Eskom	Specification	Transmission Real Estate

Title: **Provision of Air conditioning maintenance services Inspection, repairs and Testing**

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Content

1. Introduction

The purpose of this contract is to appoint a suitable qualified *Contractor* for the Provision of Air conditioning maintenance services to Eskom Real Estate (ERE) Simmerpan Offices located at Conner of Power and Refinery Road Germiston, Grand Central, Bernina, Apollo and surrounding areas. Maintenance and inspections performed shall be on a monthly basis to confirm visual operational status of Air conditioning equipment. This schedule establishes preventative maintenance of Air conditioning equipment to minimize the likelihood of breakdowns and constantly ensuring readiness. The Contractor to respond within 24 hours, however, should an emergency arise, the response time to be immediate.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

The purpose of this project is to provide a full range of Inspection, repairs, Testing, installation and Maintenance services of Air conditioning equipment as determined by the Employer. The service includes all Maintenance and Instillation of Air conditioning equipment in Simmerpan Germiston.

2.1.2 Applicability

This document applies to all the Air conditioning equipment inspection, Testing and Maintenance at Eskom Transmission Simmer pan complex.

2.1.3 Effective date

The effective date of this document is as per the date and signature of the functional manager as indicated on the cover page of this document.

2.2 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

[1] Act No 85: Occupational Health and Safety Act & Regulations.

[2] Act No 102: National Key Points.

[3] ISO 9001: Quality Management Systems.

[4] 34-1168: Colour coding, symbolic safety signs and demarcation.

[5] 32-37: Eskom Substance Abuse Procedure.

[6] 240-62946386: Eskom Vehicle and Driver Safety Management Procedure.

[7] 32-726: S.H.E. Requirements for the Eskom Commercial Process.

Note: See Annexure B: SHE Requirements for Tender Enquiries.
Annexure C: SHE Tender Evaluation and Scoring Card.
Annexure D: SHE Post-Contract Reviews.

[8] 240-62196227: Eskom Life Saving Rules Standards.

[9] SANS 10147: Standard for refrigeration and air conditioning plants

[10] ISO 14001: ISO 14001 2004 Environmental management System, requirements with guidance for use

[11] ISO 45001:2018 Occupational Health and Safety Management Systems Informative, Requirements.

[12] 32-123 Eskom Standard for Emergency Planning.

[13] National Building Regulations and Building Standards Act 103 of 1977

2.2.2 Informative

- SANS 193 Fire Dampers

2.3 Definitions

Definition	Description
BBBEE	Broad Based Black Economic Empowerment
QM	Quality Management
ESF	Eskom Simmerpan Facilities
SD&L	Supplier Development and Localisation
SHE	Safety, Health and Environmental
TSC	Term Services Contract

2.4 Abbreviations

Abbreviation	Explanation
HVAC	Heating, Ventilation and Air conditioning
COC	Certificate of Compliance
ISO	International Standards Organisation
ITM	Inspection, Testing and Preventative Maintenance
ITP	Inspection, Testing and Procedures
SHE	Safety Health and Environment
SANS	South African National Standards

2.5 Roles and Responsibilities

The *Contractor* shall ensure that:

- Inspection, testing and maintenance measures are to be performed by competent persons only. The Air conditioning technician competent persons are to ensure that they fully comply with the following requirements as per the different classifications of activities undertaken on the HVAC Systems:

Inspection Personnel and Services

- ✓ a) These are the individuals who conduct a visual examination of a system or portion thereof to verify that it appears to be in operating condition, in the proper location, and is free of physical damage or conditions that impair the operation.
- ✓ b) The inspections shall be performed by inspection personnel who have developed competence through training and experience of the Air conditioning System and other systems.
- ✓ The inspection personnel shall have attended and certified as competent with regards to SANS standards.

Testing Personnel and Services

- ✓ a) The testing personnel shall have the knowledge and experience of the testing requirements for fire detection system and its interfaces to other systems (such as Fire Protection Systems, HVAC, etc.).
- ✓ b) The testing personnel shall have attended and certified as competent with regards to the SANS standards
- ✓ c) The testing shall be performed by testing personnel who have developed competence through training and experience of the Air conditioning

Testing Activities without Tools (Maintenance personnel)

- ✓ These are individuals who perform procedures used to determine the status of the systems as intended, by conducting periodic physical tests and checks on the systems.

