Sumps and install the program on the new S7 PLC at each respective unit.
- Ensure that the modified S7 program is aligned with the latest revision of the Degrit Sump operating philosophy.
- Ensure that all functions can be fully interchanged between STL, FBD and LAD. The preferred language is STL.
- Provide a detailed control/design philosophy of the program including a flow chart of the program detailing the program flow.
- Perform full Degrit Sump C&I system commissioning (field control panel and field) on Unit 1-5.

3.1.2.4 Field Control Panel and Instrumentation

The Contractor is required to install the new PLC system inside of the existing field control panels (*0HYW65GH001) installed at Units 1-5. The Contractor's scope is as follows (note that the scope below must be provided for each of the 5 units even though it is written for a single unit):

- The field control panel design for Units 1-5 shall be identical to that of Unit 6 (see **Error! Reference source not found.**). Note that the provided drawings must be verified against what is installed at Unit 6 as there may be small differences. One such difference is that the Unit 6 field control panel has 4 circuit breakers compared to 3 circuit breakers shown in the drawings. Also should the Unit 6 design not

conform to the codes and standards listed in section 3.1.1, the Contractor aligns their design to the codes and standards to ensure full compliance where applicable.

- Perform all internal wiring to realise a fully functional system meeting the requirements and objectives of this scope.
- Terminate all Unit 1-6 Degrit Sump field devices/signals in the respective field control panels and at the respective IO.
- Provide and replace all push buttons, indicator lights, and key selector switches as per Appendix B.
- Provide and replace 24 V_{DC} power supply as per Appendix A.
- Provide and replace field instrumentation, level transmitter, flow switch, CCG boxes, and all valve proximity switches.
- Provide all terminal strips, relay sockets, relays, mounting rails and brackets, trunking, ferrules, numbering, labelling and any other accessories and consumables required to realise a fully functional system meeting the requirements and objectives of this scope.
- Ensure that the IP rating (IP66) is not negated in any way by the work performed by the Contractor.
- Should the Contractor's work negate the IP rating in any way, the Contractor restores the IP rating to IP66 at their own expense.
- Provide a 3-point South African plug socket with 220 V_{AC} supply as per **Error! Reference source not found.**

3.1.2.5 Locations

The Degrit Sump is situated directly behind the Submerged Scraper Conveyor (SSC) at the zero meter level inside each respective Boiler House (Unit 1-5).

Installed at the back-end of each Degrit Sump is the field control panel (*0HYW65GH001) in which the PLC system shall be installed.

All instrumentation interfacing to the Degrit Sump PLC system is located inside the respective Degrit Sump.

The "SSC Call for water" signal originates from the SSC Level Control Panel (*QYC10GA001) which is situated at the front-right of each respective SSC.

3.1.2.6 Cabling

The Contractor provides and replace all field cables for all Unit 1-5 Degrit Sump field instrumentation.

The Contractor terminates the cables for all the Unit 1-5 Degrit Sump field instrumentation and signals at the respective terminal strips, relays or equipment within the field control panel.

The Contractor provides all consumables required for the correct installation of all cables.

3.1.2.7 Power

Existing 220 V_{AC} and 24 V_{DC} power supplies are available within the field control panels (left side – see **Error! Reference source not found.**).

The Contractor provides and uses the PM 1207 stabilised power module (6EP1332-1SH71) for powering the new PLCs and IO modules from the 220 V_{AC} supply.

3.1.2.8 Plant coding and labelling

The Contractor shall utilise the existing KKS codes for all instrumentation and signals.

The Contractor installs clear and concise labels for all IO and PLC signals. The labelling methodology used for the Unit 6 Degrit Sump S7 installation shall be followed for the Unit 1-5 Degrit Sump PLC migration as well.

All numbering and labelling shall comply with the standards listed in section 3.1.1.

3.1.2.9 Testing and commissioning

The Contractor is responsible for all testing and commissioning activities required to ensure the system is fully commissioned and fully functional while meeting the requirements stated herein. This includes, but is not limited to:

- Loop checking
- Cold commissioning
- Hot commissioning

The Contractor compiles and submits testing and commissioning procedures, for each of the Unit 1-5 Degrit Sump systems, for acceptance prior to any installation work starting.

Upon the successful completion of commissioning activities, the Contractor compiles and submits a commissioning report for acceptance. This report shall describe the commissioning results and, as a minimum, refer to the relevant commissioning procedure as well as any defects found and how they were rectified.

The Contractor provides all Equipment, tools and software required for testing and commissioning.

3.1.3 Electrical Scope Requirements

The following electrical work shall be done by a suitable contractor. All spare parts and labour is for the contractor's account.

Component	KKS	Circuit number	Activity	Responsible Department
Ash Sump Vertical Sludge Pump Motor	1 0HDA10 AP011	380Vac Unit Board C	1. Supply and install 30cmX30cm stainless steel 304,pole mounted, local control panel,IP65 rating	Projects
	2 0HDA10 AP011	Tier 6 ,AA001	2. Re-wire the panel as per schematic in Appendix C	
	3 0HDA10 AP011			

	4/5/6 OHDA10 AP011		<ol style="list-style-type: none"> Supply and install 350 meters long 16 cores(from unit board C to Degrit sump local control panel), 2.5 sqm control cable for wiring of the local control panel. Supply and install 25sqm motor power cable of 350 meters long (4 core XLPE Insulated PVC bedded SWA PVC sheathed 600/1000 V cables manufactured to SANS 1507-4) 	
Bottom ash Supply motor	CW 13/14 BFC 21/22 BFC 31/32 BFC 41/42 BFC 51/52 BFC 61/62 BFC		<ol style="list-style-type: none"> Supply and install 30cmX30cm stainless steel 304 local control panel,IP65, pole mounted. Re-wire the panel as per schematic in APPENDIX C Supply and install 350 meters long 16 cores, 2.5 sqm control cable for wiring of the local control panel (Dust Handling Board) . Supply and install 70sqm motor power cable of 350 meters long (4 cores XLPE Insulated PVC bedded SWA PVC sheathed 600/1000 V cables manufactured to SANS 1507-4) <p>Electric Motor :</p> <ol style="list-style-type: none"> Supply and install flange mounted, 37kW, 2P, IP65, cast iron, 400Vac, 67A, induction motor... 	Projects

3.1.4 General cable requirements:

- a) The scope includes procurement, provision of proof of factory acceptance testing (FAT), supply, delivery, off-loading, storage, installation, site acceptance testing (SAT), commissioning, certification and handover of all works
- b) Supply and install all cable accessories such as terminations and jointing kits, cable glands, lugs, bolts, washers and nuts for terminations, sleeves and other ancillary material for fitting the cables into position
- c) The cable lengths provided is an estimate and must be verified upon a routing assessment.
- d) The new power cables are manufactured to SANS 1507 and SANS 1411 parts 1&2.
- e) The new power cables are installed in accordance with 240-56227443 Requirements for Control and Power Cables for Power Stations Standard
- f) The cable numbering and coding are to be in accordance with the KKS system of numbering.
- g) The Contractor submits any deviation from the associated works, scope requirements or listed standards, to the Project Manager for acceptance, before continuation of the works.
- h) The Contractor submits a quality control plan to the Project Manager for acceptance.
- i) Submit the type test certificate for the cables on offer for the Works.
- j) Existing cable routing and racking shall be used as far as practically possible. Assessment of the support capability shall be conducted on the existing cable racks such that no safety hazard or racks damage exist.
- k) The Contractor makes provision for cable racking for areas where the existing cable racks cannot be used. This shall be done after the approval by the Employer.
- l) Repairs and replace where necessary damaged racking and supports, such that every cable replaced under the works, is supported throughout its run. The cable racking supports shall be provided at least every 375 mm.
- m) The Contractor provides any type test certification provided by the respective cable manufacturer.
- n) The Contractor provides routine test certification provided by the respective cable manufacturer.
- (1) All tests shall be in accordance with SANS 1507- Part 3.

3.1.5 General

Where any component is installed on structures or gantries, the Contractor shall not damage or compromise any corrosion protection currently in place. Where corrosion protection is damaged or compromised by work activities carried out by the Contractor, the Contractor restores the corrosion protection at the Contractor's cost.

The Contractor is responsible for taking out permits to work for all work activities conducted by the Contractor.

Equipment around the Degrit Sump and SSC are prone to mechanical damage, flooding and extensive ash build-up. The Contractor shall take this into account and mitigate these risks when designing the new system. The Contractor's design must be fault tolerant for faults in both the field and power supply.

Where applicable, all equipment shall be earthed according to the standards listed in section 3.1.1.

3.2 Documentation Requirements

All documents supplied by the Contractor are subject to the Employer's acceptance.

The language of all documentation is English.

All documentation is controlled and managed in accordance with Document and Records Management Procedure (32-6).

The creation, issuing and control of all Engineering Drawings are in accordance to the latest revision of the Engineering Drawing Standard 240-86973501.

As a minimum, the Contractor submits three hard copies and an electronic copy of all drawings to the Employer.

The Contractor submits electronic drawings in Micro Station (DGN) format, and scanned drawings in PDF format. No drawings submitted in TIFF, AUTOCAD or any other electronic format are accepted.