Testing Activities with Tools (Maintenance personnel)

- ✓ These are individuals who perform procedures with dedicated and certified tools for the purpose of testing, which are used to determine the status of the systems as intended, by conducting periodic physical tests and checks on the systems.

Maintenance Personnel and Services

- ✓ a) The maintenance activities shall be performed by the maintenance personnel who have developed maintenance competence through training and experience of the HVAC Systems and other systems.
- ✓ c) The maintenance personnel shall be declared competent on the Plant Safety Regulations.

Maintenance Activities

- ✓ The individuals who perform those procedures, adjustments, replacement of components and maintenance activities as described in the OEM O&M manuals and Eskom Work Instructions, that can affect any aspect of the performance of the HVAC systems, and the systems the fire detection system interfaces to.
- ✓ The maintenance personnel shall be qualified in the maintenance and servicing of the HVAC systems.
- ✓ The maintenance personnel shall have OEM certified training and declared competent on the specific type and brand of HVAC system being serviced at the maintenance support levels.

- The Employees of the service provider shall comply with Eskom's policies and site regulations.
- Workmanship shall, at all times, be of a grade accepted as the best practice of the particular trade involved and as stipulated in written standards of recognised organisations or institutions of the respective trades, except as exceeded or qualified by the specifications. The *Employer* shall determine the acceptability of workmanship.
- The *Contractor* shall provide a complete Quality Assurance plan in accordance with the requirements of ISO 9001: 2015 to the *Employer* for approval. This plan must ensure an integrated quality service as part of the contract. Execution of all quality related activities, including inspection and test plans compilation and execution, spares material quality inspections and all quality related record keeping is part of the *Contractor's* scope of work.

3. Document Content

3.1 Requirements

3.1.1 Adherence to Eskom generic policies

All *Contractor Employees* shall comply with the non-use of cell phones in restricted areas, adherence to Eskom's life-saving rules, no smoking policy, etc.

3.1.2 Provision of Manpower

The successful *Contractor* shall utilise / provide skilled and suitably qualified staff as governed by Eskom Maintenance Contracts User Specification Requirements and should conform to: -

- Quality Management Control and Assurance as per ISO Standards.
- Have a valid South African Qualifications.

- Occupational Health and Safety Act 85/1993 and (SHE) Standards
- Procedure writing.
- Have valid medical fitness certificate.

3.1.3 *Contractor's* Management, Meetings and Key People

- The *Contractor* shall be required to do safety induction prior to start any work on site.
- The *Contractor's* safety file must be approved before any work commence on site.
- Other contract related meetings shall be communicated to the *Contractor* on arrival to site.

3.1.4 Plant and Material

- All spares and materials required for repairing, maintaining, replacing and new fitting will be provided by the *Contractor*.
- Any damage caused is repaired by the *Contractor* at his/her own cost prior to take over.

3.1.5 Equipment

The *Contractor* shall provide all tools and equipment required for the project.

3.2 Management Reporting and Process for Monitoring

The *Employer* will establish a sound contract management principle.

1. Supply, Installations, repairs and maintenance of all and any damages to Eskom properties, foreseen and unforeseen.
2. To create a safe, favourable and user friendly, environment for Eskom employees and tenants in order to maintain employee satisfaction and increased productivity.
3. On a daily basis attend to calls from Eskom employees through Transmission Facilities instruction and attend to emergency maintenance work.
4. As and when required there will be a need to do work after hours as may be requested by the Eskom Facilities.
5. As per the size of the complex and consideration of its age, we need resources that will be on site permanently to attend to day-to-day defects at the request of Eskom Facilities.
6. The response time for the *Contractor* to supply quotations is 3 working days from the date of request. Eskom will not pay for the *Contractor* for obtaining quotations, unless otherwise agreed by the *Service Manager.*
7. *The Contractor* will be subject to performance appraisals based on Eskom's key performance indicators. Based on outcomes of these performance appraisals, the *Service Manager* reserves the right to withhold allocation of works to non-performing contractors.