Drawings issued to the Employer are not "Right Protected" or encrypted.

The Employer reserves the right to use these drawings to meet other contractual obligations.

The Contractor includes the Employer's drawing number in the drawing title block. Drawing numbers are assigned by the Employer as drawings are developed.

As a minimum, the Contractor is responsible for providing the following documentation for each of the Unit 1-5 Degrit Sump systems at hand-over:

- Hardware functional design specification including the following as a minimum:
 - System overview
 - Location of devices
 - Bill of materials
 - List of critical spares
 - Identification requirements
 - Reference to product datasheets
 - Reference to drawings
- Equipment list for all equipment installed. This list shall include the following as a minimum:
 - KKS where applicable
 - Description
 - Installation location

- Brand
- Model
- Part/order number
- Reference to product datasheets
- Reference to drawings
- Drawings
 - Panel location and identification
 - Panel layout
 - Rack layout
 - Power supply
 - Power distribution
 - IO diagrams (for each module)
 - Loop diagrams indicating equipment KKS, locations, cable terminations, cable types and cable numbers as a minimum
- Backups
 - Full S7 program and functions
 - Signal/IO list (including an excel version)
- OEM datasheets for all equipment supplied
- Control/design philosophy (see Section 3.1.2.3)
- Operating philosophy
- Operating manual
- Testing and commissioning procedures
- Commissioning report
- Fully signed delivery note for the old equipment handed over to Kendal C&I Maintenance

3.3 Training

The Contractor shall provide training as well as training material (hard and soft copy) to operating, maintenance and engineering personnel. The training shall be role specific and shall cater for at least 5 operating personnel, 5 maintenance personnel and 5 engineering personnel.

3.4 Bill of Materials

3.4.1 C&I Engineering

The preliminary bill of materials is listed in Table 1 below. The Contractor amends this list based on the Contractors design and final installed quantities. Note that all accessories and consumables are not listed in the preliminary bill of materials. The Contractor must determine what exactly their design requires and update the bill of materials accordingly.

Table 1: Preliminary bill of materials

Item No.	Description	Quantity
1	CPU 1214C SIMATIC S7-1200 PLC (6ES7214-1AE30-0XB0)	5
2	PM 1207 stabilised power module (6EP1332-1SH71)	5
3	SM 1223 Digital IO module (6ES7223-1BL30-0XB0)	10

4	SM 1234 Analogue IO module (6ES7234-4HE32-0XB0)	5
7	25 A circuit breaker	5
8	6 A circuit breaker	10
9	3 A circuit breaker	5
10	3-pin RSA plug socket	5
11	4 core, 0.5mm ² , thermoplastic insulated, individual screened, twisted pair, blue-stripe instrument cable (UVG02ACM) for level transmitter x 30m	30m
12	4 core, 2.5mm ² , thermoplastic insulated, individual screened, twisted pair, armoured, blue-stripe instrument cable (UVE02DCM) for the flow switch and proximity switches x 100m	100m
13	VEGASON 62 level instrument	1
14	Flow Captor 412x.1xM water-based sensor, 30mm sensor head length, 1/2-inch BSP	1
15	24 V _{DC} proximity switch two wire	4
16	220VAC/24VDC Power supply, 15 amps	1
17	Push button with lamp holder and rubber shroud (red)	5
18	Push button with lamp holder and rubber shroud (green)	5
19	Lamp holder (with orange lenses)	6
20	Push buttons (black)	2
21	3-way selector key switch	2
22	20mm CCG boxes	4

3.4.2 Electrical engineering bill of materials

Nº	COMPONENT FLOC (KKS CODE)	COMPONENT DESCRIPTION	COMPONENT / MATERIAL SPECIFICATION	DESIGN QUANTITY
1	Local control panel	230Vac local Control panel equipped with start/stop buttons and indication lamps	a) <i>Physical size: 30cmx30cm</i> b) <i>Material: Stainless steel 304</i> c) <i>IP 65 enclosure rating</i>	6
2	Local control panel	Control cable	350 meters long 16cores, 2.5 sqm	6
3	Ash Sump Vertical Sludge Pump Motor	Power cable	25sqm motor power cable of 350 meters long (4 core XLPE Insulated PVC bedded SWA PVC sheathed 600/1000 V cables manufactured to SANS 1507-4)	6
4	Flush Pump motor		Supply and install 70sqm motor power cable of 350 meters long (4 core XLPE Insulated PVC bedded SWA PVC sheathed 600/1000 V cables manufactured to SANS 1507-4)	6
5	Flush Pump motor		Supply and install flange mounted, 37kW, 2P, IP65, cast iron, 400Vac, 67A, induction motor	6

3.5 Quality Control Plan

The Contractor compiles and submits a quality control package that includes the final scope of work, quality control plans, safety files, work execution procedures, etc. to C&I Engineering and C&I Technical support for acceptance prior to the commencement of the works. Refer to Kendal Quality Management Manual *1017374.

3.6 Competence

The Contactor shall comply with all the scope of work requirements. The competence of the Contractor will be evaluated during the technical evaluation by the Kendal C&I Engineering and C&I Maintenance team.

3.7 Equipment Requirements

The Contactor shall supply all Equipment required to fully, and successfully, meet the requirements stated in this document.

4 Procurement

4.1 People

4.1.1 Minimum requirements of people employed on the Site

The Contractor ensures that his workforce is trained and competent to perform their respective duties.

The Contractor's inspection personnel familiarise themselves with the content of the work and the Contractor ensures consistency in interpretation and decision-making.

Any new foremen/supervisors appointed by the Contractor after Contract Award or during provision of the works are fully conversant with respect to details of the methodology and communication process existing, prior to accessing the Site.

4.1.2 BBBEE and preferencing scheme

Tenderers will be required to maintain or improve their B-BBEE Recognition Level for the duration of the contract, after contract award in regard to any Broad Based Black Economic Empowerment (B-BBEE) or preferencing scheme measures.

4.1.3 Supplier Development Localisation and Industrialisation

Section 1: Pre-qualification Criteria

Failure to meet Pre-qualification at tender stage will lead to disqualification

1.1 Minimum BBBEE status level of contributor?	YES	NO
If Yes, what is the BBBEE status and/or level required	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1.2 Is there BBBEE category targeted for this enquiry?	YES	NO
If Yes, BBBEE category	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>Tender Returnable if the above elements are requirements;</p> <ul style="list-style-type: none"> Valid original or certified copy of sworn affidavit in the case of EME's must be submitted (affidavit must be completed fully), or Valid Copy B-BBEE Certificate issued by CIPC for EME's. OR Valid original or certified copy of the B-BBEE certificate / sworn affidavit in the case of QSE's must be submitted, or Valid original or certified copy of the B-BBEE certificate issued by SANAS Accredited Verification Agency for Generic Entities must be submitted, or For JV's only valid original or certified copy B-BBEE Certificate issued by a SANAS Accredited Verification Agency will be accepted and the certificate should be in the name of the JV. 		
YES	NO	

1.3 Minimum subcontracting requirement for this?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If Yes, what is the minimum percentage?			

Tender Returnable if the above element is a requirement;

- Letter of intent or any other requested document indicating commitment and the percentage required must be submitted as a tender returnable.
- Sub-contracting can only be concluded with the following entities:
 - an EME or QSE which is at least 51% owned by black people;
 - an EME or QSE which is at least 51% owned by black people who are youth;
 - an EME or QSE which is at least 51% owned by black people who are women;
 - an EME or QSE which is at least 51% owned by black people with disabilities;
 - an EME or QSE which is 51% owned by black people living in rural or underdeveloped area or townships;
 - a cooperative which is at least 51% owned by black people;
 - a EME or QSE which is at least 51% owned by black people who are military veterans

Section 2: Mandatory Compliance for Contract Award

The following requirements are mandatory compliance for contract award and submissions can be clarified during evaluations or negotiated before contract is awarded

2.1 Local Content Designation

a) Is this Commodity or part of it a Designated Sector?

YES	NO
<input checked="" type="checkbox"/>	<input type="checkbox"/>

Please indicate below Designated Components:

Commodity	Components	Local Content Threshold
Cabling	Cables	90%
Steel Component	Stainless Steel	100%

Mandatory Returnables

NOTE 1:

- SBD 6.2 Local Content Declaration Form
- Annex C (Local Content Declaration-Summary Schedule) are a tender returnable and will be mandatory for contract award.

2.2 CIDB Skills Development

a) Is there CIDB compulsory training?

If Yes, what is the % of the Construction Skills Development Goal % (CSDG)

YES	NO
<input type="checkbox"/>	<input checked="" type="checkbox"/>

If the answer above is Yes, it will then be mandatory for the supplier to match Eskom's targets

Criteria	Eskom Target	Tenderer Commitment
CSDG Percentage	N/A	
Description	N/A	

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Mandatory Compliance for Contract Award continues.....

2.3 BBBEE Compliance

Is there minimum BBBEE level targeted?