8. The contractor must submit remittance advices/proof of payment of his sub-contractors to the service manager upon request. The *service Manager* has the right to request the remittance advices directly from the sub-contractors employed by the *Contractor* at any time to recon payment made to *Contractor* versus payment made to sub-contractors. The *contractor* can choose the method of submitting proof of payment for sub-contractors, provided such proof is authentic.
9. The *Contractor* confirms that their employees will be remunerated at a minimum of the Government Gazetted labour rates.

SIMMERPAN COMPLEX BUILDINGS

Building name	Indoor units	Outdoor units	Make	Type
Air con workshop	3	2	York	2 split units, 1 console unit
Ackerman	36	22	Airedale	14 split units, 8 ducted splits, 15 consoles
D.C. Lab	38	1	National	37 Console units, 1 Split unit
Dist sever room	4	4	Uniflair	Close control server room units
Psychometric Centre	3	3	Mitsubishi	2Mid wall split units, 1 cassette
Facilities	9	9	National	Floor split units
Gavin Bruce PTM	10	2	Mitsubishi	Heat recovery units
House 1-9	42	42	Panasonic	Mid wall split units
HR Block EFC	32	32	Mitsubishi	Mid wall split units
Hume	74	70	National	split units, window units, console units
Hume prefabs	36	34	National	34 Split units, 2 window units
HV lab	3		National	3 Console units
Johan Gossen			Carrier	Included in PTM West wing
Kevin Placket west gate	5	5	Carrier	Split units, National, carrier, Panasonic

Live line and park homes	6	3	Carrier	3 Split units, 3 window units
Flexiform next to EFC	9	7	Panasonic	7 Split units, 2 console units
Metering	4	4	Carrier	3 mid wall split units, 1 ducted split unit
NMC AT PTM	4	2	Carrier	Central plant
North store Distribution	10	10		Split units
North store Ronnie	10	10	Carrier	Split units
Old Esprop office	8	8	LG	8 mid wall, 1 hide away, 1 under ceiling
Old museum	4	4	National	split units
Old pay roll and Medical C	17	17	Carrier	mid wall split units and cassette units
Old PTM	3	2	Climaven	Central plant
Old risk office behind gym	8	8	Mitsubishi	Mid wall split units
Old transport	5	2	Carrier	Split units, window units
Oriel and room 26	3	3	National	2 national splits, 1 ducted package unit
Transit building	11	3	Mitsubishi	10 Heat recovery units 1 split unit
Petrol pump Joe	6	6	National	Split units
PTM central plants	4	2	Carrier	Central plant
PTM room 77, 29	4	4	Mitsubishi	Under ceiling split units
PTM West wing	38	30	Mitsubishi	Split units, 7 Package units,1 Evap cooler
PTM Prefabs	32	30	National	split units, window units, mid wall
PTM Workshops	1	1	National	Split units
Relay store PTM	13	13	Mitsubishi	Mid wall split units

Sandra	10	10	Mitsubishi	Split units
School of tech	18	15	York	15 Split units, 3 window units
Simmer centre	55	2	National	45 Console units, 10 Split units
Matumi building	22	10	Mitsubishi	16 Heat recovery, 2 splits, 4 in rack cooling
Switchgear	3	3	Dahum B	2 Central plant 2 AHU 1 split unit
Transport west gate	1	1	Carrier	Mid wall split units
Tom stores	3	1	Panasonic	1 Split units, 2 window units
Victoria lake inn	30	30	Mitsubishi	split units
Victoria lake inn fridge	9	9		2 walk in fridge / freezer Under counter
Victoria lake heat pumps		3	Tasol	Water heat pumps
Victoria lake extractor fans	8			Ducted extraction systems
Zero and entrance	11	3	Mitsubishi	10 Heat recovery units 1 split unit
	665			

National Control, Dec, Regional Control and Simmer Centre

Building name	Indoor units	Outdoor units	Make	Type
Regional control offices	26	8	Panasonic	18 Console units, 8 split units
Regional control room	2	4	Airdale	Ducted split unit
Regional control ups	6	6	Mitsubishi	Split units
National control	202	30	Mitsubishi	195 indoors 7 heat recovery fresh air 7FAH

National control Split units	20	20	LG, Alliance	Under ceiling , mid wall splits
Simmer Centre	49	5	Mitsubishi	48 indoor heat recovery 1 split unit
National control room	2	4	Airdale	
DEC	25	5	Clivet	12 AHU 13 FCU 4 Chillers 1 heat pump
Apollo Substation				
Bernina				
	332			

In addition to the listed sites, Eskom may request the *Contractor* to execute works on other Eskom sites in the region on and as and when required basis.