If Yes, what is the BBBEE status targeted for this transaction (contractor/s will be required to submit plans to achieve the target level if not met at contract award)

YES	NO
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Successful tenderer to achieve, maintain or improved a B-BBEE Recognition Level 4 for the duration of the contract	

2.4 Subcontracting Requirements

Is there a requirement for subcontracting?

If Yes, what is the targeted subcontracting percentage

YES	NO
<input type="checkbox"/>	<input checked="" type="checkbox"/>
N/A	

2.5 Enterprise Development

Are there specific ED requirements?
(This ED intervention can either be separate or additional to subcontracting requirements, but duplication should be avoided)

YES	NO
<input type="checkbox"/>	<input checked="" type="checkbox"/>

If Yes, the main contractor is required propose development in the following areas or against the following Eskom's targets:

Eskom's Target	Tenderer Proposal
N/A	N/A

2.6 Local Procurement Content

Eskom's Target	Tenderer Proposal
100%	

Local Procurement Content" refers to value added in South Africa by South African resources. Where a single contract involves a combination of local and imported goods and/or services, the tender response must be separated into its components as per the Price Schedule included with the tender documents. Local procurement content is total spend minus the imported component

2.7 Job Creation

Jobs to be created	Jobs to be retained

2.8 Skills Development

Are there Skills Development targets?

YES	NO
<input type="checkbox"/>	<input checked="" type="checkbox"/>

If Yes, the contractor is required to propose skills development against Eskom's targets:

Eskom's Target			
Category	Number	Entry Level	Output
N/A	N/A	N/A	N/A

Section 3: SDL&I Penalty and Performance Security

Eskom will apply a penalty of 2.5% of the Contract Value for failure to meet SDL&I obligations.

One of the following options will apply for SDL&I performance security:

- For the duration of the contract, Eskom will retain 2.5% of every invoice (excluding VAT) as security for the fulfilment of all SDL&I Obligations. The retained amounts shall only be released to the Contractor upon fulfilment of all SDL&I obligations at the end of the contract.
- Alternatively the Contractor shall submit a bond equivalent to 2.5% of the Contract Value and shall only be released to the Contractor upon fulfilment of all SDL&I Obligations.
- Panels- Eskom will apply 2.5% retention on every invoice (excluding VAT) after all cumulative task orders awarded to the Contractor/Service Provider that have reached a stipulated threshold as security for the fulfilment of the SDL&I obligations.

Section 4: Reporting and Monitoring

- The suppliers shall on a monthly/quarterly basis submit a report to Eskom in accordance with Data Collection Template on their compliance with the SDL&I obligations described above.
- Eskom shall review the SDL&I reports submitted by the suppliers within 60 (sixty) days of receipt of the reports and notify the suppliers in writing if their SDL&I obligations have not been met.
- Upon notification by Eskom that the suppliers have not met their SDL&I obligations, the suppliers shall be required to implement corrective measures to meet those SDL&I obligations before the commencement of the following report, failing which Retention clauses shall be invoked.
- Every contract shall be accompanied by the SDL&I Implementation Schedule which must be completed by the suppliers and returned to SDL&I representative for acceptance 30 days after contract award.

Section 5: General Information on Validity of Sworn Affidavits

The following must be considered when it comes to validity of Affidavits:

Tenderers submitting B-BBEE Sworn Affidavits must ensure that the affidavits meet the following key pointers to ensure their validity:

- Name/s of deponent as they appear in the identity document and the identity number.
- Designation of the deponent as the **director, owner** or **member** must be indicated in order to know that person is duly authorised to depose of an affidavit. **(Mark the applicable option).**
- Name of enterprise as per enterprise registration documents issued by the CIPC, where applicable, and enterprise business address.
- Percentage of black ownership, black female ownership and designated group. In the case of specialised enterprises as per Statement 004, the percentage of black beneficiaries must be reflected. **(No blank spaces to be left).**
- Indicate total revenue for the year under review and whether it is based on **audited financial statements** or **management account**. **(Mark the applicable option).**
- Financial year end as per the **enterprise's registration documents**, which was used to determine the total revenue. **(Financial year end to be stipulated by day/month/year).**
- B-BBEE Status level. An enterprise can only have one status level. **(Tick applicable level)**
- Empowering supplier status must be indicated. For QSEs, the deponent must select the basis for the empowering supplier status.
- Date deponent signed and date of Commissioner of Oath must be the same. **(The sworn affidavit must be signed in the presence of the Commissioner of Oath. Furthermore the Commissioner must also sign and stamp)**
- Commissioner of Oath cannot be an employee or ex officio of the enterprise because, a person cannot by law, commission a sworn affidavit in which they have an interest.

4.2 Plant and Materials

4.2.1 Quality

- All Plant and Materials are new. All New Plant and Materials will be free from defects. No Reconditioned Plant and/or Materials are regarded as new under any circumstances.
- The *Contractor* will not use Plant or Materials which are generally recognised as being unsuitable or otherwise to be avoided for the purpose for which they are intended.
- Only components of high reliability will be utilised, with a proven operating history, to enable the Plant to achieve required reliability and availability. Plant and Material design, engineering and manufacture will accord with the best modern practice applicable to high-grade products of the type to be furnished, so as to ensure the efficiency and reliability of the *Works* and the strength and suitability of the various parts for the *Works*.
- Plant and Materials withstands ambient conditions and the variations of temperature arising under working conditions without distortion, deterioration or undue strains in any part.
- All parts are made accurately, and where practicable, to standard gauges so as to facilitate replacement and repairs. Like parts are interchangeable.
- No repair of defective Plant and/or Materials will be permitted without the *Project Manager's* acceptance and any such repair, if accepted, will be carried out to the satisfaction of the *Project Manager*.
- The *Contractor* ensures that co-ordinated and formally documented management system is in place for the assurance of quality as specified in ISO 9001, Quality management Systems – Requirements.
- The *Project Manager* is free to specify hold and witness points during the installation and on site testing stages of the project. The *Contractor* issues preliminary notification of such hold and witness points by fifteen working days advance notice to the *Project Manager*, and confirms such hold and witness points at least seven days prior to the activity.

4.2.2 Plant & Materials provided “free issue” by the Employer

- Scaffolding.

4.2.3 Contractor's procurement of Plant and Materials

- The functional unit is suitable for handling and removal to avoid damage to the functional unit. During transportation, packaging is done in such a way that damage is prevented. Components that are transported separately are marked accordingly and are easily identifiable.
- The *Contractor* supplies the labelling for the Plant that forms part of the *works*. The *Contractor* provides labels for the Plant according to Kendal label specification. The *Contractor* makes use of the KKS codes and descriptions provided by the *Employer*.
- The labels are affixed in such a way that they are easily legible and not obstructed by the wiring or by other components.

- Clamping methods applied to the labels ensures that removal of the labels requires force. The *Project Manager* will approve the proposed method of clamping prior to use.
- The *Contractor* supplies the *Project Manager*, for verification and acceptance purposes, with a label list showing the text only. The *Project Manager* will approve the positioning and designation of labels.
- The KKS codes are used accordingly on documentation (e.g. drawings, manuals, equipment lists, cable schedules etc.) as a unique identification means. References to plant are accompanied by the relevant KKS code for that item of plant.
- Abbreviations to descriptions on the labels are generally not acceptable. Where abbreviations are unavoidable, due to the limited number of characters that can be engraved/etched on labels, the abbreviations are submitted to the *Project Manager* for acceptance.

4.2.4 Spares and consumables

- The Contractor provides list of critical spares as part of the Works.
- The Employer is responsible for purchasing of recommended spares.
- Each recommended spare is uniquely identified with a part number, detailed specification and respective supplier name, which can be cross referenced to a spares list and associated drawing.
- The Project Manager prefers that support from the OEM or component supplier is available locally in South Africa. The Contractor is required to provide technical support for the compliance operating life of the Plant.

4.3 Tests and inspections before delivery

- The Contractor provides Quality Plan for all equipment to be repaired to the Project Manager for acceptance.
- The plan shall be reviewed and accepted to ensure all repaired items get to be checked prior to delivery and installation.
- For all items that require replacement, Contractor shall in writing inform the Project Manager and arrange for the Project Engineer to witness the equipment.

4.4 Cataloguing requirements by the Contractor

The *Contractor* makes recommendations and supplies a spares list with detailed technical description, model number, ex rating and other critical details that will form part of the installations report and be provided to the *Project Manager* during hand over.

5 Construction

The *Contractor* is responsible for carrying out all activities and supplying everything necessary to provide the *Works* in accordance with the requirements of the *Works* Information. This includes clarifying and co-ordination with plant engineers, and the *Project Manager*. A fully integrated, working system is provided which meets safety, reliability and operability criteria and performs all control, safety and protection functions as detailed in the *Works* Information. The *Contractor* makes recommendations and proposals for the hazardous areas and plant performance improvements.

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

The *Contractor's* personnel are required to attend an Eskom Kendal safety induction, provided by the *Project Manager*, before allowed to enter and work on the site of Kendal Power Station. It is the responsibility of the *Contractor* to ensure that all required personnel have attended the safety induction.