Closure of site

In the event that a site or building closes down then the service at that site must come to a stop, No compensation will be paid to the contractor when a site is closed down.

1.1 Detailed description of the service

Item	Description	Frequency
1.3.1	BUILDING MANAGEMENT SYSTEM (BMS)	
1.3.1.1	BMS and Controls – Services to be done By OEM accredited agent • Advise on software upgrades to ensure communication to latest technology controllers and to prevent system from becoming outdated. • Do system back-ups of database • Update graphics and do modifications to database when required	3 x per year for Simmerpan

	• Check alarm and failure reports from controls workstation and resolve problems if any and pick up sequential problems from alarm counts. • Check BMS system workstation for correct operation and do necessary adjustments/programming • Give problem areas/defects first priority • Check step controllers (heaters, air-handling units) for correct operation and adjust where necessary • Check all switching and monitoring points (pumps, fans, chillers, flow switches, etc.) • Control loops to be checked and adjusted where necessary(e.g. sensor, damper, actuator cycle) • Check and ensure flow switches, static pressure sensors and timers are in order • Checking and repairing of fire damper operation and control • Checking of MEC controller and PB controllers for correct operation for system communication. • Supply SMS Alarm service and ensure correct operation thereof • Investigate problem areas for better control, experimenting with supply air, return air, enthalpy or averaging control • Check and repair server where necessary • Supply report after every service • System improvement and energy management to form part of service • Physically check damper operations that control return-, outside- and exhaust air and enthalpy to confirm correct operation as per BMS settings and to ensure economy cycles are functioning efficiently • Physically check actuator operation for dampers, vortex dampers, cooling towers to confirm correct position as per BMS settings – make sure bolts are properly secured to prevent slipping on damper shafts. • Examine, clean and test all control devices • Check and ensure all sensors – for air temperature: supply-, return- and fresh/outside air, humidity, enthalpy and room temperatures are functioning properly.	

	• Also check all automatic temperature set points and adjust where necessary, including re-heater set points and sensors to switch on and off at the correct temperatures • Physically check heating- and cooling coil valves positions are correct as per BMS Settings • Check that Chiller by-pass valves are operating correctly to prevent chillers from starting and stopping too frequently- do adjustments where necessary • All minor repairs where material is not required must be done as part of service • Check that water differential pressure controllers are operating correctly • Check all control interlocks on control panels and interaction with other controls are functioning correctly • Check that level switches on Chilled water make up and expansion tanks are functional • Source, supply, and install necessary replacement parts. • Provide emergency call-out service – 2hour response time – report on site within 4 hours	
1.3.1.2	BMS POINTS LIST Service All of the general items below are described in the Points List. The Points List will determine the scope of work in that every point on each of the Points List shall be tested and proved functioning 100% correct. Five types of input/output signals to be checked Analogue input • Temperature, Pressure, Kilowatt etc. Analogue output	3 x year for Simmerpan

	• Control Signal to Valve, Damper Motor, Variable Speed Drive etc. Digital input • [Contact Condition, Door Switch, Sump Alarm, Pump Status etc.] Digital output • [Start/Stop of Pumps, Fans etc.] Incremental output • Similar to Analogue Output but Performed by Switching Relays] • The last and most important item to test is the operation of these outputs and inputs as an integrated control system by testing the program within the controller. Service of Analogue input • Physically inspect sensor for dirt, contamination or damage. • Measure the variable with an independent instrument (digital thermometer, multi-meter, current clamp meter, manometer etc. and check that this reading correlates with the Building Management System's reading within the tolerance of the sensor. • Check that the controller calibration values are current for that specific controller and rectify if required. Service of Analogue output	