The *Contractor* provides his/her safety file for acceptance by the *Project Manager*. The *Project Manager* and delegated safety personnel approves the safety file, before the *Contractor* attends the Eskom Kendal safety induction.

Site access control to Kendal Power Station will be arranged with the *Project Manager* after successfully completing the safety induction.

Alcohol and drug testing will be conducted at any time on all personnel entering the Kendal Power Station site premises. Any personnel tested positive for alcohol or drug usage will not be allowed on site.

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

All Contractor personnel vehicles comply with the National Road Traffic Act.

The Contractor applies for personnel site vehicle access, in their supply of the *Works*, for acceptance by the Project Manager.

The Project Manager and delegated safety personnel conducts Contractor personnel vehicle inspections at random.

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

The *Contractor* schedules hours of work, in their supply of the *Works*, in accordance with the site shift management at Kendal Power Station and with acceptance by the *Project Manager*.

Any incident or accident, in their supply of the *Works* is to be reported to the *Project Manager* within 24 hours. Any incident or accident, in the supply of the *Works* is to be investigated as defined in the Safety, Health and Environmental Requirements for Contractors.

5.1.4 Health and safety facilities on Site

Any medical incident on site shall be reported to medical centre and Kendal Emergency Services.

5.1.5 Title to materials from demolition and excavation

The Contractor requests permission and acceptance by the Project Manager, before removal of any items of Plant, Equipment or Materials found on site during execution of the *Works*.

5.1.6 Publicity and progress photographs

The taking of photographs at the Power Station including the project works is restricted and subject to the approval by the Project Manager.

For the purpose of the Progress Reporting Requirements, the Project Manager may prohibit the taking of such photographs and/or require that all such photographs be taken by an official Employer photographer. In the latter event, the Contractor is required to make arrangements directly with the photographer for the taking of the photographs required by the Contractor for the purpose of the Progress Reporting Requirements.

5.1.7 *Contractor's* Equipment

The Contractor provides all Equipment that is required to complete the works.

The Contractor's Equipment does not impair the operation of plant and the access to the plant.

The Contractor provides of all or any temporary or expendable materials required for the storage of equipment on site.

The Contractor's equipment, including testing equipment is validated and certified for use by the South African National Accreditation System.

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

5.1.8 Equipment provided by the *Employer*

Supply of electricity

All points of supply requested by the Contractor are provided in terms of quantity and location at the discretion of the Project Manager.

There is no energy charge for electricity used for construction purposes.

No connection is made to the permanent installation at the Power Station without the prior acceptance of the Project Manager.

No guarantees of power supply quality are given and power supply breaks of some duration may occur without warning. Planned outages are also a possibility. The Contractor makes arrangements at his own expense to improve continuity and quality of power supply where necessary for any reason and no claim of any nature relating to power failures is considered.

5.1.9 Site services and facilities

Roads

Main access roads are surfaced and complete and may be used by the *Contractor* with the necessary care. The *Employer* maintains the Site roads, described above, to a fair condition. Any costs incurred by the Project Manager from damage caused to underground services, structures, etc. as a result of the Contractor not using the prescribed routes is recovered from the Contractor.

First aid and fire fighting

The Contractor in cases of emergencies or accidents calls upon the services of the first aid and firefighting resources at Kendal Power Station and informs the Project Manager.

Sanitary facilities

The Contractor and personnel uses the Employer's sanitary facilities that are strictly allocated for contractors and as directed by the Project Manager.

5.1.10 Facilities provided by the *Contractor*

The Contractor facilities shall have Office equipment, ablution blocks and storage for project equipment. Upon completion of the works Contractor is responsible for clearing

5.1.11 Survey control and setting out of the *works*

The Contractor shall conduct surveys for any underground excavation works and safely execute any excavation scope, damages to any unforeseen underground services shall be corrected by Contractor.

5.1.12 Excavations and associated water control

All control of identified hazard to be mitigated as per Baseline Risk Assessment document which is part of the tender documents.

5.1.13 Sequences of construction or installation

The Contractor uses the installation plan in order to schedule site activities and personnel required for installation, testing and commissioning activities. Any changes to the baseline schedule should be communicated and agreed in writing with all parties.

5.1.14 Giving notice of work to be covered up

All intended activities must be captured in the *Contractor* scope of work, method statements and project schedule. The project schedule will be reviewed and updated by the *Contractor* and *Project Manager*.

5.1.15 Hook ups to existing works

All control of identified hazard to be mitigated as per Baseline Risk Assessment document which is part of the tender documents.

5.2 Completion, testing, commissioning and correction of Defects

5.2.1 Work to be done by the Completion Date

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

	Item of work	To be completed by
	As built drawings of	Within _____ days after Completion
	Performance testing of the <i>works</i> in use as specified in paragraph _____ of this Works Information.	See performance testing requirements.