	• Drive the device manually via the controller keyboard and physically verify its operation. In case of valves, the temperature on each port of the valve must be measured when the valve is fully closed. Five (5) minutes later the valve should be opened to 50% and the same temperature measurements done again. Five (5) minutes later the valve should be driven 100% open and the temperature readings checked for final result. If there is a distinct difference between the three (3) readings for the valve temperatures, there is possibility of mechanical problems with the valve, strainer, etc. Service of Digital input • Trigger the actual event, which will cause a change of state and confirm that the Building Management System receives the event correctly. Open monitored door, trip chiller, trip filter differential pressure switch, turn on pump etc. Service of Digital output • The output should be energised from the Building Management System and the corresponding equipment must be seen to start. Service incremental output • Drive the device manually via the controller and physically verify its operation	
1.3.1.3	FIRE DAMPERS TESTING • All the Fire Dampers shall be tested to ensure correct operation during an emergency. Activate from BMS. The Contractor shall be required to reset all the Fire Dampers after the test have been completed and ensure that all did reset. Prior arrangements to carry out these tests will be required from the Employer's Representative.	3 x year

1.3.1.4	Fire Dampers Service Service • Fire Dampers shall be serviced as all related equipment/accessories to ensure the smooth and faultless operation of the Fire Dampers in the event of emergency. Equipment/Accessories will include the fire damper, links, limit switches, relays, all cabling, wiring and termination points etc.	Annually
1.3.1.5	Fire Dampers Ad Hoc Testing As and when required Service Testing as may be determined by unplanned events. Reset after Emergency Application or Activation of the Fire Dampers. Ensure all fire dampers returned to normal position	
1.3.2	Heating and Ventilation Air Conditioning System	
1.3.2.1	2 x Air cooled Carrier chillers, 2 x climavaneta Water cooled at Simmerpan 4 x Air-cooled Clivet chillers at National control Diagnostics of defects, minor adjustments of controls and minor repairs. Major repairs such as dismantling of components, opening up of systems, the evaluation and re-charging of same etc., is not included in this coverage. Major repairs shall be reported to the Employer's Representative and a written quotation shall be submitted. On acceptance of the quotation the Employer's Representative will issue a written task order to the Contractor. Only upon receipt of the written task order, the Contractor may proceed with the major repairs as detailed in the task order. Routine maintenance will be done as per manufacturer's specifications, the below only an indication of work to be done.	3 x year for Simmerpan Monthly for National Control

	Service • Record operating temperatures, pressures and amperages. • Check the operation of all safety controls. • Check the operation of the microprocessor • Check the condenser and evaporator tubes for fouling. (Performance checks only, no visual inspection, record pressure drop). • Wash condenser coils (air cooled) • Check oil and refrigerant charge. • Check for refrigerant leaks. • Check all gauges for functioning properly and correctly. • Check the operation of loading/unloading system. • Check control panel and starter parts for wear. • Check all flanges and tighten where necessary. • Tighten all starter and control terminations. • Carry out insulation resistance test on motor windings and record readings. • Report all detected system deficiencies in writing. • Check power supply cable and control cable are properly supported and protected • Check and discuss the operating log with the Employer's Representative.	
1.3.2.2	2 x Air cooled Carrier chillers, 2 x climavaneta Water cooled at Simmerpan 4 x Air cooled Clivet chiller at National Control The annual service includes all the items listed in the above for the quarterly inspection and service in addition to the following items: • Record operating temperatures, pressures and amperages. • Check refrigerant for acid and moisture • Take an oil sample for analysis and report	Annual

	• Check for refrigerant leaks. • Check all flanges and tighten where necessary. • Check all support brackets of piping • Check condition of insulation • Check control panel and starter parts for wear. • Re-calibrate and check operation of safety controls • Check the microprocessor program • Tighten all starter and control terminations. • Carry out insulation resistance test on motor windings and record readings. • Check the operation of loading/unloading system. • Clean shell and tube or flush plate heat exchangers. • Take thickness readings and record. • Check the refrigerant charge. • Check and discuss the operating log with the Employer's Representative. • Run each unit and report any deficiencies and recommendations.	
1.3.2.3	Cooling Towers Service • Check General Operation • Drain Tower, Clean out Sump and Refill • Check Operation of Ball Valve and Water Level • Clean Out Sump Strainer • Check Water Does not Overflow on Shut-down • Clean Spray Nozzles • Check Bleed Valve is Clean (Setting to be adjusted by Water Treatment Contractor) • Grease Fan and Motor Bearing • Clean Eliminators • Clean Mountings • Check Impeller Fan Blades	3 x per year

	• Check Water Entering and Exiting Conditions in Cooling Tower and Record • Lubricate Motor Base Slides and Adjusting Screws • Check that Air Intake Screens are Clean and Secure • Check for Unusual Noise or Vibrations • Inspect Protective Finish and Report Condition • Check for Unnecessary Water Carry Over	
1.3.2.4	Air Conditioning Filters Inspection of Filters and Filter Frames Service • Remove all filters from one air handling unit at a time. • Inspect filters for defects. Inspect and clean filter frame properly before re-installing filters Replacement of air-conditioning filters • All the air-conditioning filters shall be supplied and replaced by the Contractor on request Remove existing old filter • Inspect all framework and clips for damage, rust and fair wear and tear. • Clean framework. Fit new filter in position	As and when required

	• The Contractor shall remove all the redundant filters from the Site and dispose of these redundant filters only at a registered dump site. It is the responsibility of the Contractor to obtain written proof from the registered dump site that the waste was disposed of in a safe manner. A copy of this document shall be placed on record in the Contractor's Health, Safety & Environmental File. Another copy shall accompany the invoice for the work.	
1.3.2.5	Filter cleaning • Two sets of filters will be on site. One set will be in operation and the second set will be stored. When it is time to clean the filters, we will take the set in storage and put them in operation while the dirty filters are washed and dried. After drying they will go into storage unit next filter maintenance take place	Monthly
1.3.2.6	Air Handling units Service • Check Fan in Operation • Check Fan and Motor Bearings • Lubricate Fan Bearings • Check Condition of Fan Belts. Realign Drives if Adjustment is Required. Check Condition of Pulleys • Check Base Mounting Springs • Inspect Flexible Duct Collar • Ensure Coupling Guard is Secure • Check Motor and Terminal Connections • Check for Excessive Vibration • Cleaning Humidifier bottles and check operation Exhaust Fans and Toilet Extraction Fans Service	3 x year for Simmerpan Monthly for National Control

	• Check Fan in Operation • Check Motor Bearings • Clean Air Screen • Check Motor and Terminal Connections • Check for Excessive Vibration • Check and clean speed drives	
1.3.2.7	Split Air-Conditioning Units Service • Check Operation of Unit • Clean Air Filters • Check Condenser Fan Motor Bearings • Clean Cooling Coil Surfaces(Brush) • Check System Gas Charge (If and when required) • Check Operating Pressures and Record Suction & Discharge Pressure • Leak Test Refrigeration System • Check and Tighten All Terminal Connections • Check Operation of Reverse Cycle • Check unit Voltage and Amperages • Check Operation of Heaters • Ensure that Condensing Unit Coils are Clean • Check drain is not blocked • Clean unit • Fill out report and hand copy to the Employer's Representative	3 x year for Simmerpan • Monthly for National Control •

1.3.2.8	Air-Conditioning VRV's External Units Service of external units • Check operation of each unit • Wash down coils on all exterior condensing units • Fill out report and hand copy to the Employer's Representative • Visually inspect units for any defects and/or damage. • Inspect all wiring and check all electrical connections. • Check all filters and clean as required or replace. • Check all refrigerant pressures and record readings. • Check compressor to ensure that it is suspended freely, that all bushes are in good condition that, that the compressor is operating correctly and that it does not overheat in normal operating conditions Internal units Service of internal Units • Check condensate drains and clear if necessary to prevent internal water leaks. • Clean equipment generally and observe its operation in all its functions. • Check amperage readings on cooling, heating and fan only operation and compare to name plate ratings. • Check air filters and clean where necessary. Should the filter be damaged or torn it will be necessary to provide a new filter at the client's cost. • Check condition of evaporator coil and clean. Straighten fins with a fin comb where necessary. • Check condensate drip trays and treat for corrosion if necessary. Ensure unobstructed gravity flow.	3 x year for Simmerpan