5.2.2 Commissioning

The *Contractor* is responsible for the initial commissioning plan of the equipments installed with the assistance from operating and maintenance departments. Commissioning and tests shall be conducted in the presence of the *Project Supervisor*, *Project Manager*, *System Engineer*, Maintenance Personnel and Operating Personnel. Commissioning of the *works* is done by the *Contractor's* personnel with the *Employer's* delegated operations/commissioning staff (including Electrical Engineering, PTM and EMD).

The *Contractor* submits a commissioning procedure and program for acceptance by the *Project Manager*. Before plant and equipment is placed in service the *Contractor* certifies that it is in a suitable and safe condition. In addition, the *Contractor* provides a complete list of numbered schematic, wiring and cable diagrams which are a true record of the plant and equipment as installed and certifies that the *works* has been wired in accordance with these drawings.

Prior to the time when commissioning is to commence, the *Project Manager* will appoint a representative who will co-ordinate the commissioning of all plant and equipment forming an integral part of the system being commissioned. The *Contractor* is responsible for the commissioning of all the plant and equipment in their supply of the *Works*, to the requirements of this specification, in conjunction with the *Project Manager* and the *Employer's* representatives. Where various components are already in place, or are supplied by the Employer to form an integrated system, the *Contractor* at the time of commissioning, carries the responsibility for the correct functioning of the whole system.

In the event of incorrect functioning, the *Contractor* determines the cause and corrects the Defect if the Defect is within Plant and Equipment of their supply. The *Contractor*, at the time of commissioning, has the agreement, or alternatively, the attendance of the *Project Manager* involved in a particular phase, before proceeding with commissioning. Consequently, the *Contractor* must assure himself/herself as to the safety of his/her own Plant and Equipment, in respect of any particular commissioning test and in the event of damage, accept responsibility for such Plant and Equipment.

The *Contractor* commissions the *works* and ensures conformance to the Employer's performance requirements for the *works*.

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

The system is put in operation after safety clearance of all plant and systems and successful completion of functional testing of the *Works*.

Sign off will be scheduled as per the project schedule on completion of each activity.

5.2.4 Take over procedures

Take-over / hand over will be scheduled as per completion of the Works and acceptance by the Project Manager once the handover checklist is signed by all the stakeholders.

The take over stakeholders are Maintenance, Operating, Engineering and Configuration Management.

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

The Project Manager arranges for the Employer to allow the Contractor access to and use of a part of the works which has been taken over if needed to correct a Defect

5.2.6 Performance tests after Completion

Acceptance tests shall be carried out to prove all the equipment guarantee figures provided by the *Contractor* in the technical schedules. Where the results of the performance tests performed don't correlate with expected results and/or the control functions as per the operating philosophy do not meet the specifications guaranteed, the *Contractor*, at his own

expense, carries out all necessary adjustments and modifications to the *works* required to obtain the required designed performance and operation requirements. Fully detailed proposals are submitted in writing to the *Project Manager* for approval before any adjustments and modifications are made and work in this respect is carried out when convenient to the *Project Manager*. All adjustments and modifications are subject to inspection and approval by the *Project Manager*.

When adjustments and modifications are completed, the *Contractor* advises the *Project Manager* in writing to this effect and applies for a further acceptance test. From the results obtained, and provided that the *Employer* is satisfied that it will be lasting, the *works* will be finally accepted by the *Employer*.

5.2.7 Training and technology transfer

The *Contractor* is to provide the following formal training of the new Bus Transfer System, to the *Employer's* personnel, including training material and manuals:

- Operating (5 sessions)
- Maintenance (3 sessions)
- Engineering (2 sessions)

The *Employer* will provide a list of personnel to undergo formal training, as part of the delivery of the *Works*.

5.2.8 Operational maintenance after Completion

The Contractor shall provide the detailed maintenance schedule for the Degrit Sump equipment and also a document that shall be reviewed and accepted by Project Manager once all stakeholders have signed acceptance of the future maintenance and operation of the Degrit Sumps.

C3.2 *CONTRACTOR'S* WORKS INFORMATION

This section of the Works Information will always be contract specific depending on the nature of the *works*. It is most likely to be required for design and construct contracts where the tendering contractor will have proposed specifications and schedules for items of Plant and Materials and workmanship, which once accepted by the *Employer* prior to award of contract now become obligations of the *Contractor* per core clause 20.1.

Typical sub headings could be

- a) *Contractor's* design
- b) Plant and Materials specifications and schedules
- c) Other

This section could also be compiled as a separate file.