	• Check condensate drains and clear if necessary to prevent internal water leaks. • Check fans to ensure that they are secured to fan shafts. • Check fan motor(s) to ensure that it (they) is (are) running freely and true and that the bearings show no sign of wear. Oil where applicable. Ensure that the baffle plates are secured between in and outlet air. • Check thermostats, switches, contactors, and the wiring thereof to ensure that all electrical connections are secure and clean. • Check refrigerant system for leaks and repair where necessary. • Ensure that all copper tubing is clear of other components. • Clean equipment generally and observe its operation in all its functions. • Check amperage readings on cooling, heating and fan only operation and compare to name plate readings. • Clean outside of unit, particularly return air grill and discharge vanes. • Rust proof where necessary. • Check and tighten where necessary all refrigerant pipe fittings. • Check head and suction pressures to ensure that these are in accordance with specifications. If not adjust gas volume to required head. • Where conditions change due to excavations, construction, dusty areas or any kind of extraordinary exercises, the cycle of service may be adjusted to maintain healthy performance co-efficient • Check operation of BS selector box	
1.3.2.9	Diffusers • Clean diffusers • Clean return air grills	Bi annual
1.3.2.10	Feed and Expansion Tank	Bi- annual

	Service • Check Level in Tank • Check Float Valve Operation • Check for Excessive Overflow/Rectify if Necessary • Clean Out Tank • Check and Report on Condition of Tank	
1.3.2.11	Water Treatment Service • Chemical residuals are to be checked in the three cooling towers and the closed loop. • Close loop – Nitrate > 1260 ppm • Cooling towers – Zinc/molybdate (Zinc 2-5 ppm) • Conductivity of the water is to be checked • Closed loop – approx. 3000 microsiemens • Cooling towers – 700 – 1100 microsiemens • The Ph of the water is to be checked. • Closed loop > 9,5 • Cooling towers 7,0 – 9,0 • Chloride levels are to be checked on the cooling towers – 300 ppm max. • Alkalinity levels are to be checked on the cooling towers – 550 ppm max • All make – up water is to be tested for ph, alkalinity, chlorides and conductivity • According to the results above, the settings on the conductivity controller and the chemical dosing pumps are to be adjusted and recorded. • Water meter readings are to be recorded and consumptions calculated. • Microbiological activity is to be tested on a routine basis to determine biological growth in water.	Monthly

	• Twice a year, samples are to be drawn off the cooling towers and sent away for analysis to determine for legionella. • A detailed record of all the above is to be entered in the on-site log book issued by the contractor for the plant and the contents discussed with Eskom's designated personal. • A breakdown service on the water treatment equipment is to be available in between the routine service calls. • A report is to be issued summarizing findings and recommendations. • All water treatment chemicals to be supplied and topped up as and when required. **Ice storage** • **Maintain glycol ratio**	

1.3.2.12	Plant Distribution Boards and Control Equipment
	
	Service
	
	• The Contractor shall be responsible for the cleaning, service, maintenance and repairs to all Air-conditioning related Plant Electrical Distribution Boards and Control Equipment.
	• The distribution boards will include the following:
	  ○ The Main Air-conditioning Distribution Board
	  ○ All distribution boards within the site that relates to HVAC
		Bi-annual

1.3.2.13	Gauges and Thermometers Service • Check for accuracy. • Check for leaks.	Bi-annual

1.3.2.14	Refrigeration Equipment and Ice Machines Service • Check Operation of Unit • Clean Condenser Coil • Check System Gas Charge • Leak Test Refrigerant System • Check Compressor Oil Levels • Check Operating Pressures. Record Discharge and Suction • Check Safety Cut-Outs. Record Discharge, Suction & O/P/S • Record Time Delay of Oil Pressure Safety Switch • Check for Signs of Oil Leaks • Check for Signs of Vibrations • Clean Condenser Coils (Hose) • Clean water strainer	3 x year
1.3.2.15	Cold Rooms and Freezer Room Service • Check Operation of Unit • Clean Condenser Coils (Hose) • Check System Gas Charge • Leak Test Refrigeration System • Check Compressor Oil Level • Check Operating Pressures and Record • Check Safety Cut-Outs and Record Discharge & Suction • Check for Signs of Oil Leaks • Check for any Signs of Vibration	3 x year

	• Check drain is clean • Check defrosting elements operating correctly • Check doors operating correctly (hinge, locks and door seals) • Check electrical connections	
1.3.2.16	Counter Fridges Service • Check Operation of Unit • Clean Condenser Coils (Hose) • Check System Gas Charge • Leak Test Refrigeration System • Check Compressor Oil Level • Check Operating Pressures and Record • Check Safety Cut-Outs and Record Discharge & Suction • Check for Signs of Oil Leaks • Check for any Signs of Vibration • Check drain is clean • Check doors operating correctly (hinge, locks and door seals) • Check electrical connections • Clean unit	3 x year
1.3.2.17	Bar Fridges As and when required Service • Pressure Test Refrigeration System • Check All Door Seals • Check General Condition of Fridge.	As and when required

	• Record temperature.	
1.3.2.18	**<u>Water Pump Sets</u>** **Service for Chilled water pump set** • Check Condition of Pump While Running • Check Mechanical Seal • Grease Bearings on Pump • Check oil level on pump • Check Gland Drain and Clean • Check Condensate Tray and Clean • Check Bearings on Pump and Motor • Check Setting and Operation of Flow or PD Switch • Clean In-Line Strainers • Inspect Coupling Condition • Ensure Coupling Guard is Secure • Check Motor and Terminal Connections • Check that Non-Return Valves Seat and general condition • Check Change Over Pump Duty	3 x Year for Simmerpan Monthly for National Control
1.3.2.19	**<u>Heat Pump</u>** **<u>Service</u>** • Heat pump base: • Clean base outside and inside. • Ensure drainage holes are clear. • Check for rust and treat as required **Electronics**	<u>3 x year</u>

	• Look for signs of corrosion on PCB controller. • Ensure all electrics are dry and clean • Ensure all connections are good. **Piping** • Check all piping and fittings for leaks. • Check lagging. • Clean the inline strainer. • Check circulation pump **Heat Exchanger** • Reverse water flush system under pressure for =- three minutes.	
1.3.2.20	**<u>Plant Room Cleaning</u>** **Service** • All plant rooms, plenums, fan rooms, chiller plant room, cooling tower area and hot water tank surrounding area shall be cleaned from the top to bottom. All waste shall only be disposed of as. • Clean Out Plenums by Using an Industrial Type Vacuum Cleaner with a Powerful Suction Action. All plant will be washed off with light detergent. All floors swept first and then washed off with non-potable water.	3 x year for Simmerpan Monthly for National Control
1.3.2.21	**<u>Crac units (Computer room air conditioning units)</u>** Service • Check Fan in Operation	Monthly

	• Check Fan and Motor Bearings • Lubricate Fan Bearings • Check Condition of Fan Belts. Realign Drives if Adjustment is Required. Check Condition of Pulleys • Check Base Mounting Springs • Inspect Flexible Duct Collar • Ensure Coupling Guard is Secure • Check Motor and Terminal Connections • Check for Excessive Vibration • Cleaning Humidifier bottles and check operation • Attend to alarms • Clean filters • Check change over switches • Check speed drive operations • Clean fresh air units • Check control panel operation	

3.2.1 General Requirements

- The *Contractor* immediately reports all injuries as well as any threat to health or safety of which it becomes aware of on the site of the *Employer*.
- The *Contractor* shall provide in writing a works programme with achievable times lines to the *Employer* before commencement of the project.
- The *Contractor* shall provide to the Employer a daily progress report that speaks to the works programme, all delays shall be explained to the *Employer*.
- The *Contractor's* performance evaluation shall be done during ad hoc meetings between the *Contractor* and the *Employer* during the project period.
- The *Contractor* shall carry out tasks as described in the scope of work and will only report to the *Employers* contract manager appointed for this project.

3.3 Applicable Scope of Work

3.3.1 Works

The *Contractor* will be expected to perform the following activities: -

3.3.2 Access, working platforms and scaffolding

- No scaffolding and platforms will be used without it having been safety cleared and the required documentation completed as per SANS 10085-1:2004 or recent version.
- Scaffolding and platforms will be supplied and daily inspected by the *Contractor*.
- All working at heights apparel should be certified and inspected daily

3.3.3 Access for and interface with other *Contractor*

- During the progress of the work the *Contractor* shall provide reasonable access to other *Contractors* to execute work carried out by other *Contractors*
- The *Contractor* will ensure that any damages made during the execution of their activities will be repaired (*Contractor's* cost) to the satisfaction of the *Employer* and that the *Employer* will not suffer adverse inconvenience in utilising parts of the complex during the project execution.

4. Revisions

Date	Rev.	Compiler	Remarks

5. Development Team

The following people were involved in the development of this document:

Name and Surname	Designation
Tshepo Mahlophe	Senior Supervisor Technical
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Thembi Makgamatho	Senior Supervisor Technical
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